WPI Teaching Practicum

WPI Teacher Preparation Program

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Chapter 1

Doherty Memorial High: Demographics, MCAS Performance History, and the Curriculum Covered in Chemistry

The practicum, during which the full taste of teaching was experienced, involved seventy-five hours of observation and one hundred fifty hours of student teaching under the supervision of Mrs. Elaine Hall at Doherty Memorial High School. Doherty Memorial High is located on 299 Highland Street in Worcester, Massachusetts, “the heart of Commonwealth” (Learn about Worcester). In 1966, Doherty Memorial High School replaced both Classical High School and Commerce High School (A Few Worcester Schools).

There were three attempted settlements of Worcester. In 1673, Worcester was given the Indian name of Quinsigamond; however, this first settlement was abandoned at the start of King Philip’s War (Learn about Worcester). The settlement, abandoned in 1701, was renamed Worcester in 1684, possibly for Worcester, England, as an angry gesture at King Charles II of England, who had suffered defeat at the Battle of Worcester in 1651(About Worcester, Learn about Worcester). Worcester, Massachusetts was incorporated as a town in 1722 and as a state in 1748 (About Worcester).

Worcester is the second largest city in the state, has a population of about 182,500, and over six million live within a fifty mile radius (Demographics and Census Information). Worcester is a growing, thriving, metropolitan city that serves as “an important manufacturing, medical, insurance, and transportation center” (About Worcester). Due to Worcester’s convenient location in Central Massachusetts and the benefits available to its citizens, the population growth the city has experienced does not come as a surprise. According to the U.S.

Census Bureau, the population in 2010 was about 181,045. The population according to the 2011 census was claimed as 182,500 (Demographics and Census Information). Worcester is a home to a diverse array of cultures. The 2010 census stated that approximately 20.9 percent of the population was of Hispanic origin, 11.6 percent was of Black ethnicity, 6.1 percent was of Asian descent, 0.4 percent was identified as American Indian and Alaska Native, and less than 0.0 percent was comprised of Native Hawaiians and other Pacific Islanders. The majority of the population, 69.4 percent, consisted of those of white ethnicity (Worcester (city), Massachusetts).

Out of the 74,645 housing units in Worcester recorded in 2010, about 70,441 were classified as households from 2006 to 2010. The median household income between 2006 and 2010 was 45, 036 dollars and 18.3 percent of the population of Worcester was below poverty. The U.S. Census Bureau states that "the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty" (Poverty). In addition, "In Worcester, a census of homeless individuals identified over 1,400 people in 2009, and local agencies that serve the homeless estimate that there are approximately 2,000 homeless individuals in the area over the course of one year" (Results of the Worcester County point in time homeless survey). The 2006-2010 census also declared that the percent of high school graduates over twenty-five years old was 84.0 percent and 29.6 percent had a bachelor's degree or higher. The percent of the population who spoke a language other than English at home was 32.4 percent (Worcester (city), Massachusetts).

The social and economic demographics of Worcester were somewhat reflected by those of Doherty Memorial High School. For instance, the ethnicity for the 2010-2011 school year was recorded as follows: approximately 29.5 percent of the school population was classified as

Hispanic, 13.6 percent were of African American descent, 10.9 percent were of Asian origin, 1.7 percent were multi-race or non-Hispanic, 0.7 percent were Native Americans, none were of Native Hawaiian or Pacific Islander decent, and 47.2 percent were of white ethnicity (Doherty Memorial High (03480512)).

The truancy rate is defined as a "[calculation] based on the number of students truant for more than 9 days, divided by the End of the Year (EOY) enrollment (including transfers, dropouts, etc.) for the school year being reported. A student is truant when he or she has an unexcused absence" (About the Data). At Doherty Memorial High School, the truancy rate reported for the 2009-2010 school year was 29.0 percent, being significantly higher than that of the state truancy rate, 2.2 percent (Doherty Memorial High (03480512)). The attendance rate of Doherty Memorial High, 93.0 percent, was similar to that of the state, 94.6 percent. The average number of days, of the 180 required instructional days, students were absent in the school was about 12.0 percent and 9.3 percent for the state. The in-school and out-of-school suspension rates, 16.8 percent and 15.8 percent, respectively, were more than fifty percent higher than those of the state, which were 3.7 percent and 6.0 percent, respectively. However, the graduation rate of Doherty Memorial High was about the same as that of the state, the rates being 81.0 percent and 82.1 percent, respectively (Doherty Memorial High (03480512)). The behavior and other social aspects of the students may be shadows of their lives at home.

The percent of the school population whose first language was not English was 42.7 percent and 17.6 percent of the students had limited English proficiency (Doherty Memorial High (03480512)). Out of the 1,327 students enrolled for the 2010-2011 school year, 48.3 percent came from low income families and 42.0 percent received free lunch (Doherty Memorial High (03480512)). "The Worcester public schools identified 2,034 of its students homeless during the first of semester of [the 20111-2012] school year" (Hammel). Despite the hardships many of the students may have faced, in the 2009-2010 school year, approximately 20 percent planned to attend a four-year private college, 30 percent planned to attend a four-year public college, and 36 percent planned on attending a two-year public college (Doherty Memorial High (03480512)). Some of the colleges that graduates of Doherty Memorial High have been accepted to are the following: Boston College, Boston University, Clark University, Fairfield University, New York University, North Carolina State University, Quinnipiac University, and Worcester Polytechnic Institute (Doherty Memorial High School College Handbook). Just as the percentage of those who planned to attend a four-year college was low, the MCAS scores of the tenth-grade students were low, as well.

The MCAS, Massachusetts Comprehensive Assessment System, is a standards-based test that is designed to meet the requirements of the Education Reform Law of 1993 (Massachusetts Comprehensive Assessment System). The Education Reform Law of 1993 was established to "[e]qualize funding among the districts to level the playing field and to improve all student performance to succeed with high standards" (Massachusetts Reform Act in Summary). This reform law has mandated that tenth grade students must pass the MCAS in order to graduate from high school. The guidelines of the MCAS given by the reform act are that the testing program must test all students in the public schools of Massachusetts, measure performance based on the Massachusetts Curriculum Framework learning standards, and report on the performance of the individual students, schools, and districts (Massachusetts Comprehensive Assessment System).

The MCAS results for Doherty Memorial High's tenth graders in 2010 were lower than the state averages. The percent of the students at Doherty Memorial High who scored at or above proficient in Science was 45 percent, in English Language Arts, 71 percent, and in Math, 67 percent (Doherty Memorial High School). The percent of students in the state who scored at or above proficient in the former subject areas, respectively, was 65 percent, 78 percent, and 75 percent. Although the scores for Doherty Memorial High on the MCAS have been lower than those of the state, the scores for the high school have been increasing over the years. In 2007, the percent of students at Doherty Memorial High who scored above proficient in English Language Arts and Math was, respectively, 67 percent and 62 percent. In 2009, the scores had increased to 75 percent and 66 percent, respectively. These statistics have proven that teachers have been making an effort to help their students succeed and that the students have been working more diligently to take advantage of the curriculum being handed to them.

The students at Doherty Memorial High School take the Biology portion of the MCAS when they are freshman. However, students who fail the Biology portion must pass the Chemistry, Introductory Physics or Technology/Engineering test when they are in 10th, 11th, or 12th grade. In 2010, the Biology test, which was based on the standards stated in the Curriculum Framework, was administered on two consecutive days, and consisted of two distinct test sessions, as well as multiple-choice and open-response questions (February 2010 Biology Test). The "Biology test results are reported under the following five MCAS reporting categories" (February 2010 Biology Test):

- Biochemistry and Cell Biology
- Genetics
- Anatomy and Physiology
- Ecology
- Evolution and Biodiversity

The Chemistry MCAS test given in spring 2011 also pertained to the standards in the high school Chemistry section found in the Curriculum Framework, included two different test sessions that were given on consecutive days and included multiple-choice and open-response questions (High School Chemistry Test). The results for the tests were reported "under the following four MCAS reporting categories (High School Chemistry Test):

- Atomic Structure and Periodicity
- Bonding and Reactions
- Properties of Matter and Thermochemistry
- Solutions, Equilibrium, and Acid-Base Theory

The following Table 1 displays the range of scores students can receive, with "Needs Improvement" being the passing score (Enrollment and Educator Data):

MCAS Performance Level (Scaled Score Range)	MCAS-Alt Performance Level	Points Per Student
Proficient or Advanced (240-280)	Progressing (Certain disability types)*	**100**
Needs Improvement High (230-238)	Progressing or Emerging	**75**
Needs Improvement Low (220-228)	Awareness	**50**
Warning / Failing High (210-218)	Portfolio Incomplete	**25**
Warning / Failing Low (200-208)	Portfolio not Submitted	**0**

* Intellectual, Sensory/Deaf and Blind, Multiple Disabilities, Autism, and Developmental Delay

The Massachusetts Department of ESE also gave the following explanation of the "Points Per Student" column in the aforementioned table (Enrollment and Educator Data):

CPI: The Composite Performance Index (CPI) is a 100-point index that assigns 100, 75, 50, 25, or 0 points to each student participating in MCAS and MCAS-Alternate Assessments (MCAS-Alt) based on their performance. The total points assigned to each student are added together and the sum is divided by the total number of students assessed. The result is a number between 0 and 100, which constitutes a district, school or group's CPI for that subject and student group.

The CPI is a measure of the extent to which students are progressing toward proficiency (a CPI of 100) in ELA [English Language Arts] and mathematics. A CPI is calculated separately for ELA and mathematics, and at all levels: state, district, school, and student group.
A school or district's CPI is calculated by combining points generated by students who take the standard MCAS tests with points generated by students who take the MCAS-Alt.

Teachers are an important part of the puzzle that piece together students' lives. A characteristic of schools that can make a difference in the overall teaching experience is the class sizes. Small class sizes can help create a better learning environment for both the teacher and the students. The student-to-teacher ratio was reported in the 2009-2010 school year as 13.6 to 1 (Doherty Memorial High (03480512)). This is a reasonable ratio, as 13.6 to 1 is a fairly small class size, and more manageable for the teacher to control than for example a class of 30 students. The smallest class size I student taught was that of 17 students, which was also my most challenging class to get participation from. Another aspect that greatly influences the educational experience provided at schools is the standards that teachers follow for teaching. The Massachusetts Standards for Professional Teachers have defined and guided teachers in the state public schools in providing a high quality educational experience for students. In summary they are the following:

- Utilizes the standards of the curriculum frameworks, external resources, such as colleagues and the community, technology, and knowledge of human development to implement strategies and lesson plans that are clear and suit the specific needs of the students being taught
- Communicates in a clear and engaging manner so as to stimulate students' interest in understanding the objectives of the teacher
- Employs an array of teaching methods to help students learn the material, which furthermore demonstrates that the instructor has knowledge of the content and the means of how to deliver such content
- Provides and critiques assignments that allow for practice in learning the material
- Presents the students with opportunities to become competent in what is being taught, and employs an assortment of assessments that give accurate measurements of what students have achieved and how they have progressed as far as learning the objectives

- Records the evaluations to use when planning future instruction and to impart the students' level of success in the course to the students, parents or guardians, and other school personnel

- Uses creativity to sculpt a classroom environment that is ordered, pleasant, and productive so that respect, safety, and appropriate behavior are maintained and the time allotted is not futile

- Strengthens students' self-confidence and belief that any challenge can be accomplished with diligence, patience, and persistence; encourages all students to achieve greatness

- Takes into account to the background of all of the students, such as proficiency in the English language and in-home experiences, adjusting delivery of instruction if necessary

- Passes onto the students the ideals and culture of America so that they may see themselves as one of its citizens, as an American

- Performs the duties and responsibilities of a teacher as a professional, including emitting enthusiasm and knowledge of their subject area to the students, presenting findings in current research and developments to the students, participating with other staff members to improve areas of teaching and student achievement, evaluating his or her teaching experience for further improvement, and complying with the legal and ethical issues concerning use of the Internet and other sources (Professional Standards for Teachers).

The curriculum used for chemistry at Doherty Memorial High School follows that of which is stated in the Massachusetts Science and Technology/Engineering Curriculum Framework (See Appendix A). A summary of the curriculum in chemistry that is to be taught in the state of Massachusetts is given in the following excerpt:

> In high school Chemistry, students learn about the properties of matter and how these properties help to organize elements on the periodic table. Students develop a better understanding of the structure of the atom. Students develop an understanding of chemical reactions, including the involvement of energy and sub-atomic particles, to better understand the nature of chemical changes. Students learn about chemical reactions that occur around us everyday as they learn about chemical reactions such as oxidation-reduction, combustion, and decomposition. Students also gain a deeper understanding of acids and bases, rates of reactions, and factors that affect those rates. From calculating stoichiometry problems and molar concentrations, students learn about proportionality and strengthen their mathematical skills (Massachusetts Science and Technology/Engineering Curriculum Framework).

The eight subtopics that are to be taught for high school Chemistry in Massachusetts are the following (Massachusetts Science and Technology/Engineering Curriculum Framework):

- Properties of Matter
- Atomic Structure and Nuclear Chemistry
- Periodicity
- Chemical Bonding
- Chemical Reactions and Stoichiometry
- States of Matter, Kinetic Molecular Theory, and Thermochemistry
- Solutions, Rates of Reaction, and Equilibrium
- Acids and Bases
- Oxidation-Reduction Reactions

A more detailed account of the learning standards for high school chemistry can be found in Appendix A.

Chapter 2

A Review of the Chemistry Courses Taught at Doherty Memorial High

The current design of the course sequence was influenced by the Massachusetts Science and Technology/Engineering Curriculum Framework, which was first implemented in 1995 and has been recently revised in 2006. Some students at Doherty Memorial High School take science courses in the following sequence: Biology in their freshman year, Chemistry in their sophomore year, and Physics in their junior year, although it is possible to take the courses in any order. The exceptions, reasons why they may not take the courses in that order, are students that retake the course after failing the previous year or those taking the course for the first time, who were unable to fit the course into their schedule the previous year. However, all students take Biology to fulfill the science credit requirement for graduation. Chemistry and Physics are not required of the students to take in order to graduate. The levels of the science courses offered are college prep, honors, and advanced placement (AP). The students' grade point average determines what level course they can enroll in. However, by recommendation they may take a higher level course. During my teaching practicum at Doherty High, I observed college prep, honors, and advanced placement Chemistry courses, which allowed me to see the differences in teaching methods and approaches to classroom management that I later incorporated into the two college prep and two honors level classes that I taught. Observations that were taken note of can be found in Appendix B, as well as the log forms used to keep a record of observation and teaching hours.

The three aforementioned science courses are all intertwined. In Biology, students learn that cells are made of molecules, which are made of atoms, how most of the body mass in living organisms is composed of the elements sulfur, phosphorous, nitrogen, carbon, and hydrogen, and how hydrogen bonds are involved in the double helix of DNA. Students are also introduced to the three types of chemical bonds—covalent, ionic, and hydrogen bonds. The laws of physics combine with the elements of chemistry, and relate to gas particles and electrons, as well, in subjects such as Thermodynamics, Quantum Chemistry, Spectroscopy, and Electromagnetism.

The four strands stated in the Curriculum Framework that run through Chemistry are Earth and Space Science, Biology and Physics. Specifically, the "Content of Each Learning Strand" that prepares students for the objectives they will be exposed to in high school can be found on pages 108-109 of the 2006 Massachusetts Science and Technology/Engineering Curriculum Framework. For students to be successful in the Chemistry course, they should have a mastery of basic arithmetic skills and Algebra I. Exposure to the periodic table in previous courses is also beneficial. Students should also be able to form a hypothesis, carry out a procedure, record data, make calculations, and clearly formulate a conclusion based on the outcome of their results. Such skills are important when participating in laboratory experiments.

Chapter 3

Course Materials and Homework

The syllabi for Chemistry that were found on the Worcester Public Schools High School Curriculum were used as guidelines for topics to be covered over the school year, in addition to the skills and understandings that were to be acquired, which are presented in Appendix C. The daily lesson plans created are given in Appendix D. The lecture notes, homework worksheets, tests and quizzes, and answer keys that were developed can be viewed in Appendices E, F, G, and H, respectively. The objectives that the teachers felt students should accomplish before graduating from high school, and those they deemed important for their future educational endeavors were covered, as time did not permit every learning standard in the Curriculum Framework to be taught sufficiently. The topics I taught and had students practice were the following:

- Dipoles
- Molecular polarity
- VSEPR theory
- Intermolecular forces
- Chemical formulas of and nomenclature of monatomic ions and binary ionic compounds
- The stock system of nomenclature
- Naming compounds using the stock system
- Ternary ionic compounds (polyatomic ions)
- Binary molecular compounds
- Covalent compounds
- Formula and molar mass
- Percent composition
- Empirical and molecular formulas
- Chemical equations
- Writing word equations and balanced formula equations using coefficients

Students were expected to read the corresponding sections in the book that they were given lectures on to complete their homework assignments. The textbook used for the course was Modern Chemistry (Davis et al., 2008. 6^{th} Ed.).

The object of the homework assignments given was to re-enforce the lectures given, to independently deepen their understanding of the topics covered that day, demonstrate that they have been paying attention, and, equally valuable, was to get feedback on how well they understood the concepts, their level of proficiency, so that, if needed, modifications could be made on the delivery of the concepts or extra practice could be provided. Students were expected to show all work on their homework assignments, otherwise they would receive no credit. As long as students gave an attempt to complete all of the questions, they were given full credit. However, if they only showed work for half of the problems they were given partial credit. They were also expected to show neatness and have their name, date, and period written at the top of their homework papers. The college prep Chemistry classes were generally given less homework than the honors level students, as every day there were always some college level students who did not complete or attempt their homework. Some of the excuses given for missing homework were that they had work, forgot to bring home their book or homework, or they didn't know they had any. There were only a few students in the honors classes who did not always have their homework. At the start of each class, the answers for the homework problems were read aloud to the class, students were called on to give their answers, or students were asked to go up to the board to write them. In addition, I asked students if there were questions they still had and went through the problems on the board. Students with any further questions were encouraged to come after school for extra help on Tuesdays and Thursdays, so that the class could move on to learn new material.

Chapter 4

The Chemistry Students

Teachers need to know their students in order to reach them, help them exceed their potential to learn, and to successfully meet the professional standards for teaching. While observing and teaching the four distinct classes of two different learning levels, I came to understand each class's character as a whole, their learning styles, and from that, adapted my teaching methods and classroom management efforts that would best suit their learning needs. In the paragraphs that follow, each class is discussed. The finishing paragraph elaborates on what was done when students were absent or joined the class in the middle of the term.

The period 2, college prep class was a very quiet group of 17 members. Several of the students were also English language learners (ELL). They learned best in an active environment, as well as when concepts were presented to them in small steps, in a simplified manner or simple terms, and in flow charts. There was a mix of auditory and visual learners. Some preferred to sit in the front, took notes, and stared at objects if they weren't paying attention, while others sat toward the back of the class, did not take notes and talked to their neighbors if they were not concerned with what was happening at the front of the class (Three Different Learning Styles).

To engage the students, I often called on them for answers, or if they didn't know, I would try and give them hints to lead them to the answer. When they worked in pairs on worksheets, I found that they learned more from each other. I also noted that many did not like coming up to the board and some students refused. After encouragement and being reminded that participation would be factored into their grades, they often participated, however that was not always the case, as those few who rarely did their homework or paid attention still would not participate. Homework was read aloud if assigned from the textbook, or posted on the ELMO projector for the students to correct their answers, and any questions they continued to have difficulty with were explained and gone through on the board.

There were a few behavioral issues in the class. For instance, Jack, whom I gave many opportunities for participation, was difficult to reach and did not want to be reached. Jack, Jackson, and Jessica were the most talkative bunch and often didn't pay attention. Shane and Itzia paid attention seldom, too. Some of the students, such as Itzia, Hillary, Shane, and Shauni gave off an aura of disinterest and carelessness toward learning. Jessica and Julie were the students who were absent the most. A few students in the class showed that they wanted to learn, and their effort, participation, and attendance proved such. Sedra, Henry, and Duy worked the hardest in the class. Henry's excuse for missing homework, not being able to come after school, and poor grades was that he had a job to go to after school, which he would put before his school work. A few times at the end of class, he was advised to put more effort into school, and eventually his grades began to rise. Sedra and Duy had language barriers that made learning a challenge for them, but their diligence pulled their grades higher than the others'. Edwin and Lexus were also students that made an effort to learn and do well. Although Edwin did not always seem to pay attention, sometimes when asked a question, he'd have an answer, or he'd help Lexus to give the correct answer, indicating he was absorbing the material, although he may not have been taking notes, which proved him to be an auditory learner.

The period 3, college prep class of 14 students was more interactive; however, four had learning disabilities. The class consisted of auditory and visual learners, who liked having material being presented to them slowly in small, simplified steps. They were given shorter lectures and about half of class time was devoted to solving problems together on the board, or in pairs. As I worked out problems on the board, I asked them to tell me how to solve it, which helped them understand how to go about doing so. The same method for correcting homework with this class was used as in the period 2 class.

The behavioral issues observed in the class involved failure to pay attention and participate. Jamal was the one student who rarely ever participated in class and when asked a question, he did not have an answer. Jacksael was often caught with an earbud in one ear, but obliged when asked to put it away. Abdulla was only present in class for a few days until he never showed up again for unknown reasons. Abdulla had difficulties with simple arithmetic and got easily irritated when asked a question that he did not know or when told to stop talking. Linette and Catherine did not participate in class often, did not have their homework every day, and performed poorly on tests. Marc was absent the most and had a low grade, with missing the lessons and not coming for extra help after school. The remainder of the students, including Edwin, Louis, Olivia, Rhodaline, and Tyler showed a desire to learn the material by asking me to go over a concept they did not understand and participating in class. Because Louis and Edwin did not do their homework every day or come for extra help, they did not score very high on tests. Rhodaline performed the best on tests and quizzes, almost always doing her homework, and, from her maturity level, I believe she could have done well in the honor's level course.

The period 4, honors class of 22 students were considered less talkative than the other honors class and consisted of a large group of active and passive learners. The passive learners in the class, such as Walker, would be seen staring blankly at the front of the class, with disinterest, not taking notes. The more active students took notes from the board, self-corrected their homework assignments, listened as I lectured, and work efficiently in groups on in-class worksheets and experiments. When I challenged the class with a question, quite a few hands were seen raised that wanted to attempt to give a correct answer. Jackie and Anthony were like sponges when it came to learning the material, and the focus in their expressions was undeniable. They were there to learn. When the class had to be told to quiet down, they listened. Most students followed the lectures, which took up most of class time, and the example problems that were given throughout the lectures. They asked questions without being called on. A few, including Islynn, came after school for help on homework problems they still didn't understand or general concepts from lecture. The students were put in pairs to work on in-class worksheets or to start on homework problems. Once in a while, I had students put their homework answers up on the board, which were thereafter corrected by the class as a whole. Due to the number of questions assigned on some of the worksheets, they were posted on the ELMO projector at the start of class, and any problems that students still could not grasp, I went over on the board.

The major behavioral issue in this class involved a female student who had a MA504, which is a federal disabilities act that must be followed to a tee. The excerpts describe the purpose of Section 504 (Section 504 of the Rehabilitation Act):

> Section 504 is a civil rights law that prohibits discrimination on the basis of disability in all educational programs and activities that get federal aid from the U.S. Department of Education. The purpose of Section 504 is to protect children with disabilities from being discriminated against at school. The law was designed to "level the playing field" for individuals with disabilities by eliminating barriers that prevent them from fully participating in programs and activities.
>
> The Section 504 law states that students with disabilities should not be discriminated against or be excluded from or denied benefits from any programs and services. Under section 504 eligible students have an equal opportunity to participate in all academic and nonacademic services. The Section 504 regulation also requires school districts to provide a "free appropriate public education" (FAPE) to each eligible student with a disability, regardless of the nature or severity of their disability.
>
> Under Section 504, free and appropriate education means that a student with a disability will receive an education that is the same as that of students who do not have a disability, with appropriate related services. The services provided are

> designed to accommodate the individual needs of the student with a disability and are free of charge except for those fees that students without disabilities also have to pay.
>
> Children with disabilities who are not eligible for special education or related services may be eligible for services under Section 504.

She often disrupted the class by talking to the male students around her and complained about having to sit in the front of class. However, because she had a 504, special precautions had to be taken, where she was given “preferential” seating and allowed to have more time than other students to hand in her homework. Tim and Noah were also caught talking to each other on a few occasions, but stopped when ordered to. Dezarae and Megi were absent more than the other students. However Megi caught up on her work, whereas Dezarae, even with the extra allotted time to her, did not hand in her missing homework assignments. The students who were almost never absent, had the highest grades, paid a great deal of attention during class, and demonstrated the most assiduity were Islynn, Anthony, Jackie, Nam, and Carly.

The period 7, honors class of 24 students was more rowdy than the period 4 honors class, yet they all held the potential for greatness, despite the dose of laziness or lack of ambition that repressed some of them. The learners were passive in that they were able to focus on lectures and take notes, and active in that they liked to work in groups on problem sets and lab experiments. The students asked questions about what was being taught, without being prompted, and either volunteered their homework solutions, or gave an attempt to the correct answer when called upon. In order to keep the talking to a minimum during lecture, I learned to not have my back to the students as I wrote on the board, and would sometimes politely tell them to be quiet in German, which would grab their attention. In addition, the students, along with Charlie and Samira, would at times encourage their neighbors to settle down so that I could continue my lesson. To check that they were paying attention to what I was saying as I wrote notes on the board, I would also substitute a German word for an English word to my sentences, which elicited a positive response from the students, revealing that they were being attentive. I also spoke a little German in the other honors class, but not so much in the college prep classes. The honors classes liked listening to the bits of German I spoke. Some even asked if I would teach them the language. For about two days, I started all four of my classes with a few jokes to raise their enthusiasm. All the same, this method of introduction ceased as my jokes were not much appreciated and did extract much interest. Homework worksheets and problems were addressed in same manner as was done in the period 4 honors class.

The named behavioral issues faced in this class were caused by four students, Gjergji, Samira, Alexandra, and Mackenzie. One day at the end of class, as students started filing out, Samira made a disrespectful comment as I was writing on the board, with my back faced away from the students. She was pulled aside before class, the next day. Samira then admitted she was wrong and apologized, promising to never commit the same act again. Mackenzie and Alexandra were often caught talking during class. When Alexandra was asked a question to check if she was paying attention she answered correctly, however Mackenzie answered incorrectly, giving the excuse that she didn’t understand the concept. Mackenzie was urged to come after school for help, but that scarcely happened. Mackenzie was also caught cheating on an exam, during which she was looking at her cellphone under her desk. The teacher notified the administrators, and eventually a consensus was made, whereby Mackenzie would get a low grade on the test, but not a passing one, instead of a zero. Gjergji was also caught cheating on an exam. A scrap of paper was found on his desk with an answer to one of the questions written on it. At the end of class, he was pulled aside.   After arguing with the teacher, he admitted that he had received the answer from a friend. His actions were brought up with the administrators the following school day. The students absent from class the most were Talyce and Gjergji, mostly on days of quizzes or exams. The students who served as role models to the rest, as they paid attention in class, did not disrupt the class, worked studiously, willingly volunteered correct answers, did well on tests and quizzes, and asked questions often out of confusion or curiosity, were Nikola, Zahra, and Theodora. Vivian, Samira, and Gisela, came for help after school the most and performed fairly well on tests and quizzes.

Guiding absent and new students was a task not uncommon for Doherty High teachers, including myself. Almost every day I recorded at least one student absent in each of the four classes that I student taught. The students that were absent for one day and were present the next were given the homework they missed and had to show me the completed assignment the following day. Those who were absent for a longer period of time, due to in-school suspension, out-of school suspension, or for any other reason, had their missed work sent home to them and were expected to bring it in the day they returned to class. Throughout my teaching experience at Doherty High, only two new students joined my class. They were asked what they had learned at their previous school and given the same homework as was assigned to the rest of the students. They were also informed of what material they needed to catch up on to be prepared for the next quiz and test. When the new students or absent students struggled with understanding the homework or information presented in class, they were given the opportunity to come after school or make other arrangements that fit both the teacher's and students' schedule.

Chapter 5

Assessment

Assessments can be thought of as the tools, the brushes an artist uses to draw the scene before him. Teachers are the passersby that compare the painting to the real scene and may help the artist by pointing out what she's missing or praise her for her detail. The picture drawn with the aid of the assessments describes to the teacher what the students, the artists, have learned from the lessons and what still needs brushing up on, or what they have no concept of. The forms of assessment administered to all classes were informal and formal, which further prepared students for the Science MCAS test, a summative assessment.

A formal assessment, such as a quiz, test, lab report, or other graded assignment, is a teacher's approach to gaining information about what the students have learned in class and from homework assignments (Sternberg and Williams). The purpose of this type of assessment is also to determine what students' strengths and weaknesses are in certain concepts. For instance, the test on section 1 of chapter 7 given to the honors students measured not only their ability to name binary ionic and covalent compounds, as well as ternary compounds, but also their ability to determine the kind of compound to be named, since they were not given that specific information. Some students answered questions wrong because they could not remember the rules for naming the compound. Others had difficulty determining the type of compound, and as a result, gave an incorrect name. However, the college prep class was given the type of compound they were to name. Hence, the questions they answered wrong proved that they had not learned or studied the rules for naming binary and ternary compounds. The test given to the honors and college prep students on sections 3 and 4 of chapter 7, consisted of questions that showed whether they had learned how to do calculations of molar mass, formula mass, and percentage composition, and the process of calculations to determine a compound's empirical and molecular formula. The students' performance on these formal assessments gave feedback on whether the methods of review and homework problems were effective in helping the students learn the material, whether adjustments to teaching methods needed to be made, or whether other areas of the students' lives needed to be addressed, such as sports or jobs, that may have affected their studying.

Informal assessments are demonstrative in that if you ask a student a question, they can answer it. These are non-graded strategies that show that students understand the lessons. Informal assessments give a teacher feedback on the how successful their teaching methods are, based on observations of the students during class as they work, and as they interact with the teacher and other students (Sternberg and Williams). One example is how during one lesson, in my period 3, college prep level class, workers were making distracting noises as they were fixing machinery behind one of the tiles on the ceiling. I then made the decision to cut the lesson short and have students play a game where they had to match up their metal or nonmetal symbol on a name tag with another student's in order to come up with different names of compounds. This made them regain their focus on the object of the lesson and changed the mood of the classroom from boredom due to sitting in a desk, while taking notes, to interest and determination to make as many combinations of elements as possible, so they would have less to fill out on the worksheet for homework. Another activity that really excited the honors students, but roped in slightly less enthusiasm from the college prep students, was a game where two teams competed, with one member from each, to correctly write the chemical formula or name on the board. This game pointed out which students were flying through the given material, and the ones who were paying less attention and having trouble.

Summative assessments are cumulative, covering material taught over the entire year, or some period of time and summarizing students' development at a given point in time (Integrated Assessment). The Science MCAS exam is a summative assessment that gives evidence of students' mastery of certain knowledge and skills at the end of their sophomore year of high school. The assessments are not only geared toward preparing students in their future undertakings, but also toward helping them pass the MCAS exam. As teachers, including myself, followed the standards in the Curriculum Framework in their daily instruction to their students and in the assessments they gave, most of the students learned them. Those that did not, as was evidenced by their grades on assessments and progress in the class, would be forced to retake the exam. To improve their performance and proficiency, one of the ultimate challenges of teaching, and to ensure they pass the MCAS, students may be given consistent encouragement and offered extra help before the start of classes. In addition, creative modes of getting material across to students and means of engaging all of the students during class may be implemented, such as group activities, games, and lab experiments.

Conclusion

Teaching at Doherty Memorial high school has been an unforgettable chapter in my life. Every day was a learning experience. This opportunity to teach was valuable from the moments of standing in front of the class giving a lesson, to the discussions I had with my mentor. Interviews with and quotes from the teacher who served as my mentor, Mrs. Hall, can be found in Appendix I. I walked into the classes without any prior experience in teaching, minus the times I would grab my stuffed animals and teach them on my little, white board. However, not a day went by that I was not prepared for my students. In the mornings, Mrs. Hall and I went over my lesson plan for each class to make sure I could get through the necessary material, we went over the quizzes or tests I made up to make sure there weren't any errors or questions too difficult, and we discussed the homework assignments I planned to give the students that day. In the afternoons, we talked about the last class, tips on how I could improve my teaching methods, or did a run-down of my plans for the next day.

Competence was achieved in the five Standards for Professional Teachers. Lessons were planned in advance or tailored for the time allowed. Teaching methods were used to suit the level of the students in the class, especially those whose first language was not English. Any questions that were asked, I answered and clarified. Questions that students asked and I did not have an answer for, I researched and resolved the next day. Each lesson was begun in uplifting spirit, which endured throughout, and was issued in an authoritative voice. In addition, just as homework was assigned almost always at the end of class, if not before, and scarcely forgotten, their work was recorded in the grade book just before the start of class. Students were also informed of what to study for tests and quizzes. For one test of a critical topic for them to learn, on which many performed very poorly, the students were allowed make it up, but only on the condition that they came after school on at least one of two designed dates. Respect was given at all times. When students committed an act of disrespect, they were managed right away and reminded of the consequences. Equity was promoted in that all students were given the same encouragement that they could reach their potential with effort and persistence. Professional responsibilities were met, also. Methods of instruction, classroom management, and assessments were reflected upon to identify, construct, and finally apply the improvements that could be made in teaching. As part of my duty as a student teacher, and to myself, I emanated my passion for chemistry to the students in hopes that some of them might catch a spark of the same wonder for the subject and pursue it.

Reflecting on the Science MCAS results reported earlier, the relatively poor scores do not come as a surprise. The majority of the students in the classes I have taught displayed a lack of aptitude and effort in science. Perhaps a way to raise their scores and interest in science would be to engage students in more laboratory experiments or bring them on a tour of a pharmaceutical industry to see the applications of chemistry out in the real world. What these students need is a spark of inspiration, motivation. One of my pursuits is to find that spark for them, light it, so that they'll go for that reach in their life and do nothing less.

Being a student teacher has not only given me experience on what it is like to be in the shoes of a teacher, it has shed light on the kind of students one teaches, and the real challenge that both share. Motivation was nonexistent in a few of my students. They could not see the competence they possessed to do well in class or they could care less to try. That is the million dollar question that could make one rich if the answer was so simple—how do you get the hopeless to believe, let alone want to put in any effort? The answer at present is to not give up on them and keep trying different ways, while concurrently, giving those who want to be there and learn the educational experience they deserve, the best that you can afford.

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Appendix A

I. CONTENT STANDARDS

1. Properties of Matter

Central Concept: Physical and chemical properties reflect the nature of the interactions between molecules or atoms, and can be used to classify and describe matter.

1.1 Identify and explain physical properties (e.g., density, melting point, boiling point, conductivity, malleability) and chemical properties (e.g., the ability to form new substances). Distinguish between chemical and physical changes.
1.2 Explain the difference between pure substances (elements and compounds) and mixtures. Differentiate between heterogeneous and homogeneous mixtures.
1.3 Describe the three normal states of matter (solid, liquid, gas) in terms of energy, particle motion, and phase transitions.

2. Atomic Structure and Nuclear Chemistry

Central Concepts: Atomic models are used to explain atoms and help us understand the interaction of elements and compounds observed on a macroscopic scale. Nuclear chemistry deals with radioactivity, nuclear processes, and nuclear properties. Nuclear reactions produce tremendous amounts of energy and lead to the formation of elements.

2.1 Recognize discoveries from Dalton (atomic theory), Thomson (the electron), Rutherford (the nucleus), and Bohr (planetary model of atom), and understand how each discovery leads to modern theory.
2.2 Describe Rutherford's "gold foil" experiment that led to the discovery of the nuclear atom. Identify the major components (protons, neutrons, and electrons) of the nuclear atom and explain how they interact.
2.3 Interpret and apply the laws of conservation of mass, constant composition (definite proportions), and multiple proportions.
2.4 Write the electron configurations for the first twenty elements of the periodic table.
2.5 Identify the three main types of radioactive decay (alpha, beta, and gamma) and compare their properties (composition, mass, charge, and penetrating power).
2.6 Describe the process of radioactive decay by using nuclear equations, and explain the concept of half-life for an isotope (for example, C-14 is a powerful tool in determining the age of objects).
2.7 Compare and contrast nuclear fission and nuclear fusion.

3. Periodicity

Central Concepts: Repeating (periodic) patterns of physical and chemical properties occur among elements that define families with similar properties. The periodic table displays the repeating patterns, which are related to the atoms' outermost electrons.

3.1 Explain the relationship of an element's position on the periodic table to its atomic number. Identify families (groups) and periods on the periodic table.
3.2 Use the periodic table to identify the three classes of elements: metals, nonmetals, and metalloids.
3.3 Relate the position of an element on the periodic table to its electron configuration and compare its reactivity to the reactivity of other elements in the table.
3.4 Identify trends on the periodic table (ionization energy, electronegativity, and relative sizes of atoms and ions).

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4. Chemical Bonding

Central Concept: Atoms bond with each other by transferring or sharing valence electrons to form compounds.

4.1 Explain how atoms combine to form compounds through both ionic and covalent bonding. Predict chemical formulas based on the number of valence electrons.
4.2 Draw Lewis dot structures for simple molecules and ionic compounds.
4.3 Use electronegativity to explain the difference between polar and nonpolar covalent bonds.
4.4 Use valence-shell electron-pair repulsion theory (VSEPR) to predict the molecular geometry (linear, trigonal planar, and tetrahedral) of simple molecules.
4.5 Identify how hydrogen bonding in water affects a variety of physical, chemical, and biological phenomena (e.g., surface tension, capillary action, density, boiling point).
4.6 Name and write the chemical formulas for simple ionic and molecular compounds, including those that contain the polyatomic ions: ammonium, carbonate, hydroxide, nitrate, phosphate, and sulfate.

5. Chemical Reactions and Stoichiometry

Central Concepts: In a chemical reaction, one or more reactants are transformed into one or more new products. Chemical equations represent the reaction and must be balanced. The conservation of atoms in a chemical reaction leads to the ability to calculate the amount of products formed and reactants used (stoichiometry).

5.1 Balance chemical equations by applying the laws of conservation of mass and constant composition (definite proportions).
5.2 Classify chemical reactions as synthesis (combination), decomposition, single displacement (replacement), double displacement, and combustion.
5.3 Use the mole concept to determine number of particles and molar mass for elements and compounds.
5.4 Determine percent compositions, empirical formulas, and molecular formulas.
5.5 Calculate the mass-to-mass stoichiometry for a chemical reaction.
5.6 Calculate percent yield in a chemical reaction.

6. States of Matter, Kinetic Molecular Theory, and Thermochemistry

Central Concepts: Gas particles move independently of each other and are far apart. The behavior of gas particles can be modeled by the kinetic molecular theory. In liquids and solids, unlike gases, particles are close to each other. The driving forces of chemical reactions are energy and entropy. The reorganization of atoms in chemical reactions results in the release or absorption of heat energy.

6.1 Using the kinetic molecular theory, explain the behavior of gases and the relationship between pressure and volume (Boyle's law), volume and temperature (Charles's law), pressure and temperature (Gay-Lussac's law), and the number of particles in a gas sample (Avogadro's hypothesis). Use the combined gas law to determine changes in pressure, volume, and temperature.
6.2 Perform calculations using the ideal gas law. Understand the molar volume at 273 K and 1 atmosphere (STP).

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6. States of Matter, Kinetic Molecular Theory, and Thermochemistry (cont.)

6.3 Using the kinetic molecular theory, describe and contrast the properties of gases, liquids, and solids. Explain, at the molecular level, the behavior of matter as it undergoes phase transitions.

6.4 Describe the law of conservation of energy. Explain the difference between an endothermic process and an exothermic process.

6.5 Recognize that there is a natural tendency for systems to move in a direction of disorder or randomness (entropy).

7. Solutions, Rates of Reaction, and Equilibrium

Central Concepts: Solids, liquids, and gases dissolve to form solutions. Rates of reaction and chemical equilibrium are dynamic processes that are significant in many systems (e.g., biological, ecological, geological).

7.1 Describe the process by which solutes dissolve in solvents.

7.2 Calculate concentration in terms of molarity. Use molarity to perform solution dilution and solution stoichiometry.

7.3 Identify and explain the factors that affect the rate of dissolving (e.g., temperature, concentration, surface area, pressure, mixing).

7.4 Compare and contrast qualitatively the properties of solutions and pure solvents (colligative properties such as boiling point and freezing point).

7.5 Identify the factors that affect the rate of a chemical reaction (temperature, mixing, concentration, particle size, surface area, catalyst).

7.6 Predict the shift in equilibrium when a system is subjected to a stress (LeChatelier's principle) and identify the factors that can cause a shift in equilibrium (concentration, pressure, volume, temperature).

8. Acids and Bases and Oxidation-Reduction Reactions

Central Concepts: Acids and bases are important in numerous chemical processes that occur around us, from industrial procedures to biological ones, from the laboratory to the environment. Oxidation-reduction reactions occur when one substance transfers electrons to another substance, and constitute a major class of chemical reactions.

8.1 Define the Arrhenius theory of acids and bases in terms of the presence of hydronium and hydroxide ions in water and the Bronsted-Lowry theory of acids and bases in terms of proton donors and acceptors.

8.2 Relate hydrogen ion concentrations to the pH scale and to acidic, basic, and neutral solutions. Compare and contrast the strengths of various common acids and bases (e.g., vinegar, baking soda, soap, citrus juice).

8.3 Explain how a buffer works.

8.4 Describe oxidation and reduction reactions and give some everyday examples, such as fuel burning and corrosion. Assign oxidation numbers in a reaction.

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II. Scientific Inquiry Skills Standards

Scientific literacy can be achieved as students inquire about chemical phenomena. The curriculum should include substantial hands-on laboratory and field experiences, as appropriate, for students to develop and use scientific skills in chemistry, along with the inquiry skills listed below.

SIS1. Make observations, raise questions, and formulate hypotheses.

- Observe the world from a scientific perspective.
- Pose questions and form hypotheses based on personal observations, scientific articles, experiments, and knowledge.
- Read, interpret, and examine the credibility and validity of scientific claims in different sources of information, such as scientific articles, advertisements, or media stories.

SIS2. Design and conduct scientific investigations.

- Articulate and explain the major concepts being investigated and the purpose of an investigation.
- Select required materials, equipment, and conditions for conducting an experiment.
- Identify independent and dependent variables.
- Write procedures that are clear and replicable.
- Employ appropriate methods for accurately and consistently
    - making observations
    - making and recording measurements at appropriate levels of precision
    - collecting data or evidence in an organized way
- Properly use instruments, equipment, and materials (e.g., scales, probeware, meter sticks, microscopes, computers) including set-up, calibration (if required), technique, maintenance, and storage.
- Follow safety guidelines.

SIS3. Analyze and interpret results of scientific investigations.

- Present relationships between and among variables in appropriate forms.
    - Represent data and relationships between and among variables in charts and graphs.
    - Use appropriate technology (e.g., graphing software) and other tools.
- Use mathematical operations to analyze and interpret data results.
- Assess the reliability of data and identify reasons for inconsistent results, such as sources of error or uncontrolled conditions.
- Use results of an experiment to develop a conclusion to an investigation that addresses the initial questions and supports or refutes the stated hypothesis.
- State questions raised by an experiment that may require further investigation.

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SIS4. Communicate and apply the results of scientific investigations.

- Develop descriptions of and explanations for scientific concepts that were a focus of one or more investigations.
- Review information, explain statistical analysis, and summarize data collected and analyzed as the result of an investigation.
- Explain diagrams and charts that represent relationships of variables.
- Construct a reasoned argument and respond appropriately to critical comments and questions.
- Use language and vocabulary appropriately, speak clearly and logically, and use appropriate technology (e.g., presentation software) and other tools to present findings.
- Use and refine scientific models that simulate physical processes or phenomena.

III. Mathematical Skills

Students are expected to know the content of the *Massachusetts Mathematics Curriculum Framework*, through grade 8. Below are some specific skills from the *Mathematics Framework* that students in this course should have the opportunity to apply:

- ✓ Construct and use tables and graphs to interpret data sets.
- ✓ Solve simple algebraic expressions.
- ✓ Perform basic statistical procedures to analyze the center and spread of data.
- ✓ Measure with accuracy and precision (e.g., length, volume, mass, temperature, time)
- ✓ Convert within a unit (e.g., centimeters to meters).
- ✓ Use common prefixes such as *milli-*, *centi-*, and *kilo-*.
- ✓ Use scientific notation, where appropriate.
- ✓ Use ratio and proportion to solve problems.

The following skills are not detailed in the *Mathematics Framework*, but are necessary for a solid understanding in this course:

- ✓ Determine the correct number of significant figures.
- ✓ Determine percent error from experimental and accepted values.
- ✓ Use appropriate metric/standard international (SI) units of measurement for mass (g); length (cm); and time (s).
- ✓ Use the Celsius and Kelvin scales.

Appendix B

Observation Notes

Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log

Name: Megan Barriga

Week Of: 1/4/2012

	Activity	Subject Area	Hours	Signature	
	~~observation~~	~~Chemistry~~			
Monday ~~[illegible]~~	~~observation~~				
Tuesday					
Wednesday 1/4	Observation	Chemistry	6	[signature]	1,5
	observation	Biology		[signature]	6
	Observation	Chemistry		[signature]	2,3,4,7
Thursday 1/5	Observation	Chemistry	6	[signature]	per. 1,2,5,6,7
Friday 1/6	observation	Chemistry	6.	[signature]	per. 1,2,5,6,7
Totals		Direct Hours			
		Observation Hours	18		

Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log

Name: Megan Barriga

Week Of: 1/9/2012

	Activity	Subject Area	Hours	Signature	
Monday 1/9	Observation	Chemistry	6	CButcher	1,4,3,5
	Observation	Chemistry		[illegible]	6,7,2
Tuesday 1/10	Observation	Chemistry	6	CButcher	1,3,5
	Observation	Chemistry		[illegible]	2,6,7
Wednesday 1/11	Observation	Chemistry	6	CButcher	1,3,5
	Observation	Chemistry		[illegible]	2,6,7
Thursday 1/12	Observation	Chemistry	6	CButcher	1,5
	Observation	Biology		EHall	6
	Observation	Chemistry		EHall	2,3,4,7
Friday 1/13	Observation	Chemistry	6	CButcher	1,5
	Observation	Chemistry		EHall	2,3,4,7
	Observation	Biology		EHall	6
Totals		Direct Hours			
		Observation Hours	30		

Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log

Name: Megan Barriga

Week Of: 1/17/2012

	Activity	Subject Area	Hours	Signature
Monday				
Tuesday 1/17	observation	Chemistry	4	C Butcher 1,5
	observation	Chemistry		E Hall 4,7
	Observation	Biology		E Hall 6
Wednesday 1/18	Observation	Chemistry	6	C Butcher 1,5
	Observation	Chemistry		E Hall 2,3,4,7
	Observation	Biology		6
Thursday 1/19	Observation	Chemistry	6	C Butcher
	observation	Chemistry		E Hall
	observation	Biology		
Friday 1/20	Observation	Chemistry	6	E Hall
	Observation	Chemistry		
	Observation	Biology		
Totals		Direct Hours		
		Observation Hours	22	

Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log

Name: Megan Barriga

Week Of: 1/23/2012

	Activity	Subject Area	Hours	Signature
Monday 1/23	Observation	Chemistry	6	Segan
	Observation	Biology		EHall
	Observation	Chemistry		
Tuesday 1/24	Observation	Chemistry	5	EHall
	Observation	Biology		
	Direct	Chemistry	1	EHall
Wednesday 1/25	Observation	Chemistry	6	EHall
	Observation	Field Trip		
Thursday 1/26	Observation	Chemistry	6	EHall
	Observation	Biology		
Friday 1/27	Direct	Chemistry	1	EHall
	Observation	Chemistry	5	
Totals		Direct Hours	2	
		Observation Hours	28	

Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log

Name: Megan Barriga

Week Of: 1/30/12

	Activity	Subject Area	Hours	Signature
Monday 1/30	Direct Observation	Chemistry Chemistry	1 3	EHall
Tuesday 1/31	Direct Observation	Chemistry	2 3	EHall
Wednesday 2/1	Direct Observation	Chemistry	1 3	EHall
Thursday 2/2	Direct	Chemistry	6	EHall
Friday 2/3	Direct	Chemistry	6	EHall
Totals		Direct Hours	16	
		Observation Hours	9	

Total observation
up to 2/1/12 : 107 hours

Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log

Name: Megan Barriga

Week Of: Feb. 6, 2012

	Activity	Subject Area	Hours	Signature
Monday 2/6	Direct	Chemistry	6	E Hall
Tuesday 2/7	Direct	Chemistry	6	E Hall
Wednesday 2/8	Direct	Chemistry	6	E Hall
Thursday 2/9	Direct	Chemistry	6	E Hall
Friday 2/10	Direct	Chemistry	6	E Hall
Totals		Direct Hours	30	
		Observation Hours		

Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log

Name: Megan Barriga

Week Of: Feb. 13, 2012

	Activity	Subject Area	Hours	Signature
Monday 2/13	Direct	Chemistry	6	E Hall
Tuesday 2/14	Direct	Chemistry	6	E Hall
Wednesday 2/15	Direct	Chemistry	6	E Hall
Thursday 2/16	Direct	Chemistry	6	E Hall
Friday 2/17	Direct	Chemistry	6	E Hall
Totals		Direct Hours	30	
		Observation Hours		

Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log

Name: Megan Barriga

Week Of: Feb. 27, 2012

	Activity	Subject Area	Hours	Signature
Monday 2/27	Direct	Chemistry	6	EHall
Tuesday 2/28	Direct	Chemistry	6	EHall
Wednesday 2/29	Direct	Chemistry	6	EHall
Thursday 3/1	—	—	—	
Friday 3/2	—	—	—	
Totals		Direct Hours	18	
		Observation Hours		

Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log

Name: Megan Barriga

Week Of: March 5, 2012 and March 12th, 2012

	Activity	Subject Area	Hours	Signature
Monday 3/5	Direct	Chemistry	6	[illegible]
Tuesday 3/6	Direct	Chemistry	6	[illegible]
Wednesday 3/7	Direct	Chemistry	6	[illegible]
Thursday 3/8	Direct	Chemistry	6	[illegible]
Friday 3/9	Direct	Chemistry	6	[illegible]
Mon. 3/12	Direct	Chemistry	1	[illegible]
Totals		Direct Hours	31	
		Observation Hours		

Total Direct Honors: 127 hours

1/4/12

Period 1, Mrs. Butcher Honors

Ch. 5 Sec. 3

Observations: Sophomores [From front of Classroom]

- Quiet, more behaved in front,
- Some quiet in back
- One Student in far back corner
- one autistic male student, 2nd row from left did not think he could do chemistry. (Sam)

Talkative: rt back
left middle side
middle

- students are interactive

Teaching methods: Refer to, have
~ students look at page(s) in book
~ Walking back & forth
~ write definition and example on board

- overall class is quite rowdy. Therefore, must talk over them, or continue not stop with little conversations going on around room.

~ use of overhead
~ talking with hands
~ ruler for Periodic Table
~ Explain main point with a few lines of notes on board

1/4/12

Period 2, Mrs. Hall college Prep

Observations 17 [From Front of classroom]

- Small class, ~~16~~ 17 students, mostly girls
- Checks off homework
- overall, class is quiet
- back student (boy) created slight disturbance
- students don't take many notes
- a bit interactive
- 2nd row, 3rd student, male, head down and male student row over texting

Teaching Methods:

~ rough sketch of periodic table
~ explanation of Atomic radius and sketch
~ go over worksheet (homework)
~ Asks class question why
~ demonstrates concept with markers
~ more quick with explanations, moving from one concept to another
~ ruler used to point to groups, rows of elements when explaining atomic radius
~ Uses side board to write due date of "lab" (homework) for that period
~ definition on board of e^- Affinity
~ trend, sketch of periodic table to summarize

1/4/12

Period 2 continued

~ briefly instructs student ~~to~~ that was texting to pay attention
~ shows enthusiasm for chemistry
~ note: for students who ask to use lavatory, give green pass, have them fill out, then sign it yourself

• Students take notes of definitions, and other notes

~ chain of ideas about one concept (ionization energy) that flows
~ when students talk, quickly asks to quiet down and 'if they're talking they aren't taking notes'
~ gives out homework worksheet and answers to worksheet were given in notes
~ use of picture of atomic radius on overhead when has extra time
~ On side board, has concepts (main) that will be going over that day
~ Lets students start h.w. early with about 8 mins to spare
◦ Student 2nd row, 2nd desk from right not as quick to participate as others when making notes on homework

1/4/12

Period 3, Mrs. Hall college prep.

Observations [from back of classroom]

- Checks for textbook and homework
- Class is rowdier, louder, more interactive
- 2nd row, 4th male student texting
- 1st row 3rd female student not taking notes (left)
- mostly quiet while being taught
- 3rd row from left, 3rd student not taking notes
- most other students take notes

Teaching Methods

~ uses pointer to point out concepts on periodic table
~ writes on board at right side of room
~ uses analogy "affinity for chocolate" to explain electron affinity
~ Tells them to pay attention because is giving answers to homework
~ repeats main concept
~ made sketch of periodic table with a few notes written on it
~ ~~doesn't~~ didnot have back to students often
~ Handed out homework worksheet with due date on board

1/4/12

Period 4, Mrs. Hall   Honors

Observations: [From front of classroom]
- large class, 22 students
- Students are fairly quiet
- understand concepts at a higher extent, so can answer when asked questions
- ~~Most~~ all students took notes
- more questions asked
- most students gave their attention
- Student asked question and got ahead of teacher
- No interruptions

Teaching Methods:
- ~ book and homework check
- ~ sketch of periodic table on board
- ~ examples on board, comparisons
- ~ Asks for trend, prompts question, praises for correct answer
- ~ Addresses all students
- ~ Question of why scale ends at 4.0 for electronegativity could not answer
- ~ Use of analogy to explain strength of electronegativity (trick-or-treaters)
- ~ speaks slowly when writing out notes on board
- ~ Did not put back to students
- ~ Used overhead to show picture

Period 4 continued 1/4/12

Observations:

- Student corrected mistake teacher made on board
- Students seem attentive to what teacher said

Teaching Methods

~ Gave a homework worksheet
~ Ended lesson about 10 mins before bell
~ When students completed periodic table worksheet, she firmly asked them to sit.

1/4/2012

Period 5, Mrs. Butcher college prep
Sophomores

Observations : [From front of class]

- more talkative students (rowdy)
- students are farther behind, ~~jus~~ still coloring periodic table
- Students ask questions freely, go up and ask
- Small class size, ~~16~~ 17 students
- Some students claimed they didn't remember having homework
- Student caught texting (2nd row, 1st male student, from the left)
- Students put themselves in groups to fill in periodic table worksheets.
- students conversed while being taught

Teaching Methods:

- Teacher was close to taking away a students' cell phone, but student turned it off.
- Went around room helping students with questions
- Must speak loud and continue teaching although students are talking, room was scarcely completely silent
- Referred students to book to go over questions

- student male, 2nd row from left had head down during later end of class

1/4/2012

Period 6 Biology, Mrs. Hall College Prep

Observations: [From front of class]

- Class size, 17 students
- rowdy and talkative
- Moved one student to front right corner and he showed a bit of attitude
- Louder, outbursting male student sits in middle in front - front & center

after - Shouting out of answers

- Most take notes
- Right, 1st row 2nd student had head down
- Most are freshmen, some have taken it once, others this is ~~those~~ their 3rd time & still do nothing

Teaching Methods:

~ Has student read definition aloud from textbook

~ Took cell phone away from student

~ Prompts for answers

~ Indicates, informs what will be on test

~ Diagram of arrows to connect ideas

~ Filled out flow chart with students using overhead

~ Had students color in chart

~ Ended class with ~5 minutes to spare

1/4/2012

Period 7, Mrs. Hall Honors Chemistry

Observations: [From front of class]

- Class size: 21 Students
- Talkative Class
- 1st row on right, 1st female student very quiet and ready to go.
- Students are interactive and respectful
- Most (all of) take notes
- Girls on left side are talkative
- Smart-commenting students
- 2nd row from right, 2nd female blond student is outgoing

Teaching Methods:

~ Allowed one student to grab her book "down the hall" (1st row on ~~right~~ left 2nd student, female)
~ Gives examples on board, e.g. Li 1s² 2s¹ etc.. to show concept of Atomic Radius
~ Tells, reminds students at start of class when ~~test is~~ "Lab" is due & when test is
~ Writes out definition on board and prompts for questions/answers
~ Used a student's book to draw attention to a specific page
~ used overhead to show atomic radius of anions + cations
~ Use ruler to point out elements in Periodic Table
~ handed out homework worksheet

1/5/2012

Period 1, Mr. Severin (1, 2, 5, 6, 7)
Chemistry College prep.

Observations:

- Most seem attentive
- Interactive with teacher
- Students answer when called on
- Students are not disruptive during class.
- Students were respectful

Teaching Methods

- Went over questions in class (h.w.)
- Humorous character, fun while teaching
- Wrote chemical formulas on board
- No F's, only "A with a broken leg"
- explains how to calculate formula mass of compounds
- Homework written on board

1/5/2012

Period 2, Mr. Severin
Chemistry Honors

Observations:

- Most students are all prepared with homework
- Students are quiet while going over the homework together as a class, and as teacher chooses specific student to answer a question.
- Class size: 20 students
- No disruptions
- All students took notes and calculate problems during class
- Overall, students were respectful

Teaching Methods:

~ Teacher used Smart Board to show, have up one slide with a few points about "Naming Binary Ionic Compounds"
~ Also on Smart Board: Hints for Learning the Names of Polyatomic Ions, Recognizing Ionic Compounds, Writing Ionic Formulas
~ Introduced Percent Composition on board and example
~ Asks one student to help another find the answer
~ Keeps students' attention

1/5/2012

Period 5, Mr. Severin
Chemistry Honors

Observations:

- 2 students absent
- All students had their work and books out
- Students were nondisruptive and attentive
- Mrs. Butcher was absent, therefore, some of her students sat in Mr. Severin's class
  - ↳ one student was texting, a few others wrote notes back and forth ~~together~~, or quietly talked among each other, drawing pictures
- Students were overall respectful
-

Teaching Methods

- Prompted questions
- Praised for correct answers
- Went over homework as a class
- Teacher had one of Mrs. Butcher's students calculate an answer
- Calculated Percent Composition on board
- Teacher smiles very often
- Homework was written on board
- When students asked for homework, when ~~the~~ it was already on what was the board, the teacher added another question

Period 6 +7, Mr. Severin
Chemistry AP

Observations:
- class size: 11 students
- students are fairly quiet, nondisruptive when teacher speaks
- students are attentive, quiet, respectful
- All students took notes at a fast pace
- The teacher informed them of many concepts they should memorize

Teaching Methods:
~ Starts class with enthusiasm
~ uses Smart Board
~ Went over The Octet Rule, Electron Configurations of Ions, d-block Cations, Lattice Energy
~ Addresses all of students
~ Also went over: Factors Affecting Lattice Energy, Covalent Bonds, Electronegativity and Bond Polarity, Types of Bonds, Determining Bond Type, Lewis Structures, Chemical Bonding, Formal Charge, Bond Energy, Bond Length

Period 6 continued 1/5/2012

~ Resonance structures

o few questions were asked

~ VSEPR Theory

1/6/2012

Period 1, Mr. Severin
Chemistry College prep

Observations

- Class size: 13
- 2 student absent
- Teacher gave a heads up as to what may be expected on their test coming up
- Class went over homework aloud
- Most participated and had out their homework
- Teacher jokingly asks some students who have homework to show him, but then tells them to sit back down.
- Teacher explained answer student gave
- Teacher chose another student to help one determine the answer and ~~helped~~ teacher helped students figure out correct answer
- One student did not do his homework
- Teacher had 2 students write out their answers to questions on the board
- One student came in after the bell rang and tried to hurry to her seat, but the teacher noticed and pointed it out.
- Most students took notes from the board

1/6/2012

Period 2, Mr. Severin
Chemistry Honors

Observations:

- Teacher asked each student if they had done their homework
- Teacher used analogy of how scale calculates a person's weight to better explain formula mass
- All students, except for one, completed their homework
- Teacher went over homework in class (Chapter Review) and choose students to answer questions
- Teacher did example on board and explained his reasoning
- There was an interruption during class. A student came in and ~~did a~~ briefly interviewed him about where he attended college.
- When the student left, they continued going over the homework
- The teacher wrote out a few answers on board

1/6/2012

Period 5, Mr. Severin
Chemistry Honors

Observations:

- Class size: 17 Students
- Because Mrs. Butcher was absent, some of her students joined Mr. Severin's class
- The teacher asked, called on each Student and asked if they had done their homework, then recorded it in ~~their~~ his grade book
- Most of the Students completed their homework
- A student that was absent was able to answer a question correctly, however, the other absent student had trouble answering a question
- Students paid attention and participated in going over the Chapter review.
- Students' from Mrs. Butcher's class (most) were attentive, as well
- students got distracted by students outside back window, but teacher quickly brought back their attention
- However, ~~Students~~ Mrs. Butcher's students were still distracted after, but shortly later returned their attention
- One student was leaning back in desk and texting behind teacher's back
- Mrs. Butchers students were playing with, and throwing candy canes ~~at~~ at each other and eating them

Period 5 continued 1/6/2012

- Teacher introduced Emperical Formula to students in a manner that did not overwhelm the students
- Teacher wrote out Steps as to how to Solve ~~thos~~ specific examples
- Mrs. Butcher's students texted eachother
- All of Mcgervain's students took notes and paid attention
- Teacher repeated steps to get answer

1/6/2012

Period 6 & 7 Mr. Severin
Chemistry AP

Observations:

- Students took notes attentively as teacher read them aloud and wrote them on the board
- All 21 students were present
- Teacher gave students ideas of what might be asked of them on a test
- students asked questions when they didn't understand a concept
- Student performed an experiment, wearing lab coats ~~and~~ goggles, and gloves, as well as a face mask. They worked in groups of 2 and 4.
- Students worked productively without further instruction from teacher and followed the procedure given

1/9/12

Period 1, Mrs. Butcher, Honors Chemistry

Observations:

- Teacher went over homework given to class the previous week
- students were talkative at the beginning of class, then quieted down once teacher began to lecture, explaining a definition
- Students took notes quietly as the teacher explained them, but talked while she had her back turned to write the notes
- from the back of the classroom, it could be seen that the right side of the room was more talkative
- One student (female) on the right side of the room was listening to an electronic device in one ear
- Throughout most of class, the room was not often completely silent, so the teacher had to talk over her students
- Teacher assigned homework from the book

1/9/12

Period 2, Mr. Severin, Honors Chemistry

Observations:

- At the start of class, the teacher reminded them when they were going to have a test, and indicated what topics they were to expect on it.
- Students were quiet as the teacher spoke
- Teacher wrote the objective on the board (Nomenclature, percent composition, formula weight, empirical formula)
- Teacher indicated that vocabulary and whatever he had written on the board would be on the test
- One student was absent from class
- All students took notes
- Teacher told them what to write in their notebooks (steps for calculating empirical formula)
- Teacher reminded students to show all of their work, steps, on the test
- Teacher assigned homework to the students
- Students were given 10 minutes to work on homework and ask questions
- Students were quiet throughout the entire class and only a few times did a pair of students quietly converse or ask questions of each other
- Teacher walked around and sat behind desk

1/9/2012

Period 3, Mrs. Butcher, Honors Chemistry

Observations:

- students were very talkative at the start of class
- class size: ~~24~~ 25 students
- Some Students talked quietly, as teacher explained concepts, on the left side of the room, observing from the front of the room
- Teacher wrote some notes on the board, with her back to students and the students talked
- Students took notes quietly
- Teacher talked with hands and stood during class
- Topics of Ionization energy, electron affinity, electronegativity (Periodic Trends)
- One student (male) paid attention but did not write notes
- Teacher told them to focus on notes given on the board
- Student asked teacher to explain a concept again.
- Teacher used Analogy to explain electronegativity
- Use overhead to show electronegativity and other topics
- Teacher had a mostly sophisticated demeanor
- Teacher assigned students homework

1/9/2012

Period 5, Mrs. Butcher, college prep Chemistry

Observations:

- Some students had difficulty completing the worksheet they were given the previous week, so the teacher went over it in class.
- From the front of the room, the students on the ~~rig~~ left side were observed as more talkative
- Teacher used a special overhead projector so that she could have the worksheet up on the board
- Teacher had to talk slightly over some students
- students were interactive with teacher and answered right away when asked questions
- students picked up a second worksheet once they had completed the first
- One student was caught texting on her desk, and put it away before being threatened to have it taken away.
- During class, students came up to the teacher in front of the room and asked questions when they did not understand how to determine an answer or the questions themselves
- A male student in particular, Joe, talked the whole class time

1/9/12

Period 6+7, Mr. Severin, AP Chemistry

Observations:

- students continued working on their experiment in a productive manner
- Teacher reminded students of their test tomorrow
- When students finished performing their experiment, they cleaned their equipment and lab bench area
- Teacher talked to students who finished early, but did not replace the empty bottle of HCl solution, which the other group still needed.
- Students kept busy with their homework and studying for the test when they finished cleaning up after their experiment
- teacher told students it was their responsibility to go online and do the online practice questions as preparation for the test
- Teacher told them what they should know for the test
- Teacher went over questions (multiple choice) on an overhead projector

1/10/12

Period 1, Mrs. Butcher, Honors Chemistry

Observations:

- Teacher went over book questions in class that reviewed periodic trends.
- Students, a few, raised their hands to answer
- When student answered incorrectly, teacher explained reasoning simply for correct answer
- Students were fairly quiet while going over the questions
- Teacher asked if anyone still did not understand a question and clarified the misunderstanding for a student
- Students then handed in their homework to teacher in front of room
- Teacher handed out a form to the students from the office to be brought home and signed by a parent as a homework assignment
- Students put themselves in groups of two or three to work on a fun activity, at which point the noise level of the room rose
- The teacher read the instructions aloud, then went around the room to help groups
- Teacher reminded students of their Chapter test on Friday

1/10/12

Period 2, Mr. Severin, Honors Chemistry

Observations:

- Teacher had students write in their notebooks the chemical formula for the names of the compounds on the board
- Students were quiet while working
- Teacher went over answers in class and wrote them on the board next to the corresponding names.
- Teacher assigned homework in the book at the end of class (two section reviews)

1/10/12

Period 3, Mrs. Butcher, Honors Chemistry

Observations:

- Teacher went over homework in class
- students were fairly quiet
- Teacher put periodic table on overhead to display and clarify periodic trends
- Teacher reminded students of exam on Friday
- A few students were eating a snack and one was drinking ~~soda~~ iced tea and the teacher told them not to. They listened.
- Students asked questions and teacher gladly answered them
- During class, the noise level rose slightly
- Teacher ~~handed collected~~ handed out the group activity and told students to work in groups of two or three. She also told them the instructions
- The noise level in the room rose a notch as students worked together
- The handout gave students the opportunity to use critical thinking skills on question dealing with atomic radius, valence shell, electrons, and periodic trends (ionization energy)

1/10/2012

Period 5, Mrs. Butcher, College Prep Chemistry

Observations:

- Teacher talked briefly about the history of the periodic table
- From the front one saw that those on the left side of the room were more talkative
- Teacher wrote notes about the history on the board
- Most students took notes
- Four students were brought in by another teacher to sit at the back of the class for misbehavior (3 male, one female)
- Teacher used overhead to show an early version of the periodic table
- The 4 students in the back talked amongst themselves, asked teacher to go to the library, however the teacher did not allow it, and told them they would have needed to get a pass earlier.
- When one of her students complained about another bothering their desk, the teacher told him to move his desk up, then resumed lecturing
- Teacher wrote facts about a few famous chemists, definitions
- Although students from the other class were slightly disruptive teacher ignored them
- Teacher asked if students had taken notes before she erased the board

Period 5 continued 1/10/2012

- students on the left side of the room, especially Harold, talked throughout the entire class period
- Teacher handed out a worksheet, which was assigned for homework, and they would be allowed to use it on the exam.
- She ended class about 18 minutes early and allowed students to start working on the handout
- Some students decided to talk for the remainder of class, others got started on the worksheet, however, eventually, all students worked on it.
- The teacher walked around the room to help students who had questions
- Students who finished, handed in their worksheet to the teacher
- It was observed that one student copied another's worksheet, while another helped a student understand a question

1/10/2012

Period 6+7, Mr. Severin, AP Chemistry

Observations:

- One student was absent
- 10 students were present
- Students quietly took their exam
- A student asked a question about a question they did not understand on the test and the teacher read the question aloud, but could not give further explanation without giving away answers
- Students from another class, six female, came in and sat quietly in the back, doing their work, or drawing
- Teacher corrected some tests, handed back all of them and had students correct their exams and write the points they earned next to each question
- However, he did not go over all questions and had the students hand in the exams so that he could correct the rest, as he thought the students' correcting their own tests was too difficult.
- The teacher went over the remaining questions on the test aloud
- Teacher told them the 4 topics to expect on the AP exam (Thermo, Equilib, buffers, Kinetics)

1/11/2012

Period 1, Mrs. Butcher, Honors Chemistry

Observations:

- Students continued to work on a group activity.
- The noise level of the room was loud, but not overbearing
- The teacher walked around the room to see if students had any questions or needed clarifications
- Teacher called to the attention of the students to help them answer a specific question.
- All students focused on working on the handout together
- Once the students had finished the questions on the handout, they were allowed to work on homework from other classes, after handing in the handout to the teacher
- Some students were socializing, ~~on one side~~ others worked on their homework
- Some students played with their cell phones, however, they were not allowed to play music

1/11/2012

Period 2, Mr. Severin, Honors Chemistry

Observations:

- Teacher had students work out problems on the board, writing out the Chemical formula (Nomenclature)
- When one student was not taking notes, teacher told him he should be doing the problems on the board and take out his book
- Teacher gives hints as to how to write chemical formula. For example, when there's two nonmetals, a prefix must be present, such as for ~~4~~ CO, carbon monoxide
- Teacher wrote answers on board next to corresponding question
- All of the students paid attention to teacher and were quiet, unless spoken to
- Teacher reminds them the ending a compound should take when an ionic compound and metal are present (-ate)
- Teacher reminded students of the method of criss-crossing charges.
- Teacher went over review questions in class about calculating formula weight and molar mass, atoms, molecules

1/11/2012

Period 3, Mrs. Butcher, Honors Chemistry

Observations:

- Teacher had students continue working on their group activity
- Noise level in the room was moderate
- All students worked on the handout together
- Teacher walked around the room answering students' questions
- In the larger groups, for example, of 3 students, two students were seen as more active than the third in answering the questions
- Teacher explained theory of a question to the class
- Students who completed the worksheet early could work on homework from other classes after handing it in to the teacher

1/11/2012

Period 5, Mrs. Butcher College Prep Chemistry

Observations:

- Left side of the room, viewing from the front of the class, is more talkative than the right
- Teacher gave notes on board about atomic radius, ionic radius, ionization, electron affinity, and electronegativity
- Only some students took notes
- The girl students, 3, came in a few minutes late due to a presentation given by MIT women engineers students
- However, when the teacher mentioned that they could use their notes on the test, all of the students decided to take notes
- Two male students in the left and right back corners were very quiet
- Teacher tells the male students on left side "enough", but they continue to speak when not called on and slightly disruptively
- Teacher reminded students of their test tomorrow
- The male student on the left, Harold, talked throughout the whole duration of class.
- During class, one student had their head down (male) and did not take notes. The teacher did not reprimand him. He did not keep his head down the entire class time
- Teacher told students what to focus on in the last section before the Chapter test
- Teacher assigned book homework

1/11/2012

Period 6 + 7, Mr. Severin, AP Chemistry

Observations:

- One student told the teacher he would give the student who has been out for a few days the homework he's missed
- Teacher gave a powerpoint presentation of Thermochemistry and student took notes
- All students were quiet as they took notes
- Teacher read off the powerpoint
- Students learned about the types of energy, (kinetic, potential), specific heat and calculations, calorimeters, state function, types of systems
- Student asked for clarification between state and non-state functions and teacher gave explanation, using heat as an example, although the student did not show a definite sign that they ~~th~~ finally understood
- Teacher also taught students about endothermic and exothermic reactions, energy measurements, heat and work, Laws of Thermodynamics, work, enthalpy, intensive and extensive properties, Hess's law, Standard enthalpy

1/12/2012

Period 1, Mrs. Butcher, Honors Chemistry

Observations:

- On board, teacher wrote assignment for class, as students were coming in late due to the wintry weather. They were to do Chapter 5 Review Questions p. 168, 40-48 evens
- Noise level of the room was moderate
- Most students had their books open to do the questions, but a few conversed without doing much work (two male students)
- One male student who had been working alone in the left back corner (viewpoint from front of classroom) finished early, then joined his friends to talk
- A female student came in a few minutes late and joined in the conversation with the two male students who weren't doing their work
- After about 25 minutes into class, the teacher called students' attention to inform them that the announcement said students admitted into class after that time would be tardy, and that they should be working on their assignment, which they could hand in tomorrow before their test
- One of the male students opened their book with about ten minutes left of class

1/12/2012

Period 2, Mrs. Hall, College Prep Chemistry

Observations:

- Students present: 14, 10 female, 4 male
- Absent: Edwin, Jackson, 2 females
- Students were asked to hand in their graphs and worksheets when called on.
- The homework worksheet they had been assigned while Mrs. Hall was out, would count as their quiz grade as decided by her
- The class was fairly quiet as Mrs Hall checked to make sure she had everyone's homework
- The student who was absent ~~d~~ during the week, Cat, was told to hand in the vocabulary she had not done by tomorrow
- Ch. 6 was ~~star~~ introduced. They would be tested on sections 1-4
- Topics covered were Chemical Bonds, ionic, covalent, electronegativity (electronegativity scale), cations, anions
- All students, except Cat and one other female, Jess (Jessica) (3rd student in the farthest left row as viewed from the front of class), took notes
- Students were quiet as Mrs. Hall lectured
- Jess eventually took notes
- Mrs. Hall asked Cecha to demonstrate with her nonpolar vs. polar covalent bonds by holding a marker
- Mrs. Hall asked Cat politely and seriously to pick up her head

Period 2, continued 1/12/2012

- Mrs. Hall used analogy of tug-of-war across a river to further explain nonpolar and polar covalent bonds
- Cat continued to not take notes, and put her head back down on her desk
- Mrs. Hall did some examples on the board of determining the difference in electronegativity to determine bond type of a compound
- Another student, female in the 3rd seat, first row on the right, later put her head down, too
- Cat put her head up when Mrs Hall started going over questions from the book that she had assigned to her students
- The female student in the 3rd seat, 1st row on the right put her head up also
- When Mrs. Hall asked who had done the questions, some students said they hadn't, however Mrs. Hall still went over the questions in class
- The student in the right 1st row, went back to closing her eyes and resting her head on her arm, not participating in class
- Because today's period 2 was a little over an hour, Mrs. Hall stopped about ten minutes early and allowed students to work on their work from other classes
- Most of the students did not work on other homework, but ~~talked~~ or texted on their phones
- the room was fairly quiet
- The delivery of the lecture was slower and more explicit due to those who were not as proficient in English

1/12/2012

Period 3, Mrs. Hall, college prep. Chemistry

Observations:

- Students present: 12, 6 male, 6 female
- Mrs. Hall collected the worksheet they were assigned, which would count as their quiz grade
- They also handed in their labs and vocabulary
- She informed them that they would be given two tests for Chapter 6, one on sections 1-4, the other on section 5.
- Students were fairly quiet during class as Mrs. Hall gave her lecture.
- Concepts taught were: Chemical bonds, Ionic bond, cations, anions, covalent bonds (polar & nonpolar), electronegativity
- She ~~allowed students~~ ended class about three minutes early
- Not all students took notes, one was texting, another, Meghan refused and asked why, ~~then they~~ had another female (1st row on the right, 1st seat, viewing from the back of the classroom) also protested that they shouldn't have to because they already wrote the vocabulary for homework. Mrs. Hall retorted that they should know and understand the terms and taking notes would help
- Mrs. Hall prompted students for definitions
- 2 male and 1 female students ~~to~~ did not take notes, and ~~one~~ two males ~~was~~ were texting
- Mrs. Hall went over homework problems on board about determining bond type
- Delivery was faster paced w/less notes because English was the students' first language

1/12/2012

Period 4, Mrs. Hall, Honors Chemistry

Observations:

- students present: ~~18~~ 19, ~~6~~ 7 female, 12 male
- worksheet students handed in would be counted as a quiz grade
- Teacher told students to pass in vocabulary at the start of class, as well.
- Mrs. Hall took attendance
- Noise level was moderate at start of class
- Mrs. Hall went over definitions, but expected them to learn them on their own, however she explained the terms more thoroughly aloud and ~~using~~ drawing pictures on the board
- Mrs. Hall informed students that they would be tested on Chapter 6, sections 1-4, and a separate test would be given on section 5
- Topics covered on board: Ionic Bonding, covalent bonding (polar and nonpolar), electronegativity (scale)
- Almost all students took notes, some only sat with their notebooks open
- Mrs. Hall used analogy of tug-of-war to explain polar vs. non polar covalent bonds and gave examples of determining bond type on the ~~bo~~ board
- Mrs. Hall finished section 1
- Students were quiet as she lectured during class

1/12/2012

Period 5, Mrs. Butcher, college prep Chemistry

Observations:

- Students present: 14, 11 male, 3 female
- Mrs. Butcher went over answers to questions assigned for homework, during class
- Harold talked during class quietly to the students in front and behind him, as well as to his left (as viewed from the front of class)
- Not all students took notes as Mrs. Butcher wrote on board
- Harold announced during class that he was going to get an 80 on the test, and that that's all he'll be able to get.
- Mrs. Butcher told him that's good and continued to lecture
- She assigned the students Mixed Review Questions p.168, 40-48 (evens) to be worked on in class and finished for homework, and to use to study
- Mrs. Butcher told students what they'll expect on the test and what they could use on the test.
- Mrs. Butcher allowed them 40 minutes to complete the assigned work and also announced that the test would be open notes
- 3 students were absent from class
- All students worked together on the homework.
- Noise level became moderate
- Mrs. Butcher walked around the room to answer questions

1/12/2012

Period 6, Mrs. Hall, college prep ~~[illegible]~~ Biology

Observations: [from Front of class]

- Students present: 13 male, 6 female, 19 total
- Absent: Keith, Alexis, Azal, Joel
- A new student ~~Robby~~ Youle was in class
- The noise level was fairly high at the start of class
- Students had to hand in their assigned homework worksheet, which would count as their quiz grade
- Mrs. Hall asked students to hand in their vocabulary ~~[illegible]~~ who hadn't.
- Robby was one of the more sociable, talkative students
- Mrs. Hall used the overhead projector to put a worksheet on the board for the class to fill in together
- To quiet the students, she told them that if she had to call on them for misbehaving or if they did not want to learn, they could leave and go to the office. The students quieted down, and only a few made a comment or talked to a neighbor now and then.
- Mrs. Hall took attendance at start of class
- Junior also answered aloud when Mrs. Hall prompted for an answer
- When Mrs. Hall caught a student with his phone out (right-most row, 1st seat), she raised her voice ~~to~~ to tell him to put away his phone and he listened

1/12/2012

Period 6, continued

- Students became very quiet as the lecture about the terms on the worksheet continued
- All students, except for the one caught texting ~~and a female in the 2nd row from the left, 1st seat, who~~. However, shortly later he did participate and fill in the blanks on the worksheet.
- The female student in the 2nd row from the left, ~~second s~~ first seat, was told to wake up when she was caught resting her head on her arm
- For the remainder of the period, after they finished filling in the blanks on the worksheet, the students were to color the objects on the worksheet.
- The students were given about five minutes or so to color in the pictures
- The noise level rose to a moderate level
- When students stood up and walked to the back of the room to talk, Mrs. Hall noticed them standing there and called them back to their seats

1/12/2012

Period 7, Mrs. Hall, Honors Chemistry

Observations: (from front of class)

- Students present: 22, 8 male, 14 female
- Mrs. Hall went through the worksheets to see who hadn't handed them in, as well as vocabulary definitions
- Vivian, 1st row on left, 2nd seat, was more talkative of the students, whereas the female in the 1st row, 1st seat on the right was not talkative and didnot talk to those around her, aswellas the female in the last seat of the 2nd row from the left.
- Students were told to take out their notebooks
- Mrs. Hall asked her students to be quiet, so that she could teach
- As she ~~st~~ wrote on the board and explained chemical bonds, students took notes
- Topics covered were ionic bonding, cations, anions, used electron configuration of F and Li to clarify transfer of e^- (so they have a full shell), covalent bonding (polar and nonpolar), electronegativity to determine bond type

- Used analogy of a rainbow to explain scale of electronegativity, as there's no fine line between the kinds of bonds
- Mrs. Hall did a few examples on board of bond type determination

1/12/2012

Period 7, continued

- Class was very quiet for the time Mrs. Hall was ~~lecturing~~ lecturing at the front of class
- students were told to study the material, although they were not given any homework
- At the end of class, Mrs. Hall checked for attendance on the days she was out sick

1/13/2012

Period 1, Mrs. Butcher Honors Chemistry

Observations: ~~[illegible]~~ (from front of class)

- ~~2~~5 students present, ~~16~~ 17 boys, 8 girls
- Students were talkative at the start of class, but when they exams were passed out, they were quiet and also as they were taking the exam
- Students were allowed to use the periodic table on the exam
- A few students raised their hands, then went up to Mrs. Butcher to ask her to clarify what a question was asking.
- The test consisted of multiple choice (10 questions), 29 short answer, which called for one-word answers, and an open response question.
- The students asked how many points the questions were worth and Mrs. Butcher told them. However, in the future, it may be beneficial for the teacher to write how many points each type of question is worth.
- The student with autism also asked the teacher for clarification on a few questions and the teacher gladly helped
- Students when finished, some had their phones out
- The room became louder and more talkative as more tests were handed in
- ~~One female student came into class too late~~

1/13/2012

Period 1, continued

- one student came in near the end of class (female), and she worked out with Mrs. Butcher when she could take the test
- one student was reading a book (male) two other boys were listening to an ipod, and a few others had their phones out, when everyone had finished their test
- Students were also asked to hand in the review questions from the previous day

1/13/2012

Period 2, Mrs. Hall, College Prep. Chemistry
(fam front of class)

Observations: Edwin, Febles, Hilary, Henry, Katherine J.

- Julie on Jackson were asked to pass in the work the had missed when absent
- 14 students were present, 4 boys, 10 girls
- Students were told that they would have a quiz on Tuesday and that it would cover 6.1:
  - vocab terms in bold
  - predicting band types: ionic
    polar & nonpolar covalent
    using electronegativity
- Today Mrs. Hall covered
  section 6.2 - molecule, covalent bond, bond energy, octet rule, Lewis dot ~~configuration~~ structures
- Shane did not take notes, Jessica took notes after Mrs. Hall had written notes on the board, or she may have been drawing, as she did not seem to be paying attention to what Mrs. Hall was writing
- The four students in the front seats, Theodora, the first row on the right, 3rd row (Jack and Jackson), the three girls in the first row on the left, except possibly Jessica, and the 2nd row from the right (Cedra, Julie, Itzia) took notes during class
- As Mrs Hall wrote notes on the board, she said what she was writing
- Shane and Jessica talked quietly to each other during class, however the rest of class was quiet during lecture

1/13/2012

Period 3, Mrs. Hall, college prep. Chemistry

Observations: (from back of class)

- 12 Students present
- Students who did not pass in their assignment were told they were getting a zero
- Students were talkative at the start of class
- Students complained when told they would have a quiz on Tuesday: 6.1 - Vocab in bold
  - predicting bond type
- Edwin came into class late with a pass (~5 minutes late)
- Topics Mrs. Hall covered were: Molecule, molecular compound, molecular formula/Chemical formula,
- Isolated/bonded atoms, covalent bond, Bond energy, bond length
- All students took notes, and were quiet as Mrs. Hall lectured
- Mrs. Hall asked what a covalent bond is and a student appropriately gave an answer
- She gave an example, glucose $C_6H_{12}O_6$, and told them what the subscripts mean (atoms of each element in single molecule), and mentioned that for CO_2, ~~there~~ it's understood that there's a 1 subscript next to carbon.
- Lewis, 5th seat, 1st row on left, asked what the difference was between a subscript and superscript
- Mrs. Hall used analogy, sitting in seat to explain being at a lower state of energy than running around
- She used markers and the analogy of two children meeting at a school yard as opposed to running around alone - higher vs lower energy state

1/13/2012

Period 3, Mrs. Hall, continued

- Mrs. Hall also lectured about the octet rule
- Jamal was told to pick up his head during class and he did not take notes
- Mrs. Hall used electron configuration to show that two H atoms share electrons to form a bond and result in H_2
- Mrs. Hall wrote e^- configuration of HCl as another example to show that a s electron would be shared
- Edwin was slightly disruptive when talking to the male student behind him
- The example of O_2 was shown, as well.
- Lewis dot structures were introduced
- Jamal was caught with his electronic advice out and told to put it away
- Mrs. Hall made a table of: group #, valence electrons, electron dot, and an example, for main group elements
- Jamal was reprimanded again for not paying attention
- Single bonds were introduced, using Lewis dot structure of two H's and HCl.
- Mrs. Hall ended class about 15 minutes early since today's third period was a long period (about 1hr)
- Noise level was moderate at end of class, ~~and~~ and some students had their phones out

ea

1/13/2012

Period 3, Mrs. Hall, continued

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era

1/13/2012

Period 4, Mrs. Hall, Honors Chemistry

Observations: (from front of class)

- students present: 13 boys, 5 girls, 18 total
- class was talkative at the start
- students were informed of a quiz they'd have on Tuesday: section 6.1
- one student, Icy, 2nd row, 2nd seat from the right, was using her ipod (electronic device) possibly to text. Then as Mrs. Hall wrote notes on the board, she put it away and started taking notes
- All students quieted down and took notes
- Topics covered were: ionic compounds, molecules, molecular formula, formation of covalent bond, bond energy, covalent bonds, octet rule, Lewis dot notation
- The examples of glucose, H_2O, and CO_2 were given for molecular formulas
- All students were quiet during Mrs. Hall's lecture
- Whirlwind - isolated atoms, lots of energy, less stable compared to atoms that come together → explanation given
- Walker and Noah volunteered to be the atoms in Mrs. Hall's analogy of how molecules have more energy when alone and quiet when they approach each other to bond, when they get to a certain distance, but not too close, otherwise they repel each other.
- students responded with amusement to the analogy
- Mrs. Hall explained that when atoms approach each other, they'll form a bond as they've reached the state of lowest potential energy

1/13/2012

Period 4, continued

- Mrs. Hall used the electron configurations of H and F to show how they share electrons to form an HF molecule, and O_2 as well as an example, showing how the orbitals overlap
- When atoms fill their valence shell, lose or share, then they are "happy"
- Mrs. Hall told Tray she'd like to nap too, when she caught him with his head down, but told him ~~to~~ that he needs to keep his head up and he listened
- Mrs. Hall made a table including: group number, valence electrons, electron configuration, electron dots, and an example for the main group elements
- She simplified the rules for how to place dots on the symbols of elements for Lewis dot structures
- Mrs. Hall showed one example HF of how a bond forms using Lewis dot ~~St~~ notation

1/13/2012

Period 5, Mrs. Butcher, College Prep Chemistry

Observations: (From Front of class)

- Students present: 17, 13 boys, 4 girls
- Students were given their test
- Once the tests were handed out, Mrs. Butcher caught two students talking and asked them to stop
- Students were allowed to use a periodic table and their own notes
- Mrs. Butcher read through each of the questions on the test aloud
- When one student had a question and raised her hand, Mrs. Butcher walked over her desk to clarify her misunderstanding
- When Harold had a question then ~~told~~ asked her if his fixed answer was right, Mrs. Butcher nodded ~~to~~ he was correct.
- The room was silent as everyone was doing the test
- Harold was talking to the female student behind him as Mrs. Butcher was answering questions at the front of the room. Therefore, she did not notice. However, she did catch him talking, eventually.
- Two other male students seemed to be checking answers with each other, as well. ~~The~~ One had his paper showing from under his notebook so the other could see, although it seemed like he was done already, but hadn't handed it in. The one that needed help asked the other if he was right for a few questions and the other told him.

1/13/2012

Period 5, continued

- The one male that helped the other with the test handed in his first, and the other a few minutes later.
- Mrs. Butcher announced that there should be no talking during the test
- 2nd row from the right, 1st seat, male student and 3rd row, 2nd seat male student were the ones cheating, but did not get caught during the test.
- Harold was the last student to finish the test
- The students were quiet as Harold worked to finish the test
- Once Harold finished, the noise level of the room became moderate, however those on the right side of the room were quiet

1/13/2012

Period 6, College prep Biology, Mrs. Hall

<u>Observations</u>: (from front of class)

- Students present: ~~10~~ 11 boys, ~~4~~ 7 girls, 18 total
- Two students were written up for misbehavior
- Mrs. Hall put up a worksheet, fill-in-the-blank, up on the overhead projector
- Mrs. Hall filled in the blanks as she went through the worksheet
- Paul was told to stop pushing the desk in front of him with his feet, and he listened
- Comments were made by a few students during class, which were not very disruptive, but still rude and unneccessary.
- one female student was texting under her ~~desk~~ desk during class, and a male student was also texting (2nd row, 1st seat from left, 1st row 2nd seat on the right, respectively)
- Collin came in late to class with a pass
- Most students seemed bored, however they continued to fill out the worksheet as Mrs. Hall went over it.

1/13/2012

Period 7, Mrs. Hall, Honors Chemistry

Observations: (from front of class)

- Students present: 9 boys, 13 girls, 22 total
- When Mrs. Hall mentioned the quiz on Tuesday, the students protested and complained
- She announced that section 6.1 would be on the quiz ~~as we~~ (predicting bond type, etc..)
- Mrs. Hall waited for the class to stop talking
- Because they already did the section review questions for 6.2, she told them today she'd be mostly outlining what they've already read.
- As Mrs. Hall turned her back to write a few notes on the board, the students talked.
- She then turned around and raised her voice to tell them that their pens should be moving, not their mouths
- Covered topics: ionic ~~bonds~~ compounds, molecules, chemical vs. molecular formulas, bond energy, Lewis dot structures
- All students took notes and were quiet at one point
- Explained that molecular formula shows the kind and number of atoms of each element (subscript) in a molecule
- Talked about how covalent bond forms (isolated atoms - lots of energy, meet at point of lowest potential energy)
  - ↳ attractions overcome repulsions at this point

1/13/2012

Period 7, continued

- Felice and Samod volunteered to be the characters in ~~her~~ Mrs. Hall's analogy, unstable, when two freely moving electrons come (isolated) together at a comfortable distance (lower state of potential energy), where they're stable).
- The girls in the 3 rows on the left and Mackenzie were talkative during class, but Mrs. Hall got their attention
- Students in the far back were quiet during class, as well as those in the first desks
- Mrs. Hall used electron ~~on~~ configurations of HF and O_2 to show the overlap of orbitals, sharing of electrons, and formation of molecules
- Mrs. Hall made a table of group number, valence electrons, Lewis dot structures for each group with a generalized X symbol, and an example for each group (for main group elements 1, 2, 13-18)
- One male student, 3rd row, last seat, did not take notes
- 3rd row, 3rd seat female student and 2nd row, 3rd seat female student were talkative at times during class
- Mrs Hall ended class about 5 minutes early

1/17/2012

Period 1, Mrs Butcher, Honors Chemistry

Observations:

- Mrs. Butcher spent the beginning of class to hand back graded papers and she wrote on the board how many students got grades A-F on Chapter 5 test.
- The average on the Ch 5 test was a 71, 2 students received an A, 4 a B, 9 a C, 2 a D, and 9 an F.
- Mrs. Butcher addressed the questions students had trouble with on the test
- The class was fairly loud during most of the duration of the ~~ct~~ period
- ~~4~~ A student asked if he could retake the test, however Mrs. Butcher said that she does not allow retakes.
- ~~During class~~ At one point, some students were up out of their desks, on their electronic devices.
- The student with autism was not interactive with those around him and seemed to display a character who showed lack of self-confidence that he could perform well in this course, which was supported by his effort to ask Mrs. Butcher to retake the test.
- Mrs. Butcher asked students to listen to announcements, however the noise level didn't diminish
- Students sat when told

1/17/2012

Period 4, Mrs. ~~Butcher~~ Hall, Honors Chemistry

Observations:

- Students were fairly quiet as class began
- Absences: Lenny is a student who has been known to be repeatedly absent. He refuses to drop down to the college level, but doesn't do his work, either. He was allowed to do a series of ~~a~~ work over christmas break to bring up his grade, but he completed nothing. He was also once allowed to write a two-page essay when he had missed a Flame Test lab, ~~ho~~ but he did not write one.
- Mrs. Hall passed back graded papers at the start of class
- Due to the number of absences, Mrs. Hall pushed the quiz to tomorrow
- Mrs. Hall called up students ~~to~~ to look at their average grade so far
- Mrs. Hall ~~refreshed~~ reviewed quickly, Lewis Structures, which they had learned in the previous lesson, writing the structures for the groups 1-2, 13-18 on the board.
- Students were quiet as she lectured
- Topics covered: bonding and nonbonding electrons (lone pairs)
- Mrs. Hall looked at book briefly as she lectured and wrote notes on the board

1/17/2012

Period 4, continued

- Mrs. Hall prompted questions as she wrote notes on board
- All students took notes
- Mrs. Hall introduced structural formulas
  ↳ she liked to (preferred) including lone pairs in structural formulas, whereas she stated that the book said not to, although both are correct
- Multiple bonds were lectured ~~about~~ about, such as single covalent bonds, double covalent bonds, triple bonds
- Absent from class: Peter, Trevon, ~~Nathan~~ Nam, Daniel, Timothy
- One student, Meggie (1st row, 2nd seat, as viewed from front of class), asked how electrons spin, together/separately in a bond. Mrs. Hall said they rotate about the bond, but they don't go into detail in their class
- Mrs. Hall shows how two molecules of O_2 bond, via Lewis structures + structural formulas. She also showed the bonding of Lewis structures of C_2H_4 and HNO (to display double bonds)
- N_2 and carbon were shown to be able to form triple bonds
- Mrs. Hall ended class about 7 minutes early
- Students were moderately loud at the end of the lesson

1/17/2012

Period 5, Mrs. Butcher, college prep Chem

Observations: (from front of class)

- ~~8~~ 6 students (4 male, 2 female) came in and sat ~~at~~ in the back of class before the start of class
- Mrs. ~~B~~ Butcher handed back their graded tests
- ~~Mrs Butcher was~~ The students were quiet as Mrs. Butcher went over the test and how she graded each question
- The average on the test was ~~an~~ 82, 7As, 2Bs, 1F
- Mrs. Butcher introduced Chapter 6, Chemical Bonding and the terms: chemical bond, ionic bonding, covalent bonding, non-polar covalent bond, polar covalent bonds

- Students were slightly talkative as Mrs. Butcher wrote on the board.
- students who had their books were urged to follow along
- most students took notes except for one boy with his head down (2nd row 2nd seat from left) and 2nd row, 3rd seat male student, who listened to music instead
- overhead projector was used to show e- distribution and the types of bonds on the electronegativity scale

1/17/2012

Period 5, continued

- The two female students who sat at the back of the class (who ~~can~~ were from a different class) were talking, but listened ~~over~~ when called on and stopped ~~talking~~ talking for a short time before continuing
- Mrs. Butcher looked at the book, taking definitions and writing them on the board
- one male student moved his seat next to another male student* who was not taking notes, and talked to him

* (sitting in the left back corner)

- Students were assigned 6 question on p177 for homework

1/17/2012

Period 6, College Prep Biology, Mrs. Hall

Observations: (from front of class)

o Absences: ~~Constantine~~, Alexis, ~~Pete~~, Keith, Miguel, Bret ~~Kons~~ Kostandina, Sylvia, Luis, Tamara, José

o Mrs. Hall checked homework and put data in ~~her~~ her gradebook

o students were given a diagram which they were to fill out as a class with Mrs. Hall, and hand in at the end of class

o One student was given a detention for coming into class after the bell had rung

o Dimas, who sat in the front of the 3rd row was the ~~loudest~~, most outspoken in the class

o Not all students participated in filling out the worksheet (2 males in first row on right)

o The student earlier given the detention ~~is~~ was sleeping at the back of the class, but later colored the worksheet with the rest of the class

o Students were then given instructions to color in the worksheet

o Mrs. Hall informed students that they would have a test on Friday and what topics it would cover: cell cycle, mitosis, Chromosome notes

o Dimas talked during the entire class

o Students were moderately loud toward the end of class when they were given 20 minutes to color the handout

1/17/2012

Period 7, Mrs. Hall, Honors Chemistry

Observations:

- Students Absent - None

- Mrs. Hall reviewed electron dot ~~configurations~~ notations
- students had to be told to quiet down, and they listened
- New topics/terminology introduced: Lone pairs, structural formula, single bond, multiple bonds, double bond, triple bond

- Students were mostly quiet while taking notes from the board
- Mrs. Hall gave example of single bond using H_2 in electron dot notation
- HCl was used to show a shared pair of electrons and the lone pairs
- Mrs. Hall spoke slowly when emphasizing the main point of a concept
- Mrs. Hall likes to show lone pairs in structural formula because then "you know they're there"
- The example of C_2H_4 was given to show double bond using electron dot notation + structural formula
- When asked what other element could form a double bond, students answered correctly oxygen + nitrogen (O_2 , HNO)

1/17/2012

Period 7, continued

- Nitrogen was given as an example of an atom that can form a triple bond (N_2)

- Students were told to listen when they started to become rowdy

- Students were quiet as Mrs. Hall continued to lecture and give examples of H_2O and NH_3 ~~HCO~~ on the board, for writing structural formulas

- students become moderately loud when Mrs. Hall ended class about 5 minutes early. She also called up students one at a time to show them their grade so far

1/18/2012

Period 1, Mrs. Butcher, Honors Chemistry

Observations:

- Introduced Chapter 6, section 1: Intro to Chemical Bonding
- Terms defined: chemical bond, ionic ~~bon~~ bonding, covalent bonding (polar/nonpolar), using Electronegativity difference to determine bond type

- students were quiet as Mrs. Butcher wrote notes on the board as class started
- Mrs. Butcher walked in front of the class with her book now and then as she talked about concepts
- Students became progressively louder as class continued, however it was not loud enough to disrupt Mrs. Butcher as she lectured.
- Mrs. Butcher explained the difference, reiterating, between nonpolar and polar covalent bonds, using a picture on the overhead.

She also referred to a page in the book for students to turn to so that they could see a similar picture
- Some students sneakily took a peek at their cell phones without being caught
- One student asked what was the difference between atomic mass & electronegativity, which Mrs. Butcher clarified

1/18/2012

Period 1, continued

- Mrs Butcher asked the class the type of bond they would expect for SH, CeS after ~~as~~ giving the electronegativities on the board
- p. 177 #1-6 was the homework assigned to the students
- The room was moderately loud as students were given a few minutes to start their homework
- Some students started their homework, others talked to their friends instead
- Instead of starting his homework, Sam ~~there~~ sat and waited for the bell to ring
- A few students handed in their homework before class ended

1/18/2012

Period 2, Mrs. Hall, College Prep Chemistry

Observations:

- Absences - Julie, Itzia, Kat
- Mrs. Hall informed them of their test on Friday
- She reviewed the main group elements' number of valence electrons, ~~and~~ corresponding electron configurations, electron dot notation
- Not all students took notes (2 males weren't) Edwin
- Two female students from another class came in to finish up a test and sat in the back of the room. Mrs. Hall had to tell one student to sit a few desks away from the other because she noticed their eyes wandering to each other's test.
- Topics introduced - structural formula, single bond, double bond, triple bond

- Most of the class was attentive and seemed to be focused on learning ~~the~~ what Mrs. Hall had to teach
- Jack was called on to pick up his head from his desk.
- Theodora answered Mrs. Hall ~~to~~ correctly when Mrs. Hall asked the class for the number of valence electrons of nitrogen, when determining the # of bonds N_2 makes

1/18/2012

Period 2. Continued

- Theodora, Lexus, Cedra seemed to pay the most attention ~~and~~ best behaved, and ~~still~~ eager to learn in the class
- Mrs. Hall ~~had students~~ posed a question on the board: Draw the Lewis dot structure and walked them through 2 different methods for writing the Lewis dot structure using a few examples (NH_3, CH_4)
- Two other male students in the 2nd row from the left, 1st and 3rd seats (viewing from the front) had their heads down at one time in class
- Mrs. Hall had the class, although only Henry participated aid her in writing the Lewis dot and structural formula for CH_4
- Julie come in late to class with a pass
- Mrs. Hall also gave the example of CO_2 on the board
- Homework was assigned p. 210-211, #21 + 47 (85's total)
- A few minutes of class ~~was~~ were left to write only the Lewis Structures

1/18/2012

Period 3, Mrs. Hall, College Prep. Chemistry

Observations

- ~~Edwin~~ Mckayla, Karla, Emily Michela, Edwin, and Catherine were absent
- Mrs Hall reminded the students of their test on Friday

- Abdulla, 2nd row 5th seat was caught texting and warned that his phone would be taken away ~~unless~~ if he didn't stop texting
- Lewis, 5th seat, 1st row on the left (as viewed from the rear of room) was told to stop talking. He obeyed without retaliation.

- Topics covered: Lewis dots, structural formula, ~~ous~~ single covalent bond, double & triple covalent bonds, lone pairs,

- Jamal was also given one last warning before Mrs. Hall said she'd write him up for using his phone
- The example of CH_4's lewis dot ~~notation~~ structure was given
- Example shown for a single bond was H_2, O_2 for a double bond, N_2 for triple bond

Period 3, continued

- Everyone was quiet and took notes as Mrs. Hall lectured & wrote on the board, ~~except for Jamal~~
- Went through steps of how to write the Lewis dot structure for CH_4, NH_3, & CO_2 and wrote a few steps on the board
- ~~Kheng~~ Meghan did not take notes and had her head on her desk
- Homework was given p. ~~177~~ 210-211 #21 & 47 ~~Lewis~~ (Lewis dot only)
- Class ended ~~at~~ about ~~2~~ 5 minutes before the bell
- Mrs. Hall passed back a few graded papers

1/18/2012

Period 4, Mrs. Hall, Honors Chemistry

Observations:

- Students were handed a quiz at the start of class and the room fell silent
- students absent were: ~~Mitch~~ Milton
- Students were given about 20 minutes to complete the quiz
- Topics covered: Lewis structures for molecules,

- Mrs. Hall wrote the example of CH_4 + the rules for going about writing the Lewis structure
- Mrs. Hall asked a student kindly to not throw objects across the room
- All students took notes and were quiet
- Walker was looking down at his phone during class, but was not caught by Mrs. Hall
- Example of H_2O for Lewis dot was shown

1/18/2012

Period 4, continued

- structural formula for H_2O was shown
- HCN was also ~~also~~ drawn on the board (Lewis dot structure(s) and structural formula) as well as H_2CO

- Some students were told to pick their heads up

- Homework assigned p.210-211 #21 & 47 (Lewis dot only)

- 3 minutes left at end of class before bell rang

- She informed them of some form of test or quiz on Friday

1/18/2012

Period 5, Mrs. Butcher, College Prep Chemistry

Observations:

- p.177 homework was corrected aloud during class
- Mrs. Butcher called on a few students to answer questions
- Overhead picture was used to display the different types of bonds on the scale of electronegativity
- Mrs. Butcher wrote on some questions from the homework on the board and worked out the answers with the class, prompting for answers, as well
- One male student came in and sat in the rear from another class next door
- Students on the left side of the room (as viewed from the ~~middle~~ front of class) were disruptive as they talked amongst one another.
- Mrs. Butcher told them to stop talking, but a few still continued to talk (Harold and the student in front of him, Clara)
- Most students took notes
- Left side of room was constantly noisy
- Ch. 6, sect 2, Covalent bonds & molecular compounds was introduced and notes were given on board
- Terms defined - molecule, molecular compound, chemical formula, molecular formula, covalent bond, bond energy

1/18/2012

Period 6, Mrs. Hall, college Prep biology

Observations: Absent - Allegra

- students were informed of their test on Friday
- Mrs. Hall used the overhead to have students fill in the blanks of their worksheets along with her
- All students participated in filling in the blanks on their worksheets
- Mrs. Hall had Paul move to the back of the class and gave him a detention for disrupting the class
- Students were given another worksheet which they completed together with Mrs Hall (using the ~~overhea~~ overhead projector)
- Paul and Collin (in back of class) were told to be quiet, but they continued talking

- Mrs. Hall drew stages of Mitosis on board
- Students filled out another worksheet with Mrs. Hall.
- Students passed ~~&~~ their worksheets forward near the end of class
- Students were given about 10 minutes before the bell to work ~~at~~ on the questions at the bottom of a worksheet, to be handed in tomorrow for a grade

1/18/2012

Period 7, Mrs. Hall, Honors Chemistry

Observations:

- Absences: None
- Students were given a quiz at the start of class, soon after which they quietted down
- Students had about 15 minutes to hand in the quiz
- Mrs. Hall told students there would be a test/quiz on Friday
- Topics Covered: Lewis dot structures, terminal atoms, central atom, lone pairs
- Mrs. Hall drew Lewis structures of molecules like CH_4, and rules for how to go about doing so
- All students were paying close attention to the lecture and quietly taking notes from the board
- Lewis structure for SO_2, H_2O, H_2CO
- Homework given p. 210, 211 #21 + 47 (Lewis only)

1/19/2012

Period 1, Mrs. Butcher, Honors Chemistry

Observations

- First ~~[illegible]~~ activity done in class was a book check to make sure students still had their books from the start of the year
- Homework given the previous day was gone over ~~[illegible]~~ with the class
- The questions were written on the board and Mrs. Butcher prompted for answers, which she received readily
- Students, some had their books open to follow along with the ~~home~~ teacher when going over the homework, which they later handed in
- Ch. 6 section 2: Covalent Bonding and Molecular compounds ~~were~~ was introduced
- Terms defined on the board: molecule, molecular compound, chemical formula
- Mrs. Butcher lectured until the end of class

1/19/2012

Period 2, Mrs. Hall, College Prep Chemistry

Observations:

- Absences: Kat, Jessica

- Mrs. Hall walked around the room to check if students had done their homework
- Edwin had not done his homework, and neither had Julie
- ~~The students were told they were might have a quiz tomorrow~~
- Mrs. Hall went over the homework questions on the board
- Students were praised when they answered questions aloud correctly

- Mrs. Hall was interrupted with a phone call from the office
- Cecilia diligently took notes
- One student asked to go to the nurse during class
- Ch. 6 Section 3 was introduced (Ionic Bonding)
- ~~The~~ Mrs. Hall was interrupted by a student who had a pass for Itzia
- Edwin did not take notes, ~~I~~ but dozed of now and then
- Theodora correctly answered that a ~~second~~ e^- from ~~each~~ Ca atom would be given to a second Cl atom when given Ca & Cl to start with to produce $CaCl_2$

Period 2 continued 1/19/2012

- The term Crystal lattice was defined

- Students were told they would be quizzed tomorrow on vocabulary from 6.1 and 6.2 and Lewis dots of main group elements, and ~~a question~~ Lewis dot structures for simple molecules

- Students were given a review sheet to work on and study from

1/19/2012

Period 3, Mrs Hall, College Chemistry

Observations:

°Absences: Jacksael

° Students were told they would have a quiz tomorrow on 6.1 and 6.2 vocabulary, Lewis structures of elements + simple compounds

° Abdulla was told to sit in front, however, he refused and gave Mrs. Hall an attitude

° Homework was gone over in class on the board

° students were quiet as Mrs. Hall spoke and worked out problems on the board

° Michela, ~~and~~ Jamal, and Edwin were not paying attention as Mrs. Hall went over the homework

° Michela was ordered to go sit in the room next door because she continued to talk and not pay attention

° Topics covered: section 6.3, Ionic Compounds, Crystal lattice, ionic bonding, formula unit

° students were given a review sheet ~~to~~ to work on and study for

1/19/2012

Period 4, Mrs. Hall, Honors Chemistry

Observations:

—Absences: Jacqueline

—Mrs. Hall walked around room to check for homework

—Students were told they would have a test next week on 6.1 - 6.4

- homework was gone over on the board
- Students were quiet and attentive as Mrs. Hall went over the homework questions that the students ~~asked for~~ requested
- One student Charles, had his head down while the questions were being corrected
- ~~6.3 wa~~ Section 6.3 was introduced
- Terms discussed: Ionic Bonding, formula unit, crystal lattice, Lewis dot for ionic compounds
- Most students, except for resting Charles ~~took notes~~, who eventually paid attention
- Students were given a review sheet to study from and work on

1/19/2012

Period 5, Mrs Butcher, College Chemistry

Observations:

- Mrs. Butcher checked for textbooks as a homework assignment

- One student was listening to his ipod and did not put it away when told

- Notes were given on the board on section 6.2 on terms such as octet rule (and exceptions), electron dot notation

- Harold talked during the entire class, and Clara spoke often, as well.
- Harold was told to ~~move to his~~ sit ~~in the front~~ in a ~~seat~~ desk in front of the class because he continued to talk and disrupt the class. He became quieter

- The majority of the class was quiet during lecture

1/19/2012

Period 6, Mrs. Hall, College Biology

Observations:

Absent: Robert, Keith, José, Paul

- A new student came into class. Mrs. Hall told her she'd get her a textbook tomorrow. She had difficulty understanding English
- Students ~~handed~~ passed in their homework

- Students were reminded that they would have a test tomorrow and the topics they were to study were written on the board:
  - Chromosome structure, cell cycle,

- ~~The new student didn't take notes, and neither did a few other students~~
- The new student took notes, however 5 male students did not

- ~~St~~ Mrs. Hall had students work on an activity relevant to the cell cycle, in which they'd ~~cut~~ cut out, ~~color or~~ glue, order, & ~~color~~ label the phases ~~on~~ a piece of construction paper.
- One student helped the new student work on the activity

1/19/2012

Period 7, Mrs. Hall, Honors Chemistry

Observations

- Mrs Hall walked around to check for homework
- Absences: Joseph, Kayla, Lora
- 6.1-4 are the sections students ~~were~~ were told to expect on the test next week
- Students went over homework w/ Mrs Hall in class on the board
- students were quiet as Mrs Hall went over the homework
- Bailey was trying to hide that she was texting with her arm straight across the desk over her homework, phone hidden by her arm. She later put it away.
- Topics discussed (section 6.3): Ionic bonding, ionic compounds, Formula unit, Crystal lattice, lewis dot structure for ionic compounds, crystal lattice
- Charles had his cellphone out on his lap @ one time, and Samira also had hers on her desk. Charles later put his phone away

1/19/2012

Period 4, Continued

- Vivian, ali, and Samira, Mackenzie and Bailey were the most talkative in the class

- Students were handed a worksheet for homework

1/20/2012

Period 1, Mrs. Butcher, Honors Chemistry

Observations:

- Students were very talkative when class began.
- When Mrs. Butcher ~~few~~ wrote the first few definitions on the board they continued to talk, but as she explained them, they quieted
- terms defined: chemical + molecular formula, bond energy, bond length, octet rule

- topics discussed - formation of a chemical bond, exceptions to octet rule, expanded valence, electron dot notation

- students talked during the entire period
- examples were given next to appropriate definitions
- A few students did not take notes
- Seemed that lecturing was not an effective method ~~was~~ not for all students, as some were ~~very talka~~ constantly talking.
- ~~One female student was sleeping during class at some point, but~~
- No homework was given for the weekend

1/20/2012

Period 2, Mrs. Hall College Chemistry

Observations:

- Absences: Kat, Itzia, Jessica

- Mrs. Hall read some of the worksheet given to the students the day before
- Students took a quiz and were allowed to use a periodic table
- One student needed assistance taking the quiz because of an injured hand. The quiz consisting of 16 matching and two question that asked for Lewis dot structures. He did not know how to answer the last two questions

1/20/2012

Period 3, Mrs. Hall, College Chemistry

Observations

- Absences: ~~A~~ Karla

- Mrs. Hall went over the homework worksheet with her students at the start of class.
  - Students had to Finish the back of the worksheet for homework and study for their quiz on Monday
    - They were to study definitions from 6.1 & 6.2 and the Lewis dot structures for the main elements
  - Only 3 students did their homework
  - All Students were shortly called to the gym and auditorium to watch a ~~person~~ man give ~~a~~ ~~motivational~~ speech about his mistakes he made when ~~do~~ using drugs and how he came out of it. Freshman and Sophomores watched the ~~movie~~ speech live on a screen, and juniors & seniors watched the man in the gym

1/20/~~20~~2012

Period 6, Mrs. Hall, ~~B~~ College Prep Biology

Observations:

- Students passed in their homework
- Absences: ~~Diomar~~, Joseph, Brandon, Dimas, Luis, Sylvia, & Diomar
- The new female student's primary language was Portuguese and she came from Brazil
- Only 5 students handed in their homework out of the ~~16~~ 18 present
- Students took a test
- The class quieted down after being told a few times.

1/20/2012

Period 7, Mrs. Hall, Honors Chemistry

Observations

~ because of the presentation earlier in the day some students were at lunch for the first half of class

~ The rest of the period, students were allowed ~~Observers~~ to work on homework or talk quietly

1/23/2012

Period 1, Mrs. Severin, College Prep Chemistry

Observations:

- Mr. Severin reviewed the types of reactions and asked the class questions about specific reactions, such as why the reactant, Oxygen in one reaction had the number two subscript.

- Because Mrs. Butcher was absent today, five of her students sat in on Mr. Severin's class

- All students were paying attention and quiet as Mr. Severin lectured

- Mr. Severin told students what formulas they should look up in their books and the reactions to memorize
- The class did problems in the book together and were assigned problems for homework

1/23/2012

Period 2, Mrs. Hall, College Prep Chemistry

Observations:

- Homework was checked off in Mrs. Hall's gradebook.
- Absences: Jessica, Jack, Itzia

- Students were informed of a test on Wednesday
- Mrs. Hall reviewed section 6.3, Ionic Bonding, formula unit, using Lewis dot to show ionic bonding, crystal lattice, Lattice energy, comparison table between ionic + molecular compound properties

- Students were quiet as Mrs. Hall lectured
- two students, Edwin and Michelle had their eyes closed at one time + didn't take notes
- Mrs Hall used table salt and crushed it with a stapler to explain what occurs when it is ~~[illegible]~~ crushed (like charges repel in crystal lattice)
- Class went over homework worksheet together
- Theodora answered the majority of the questions Mrs. Hall posed during lecture, correctly
- Mrs. Hall informed students of a test either Wednesday or Thursday
- Students were told to study the worksheet they just went over for tonight

1/23/2012

Period 3, Mrs. Hall, College Prep Chemistry

Observations:
• Absences — Karla, ~~Micayle~~ Michela, Katherine

• Students were told they'd have a test Thursday
• Class went over part of the homework worksheet
• students then took a quiz quietly

Period 4, Mrs. Hall, Honors Chemistry

Observations:
- Absences: ~~Delaney~~, Trung ~~Howard~~ (Eric)

• Mrs. Hall checked for homework and ~~marked~~ gave students who had them points in her grade book.
• Mrs Hall handed back quizzes
• The students were told their test on 6.1-6.4 would be on Friday
• Topics covered in lecture: Crystal Lattice, crushing table salt (crystal lattice) demonstration, Properties of ionic & Covalent-bonded compounds

• All students except for Charles took notes, who had a low average for ~~3~~ 2nd term

1/23/2012

Period 5, Mr. Severin, Honors Chemistry

Observations:

- Students were given a quiz at the start of class
- After about 10 minutes when everyone had finished their quiz, one student handed them out randomly so that the students could correct each other's papers, writing their name on the student's paper to be graded
- Topics lectured: Types of reactions (synthesis, single- & double-replacement, combustion, decomposition)

- Class went over a few book problems
- Mr. Severin joked that "If you look away, I'm going to call on you", ~~as~~ while they were answering questions in the book
- Mr. Severin displayed enthusiasm and good humor during class
- Students were assigned problems in the text book for homework
- Quizzes were handed back and students were given about 20 minutes to start their homework

1/23/2012

Period 6, Mrs. Hall, College Prep Biology

Observations:

- Absences: Joseph, Ale
- 3 new students were admitted into class: they were given the same work to do presently as the rest of the class.
- Dimas and Brandon ~~was~~ were told to go into the next room ~~because he was not behaving appropriately~~ to ~~finish~~ take ~~his~~ their test
- Mrs Hall went through a worksheet and filled in the blanks with the class as her lecture.
- Bret did not ~~[illegible]~~ complete his worksheet
- Joel was caught texting and told to write ~~[illegible] he did not [illegible] and~~
- collin has asked for a pass to go to the restroom once every class (6th period)
- Students were taught about mitosis and meiosis
- Their homework was to ~~fill out~~ complete a certain part of the worksheet

1/23/2012

Period 7, Mrs. Hall, Honors Chemistry

Observations:

- Absences - ~~Joseph~~, alexandra, ~~Nikola~~

- Mrs. Hall ~~[illegible]~~ marked points in her gradebook for students who had done their homework

- Topics discussed and written on the board: ionic compounds, crystal lattice, formula unit, lattice energy, comparison of molecular and ionic bonding in a table (of properties)

- Students quietly took notes
- Mrs. Hall demonstrated why table salt makes a crunch when ground down, explaining how bonds break in the crystal lattice of NaCl
- Bailey, Samira and Ali talked sometimes during class
- Students received their quizzes and were shown their average grades for last (2nd) term

1/24/2012

Period 3 : Absences - Meghan, Collin, Catherine

Period 2: Absences: Edwin, Shauntaisia, Kat, ~~Maras~~ Itzia - in house

Period 4: Absences: None
*new student = ~~De~~ Dezarae, Mosley
Period 7: Absences: alexandra, Bailey

Period 6 : Thalia, Robert

- Today, Mrs. Hall demonstrate conductivity using ~~a~~ special light bulb conductivity equipment (device), ~~and~~ distilled water, tap water, and salt, to show that pure water doesn't conduct electricity, but tap water w/salt does. She also showed them containing copper sulfate crystals ~~to~~ to explain that ~~they~~ crystals can be different colors, not just white.

1/25/12

Period 2 : Absences - ~~Jessica~~, Katherine, Theodora, Shammol

Period 3 : Absences - Jamal, Karolyna came in late, ~~Catherine~~, Karla ~~and~~ she came in late

Period 7 : Absent - Alexandra

Objectives and homework were written in the corner of the board or small sideboard, depending on which classroom the teacher was in.

Period 2 - Jack and Jackson appear to care less about their grades. Edwin didn't take notes
Mrs. Hall demonstrated how salt doesn't melt on a hot plate, but sugar does and she showed how ~~saltt~~ salt in water conducts electricity

Period 7 - Charlie was one to watch, checked his phone sometimes talked to neighbors

Period 3 - Jamal was reading a novel, instead of paying attention and taking notes
Luis pays close attention and answered a question correctly - that Cu ions become ⊕ when they lose an e⁻ - when Mrs. Hall asked the class

On the field trip w/ ~~the~~ Mrs. Hill's AP Biology students, I oversaw 14 of the 28 students. Students performed a few activities in the lab at UMass Medical School, ~~Then~~ such as viewing yeast cells under a microscope and viewing a demonstration of electrolysis. All students in my group ~~were~~ were well behaved.

1/26/12

Period 2: absences - Hillary, Jessica, Theodora, ~~[illegible]~~, Shauntaisa, Julie, ~~Shane~~, Kat

Period 4: absences - Leonard

Period 3: absences - Michela ~~[illegible]~~

Period 7 - absences - Bailey

Period 2 - Shane did not correct his homework as Mrs. Hall went through it. Mrs. Hall told students what to know for the test, however no one took note. Henry volunteered to read his homework answers aloud. One could see that he had difficulty ~~with~~ speaking English clearly. ~~[illegible]~~ Mrs. Hall often had to ask Henry to repeat himself. Duy also showed ~~[illegible]~~ he was inproficient in English.

Period 3 - Class was quiet, nondisruptive today. Jamal read a novel and did not pay attention in class at all. Students took note of what Mrs. Hall said would be on test.

Period 4 - Peter did not have his homework worksheet to follow along with Mrs. Hall. All students took notes quietly.

Period 7 - ~~[illegible]~~ Class was quiet. Mackenzie and Charlie were talking across the room ~~at~~ one time. Mrs. Hall told class what to study for test and gave them a study guide

1/27/12

Period2 : Julie, Edwin, Kat, Theodora - absent
Period3 : Linette, Karla - absent
Period4 : Daniel - absent

1/30/12

Period2: Absent - Jessica, Julie, Riman, Shauntaisa, Kat
Period3: Absent - Marc, Karla, ~~Michaela~~ Michela, ~~Kelsey~~
Period4: Absent - Walker
Period7: Absent - Bailey, Patrick

1/31/12

Period2: Absent - Kat, Jessica, Julie
Period3: Absent - Michela, ~~Kelsey~~, Karla
Period4: Absent - Megi

Period 7: Absent - Talyce, Rahra

Absences: 2/1/12

Period 2: Kat Jessica, Hillary, Julie, Jack
Period 3: Michela, olivia, Edwin ~~Linette~~
Period 4: ~~Fabian~~ Trevon
Period 7: Alba

2/2 Absences
per. 2 : Julie, ~~Shane~~ Kat
Period 3 : Michela, Karla
Period 4 : None
Period 7 : Charlie

Observation: Mrs. Raazaq, RM 317
Period 6; Precalculus, Grade: 12

- Teacher projected her voice sufficiently and kept order in the class.
- When she realized that she was giving a question at the start of class that her students couldn't answer because she hadn't taught them the material ~~[illegible]~~ yet, she quickly came up with another question.
- Students were comfortable and talkative in her presence.
- Teacher was authoritative, but fun
- Students were randomly handed a piece of paper with a shape and got together in groups
- In groups, leader was to say their answers, recorder was to write their answers and then say which questions were answered differently
- Teacher waited for students to ~~talk~~ stop talking
- As students were going over homework in groups, teacher checked off h.w. in gradebook
- Then she posted answers on board using the ELMO projector
- Teacher, throughout class, walked around
- Jokingly spoke in another language

- Teacher told students "pay a little more attention and participate"
- Answers on ELMO are clearly written out.
- While correcting homework, teacher prompted for answers, and after each question, she asked if students still had any
- Markers are all dark and clearly visible on board, which was also very clean and could be easily read off.
- Teacher informed students that whatever material they didn't cover, which would be a review from what they learned in Algebra 2 (unit circle), they would be responsible for reviewing on their own at home
- When she asked if everyone remembered a concept, she told them with good humor to nod and say yes.

Appendix C

Syllabi for Chemistry

Worcester Public Schools
High School Curriculum

Course Syllabus – Part I

Course Title: Chemistry I

Course Description:

This course provides students with knowledge and understanding of the properties of matter and how these properties enable science to organize these elements on the periodic table. Students will develop understandings of the structure and function of the atom, and its chemical reactions, including the involvement of energy and sub-atomic particles to better understand the nature of chemical changes. By learning about various chemical reactions such as oxidation reduction, combustion, and decomposition, students learn about the chemical reactions that take place around us everyday. In addition students will develop deeper understanding of acids and bases, rates of reaction and factors that influence those rates. From the calculating of stoichiometry problems and molar concentrations, students will develop understanding of proportionality and strengthen their mathematical skills.

Course Objectives:

Students will:

- Understand the properties of matter.
- Explain nuclear chemistry.
- Recognize repeating patterns of physical and chemical properties among elements.
- Explain the chemical bonding process.
- Explain chemical reactions and employ the use of stoichiometry.
- Develop an understanding of thermochemistru
- Explain solutions, rates of reaction and equilibrium.
- Demonstrate knowledge of acids, bases, and oxidation reduction.

Essential Questions:

1. How can a limited number of elements combine to develop the diversity of materials that make up our environment?
2. What do chemical interactions take place to form both inorganic and organic chemical systems?
3. In what ways is chemistry a factor in everyday life and the environment?

Texts:

Holt ,Rinehart ,and Winston; Modern Chemistry; 2006

District-Wide Reading Skills Across the Curriculum:

- **Preview** (survey) – note major elements such as organization, vocabulary, summary and graphics.
- **Ask Questions** - question the text, the author and self.
- **Activate Prior Knowledge** (schema) – use what is already known to enhance understanding of what is new in the text.
- **Make Connections** - link text to self, text to world and text to text.
- **Visualize** - use sensory images to create a mental picture of the scene, story, situation, or process and involve oneself in it.
- **Draw Inferences** - go beyond the literal information in the text including predicting, figurative meaning and thematic understanding.
- **Distinguish Key Ideas** - recognize main idea and key concepts.
- **Use Fix-Up Strategies** - monitor own understanding by pausing to think, re-reading, considering, restating what makes sense.

Contextual Vocabulary:

properties of matter
atomic structure
elements
atoms
periodicity
chemical bonding
matter solutions reactions
equilibrium
stoichiometry
acids
bases
oxidation reduction
nuclear chemistry

Recommended Grading Policy (indicate percent for each factor):

- Classroom participation -
- Projects/papers -
- Homework -
- Final test/assessment* - 10%
- Annual Science research project (research, experiment, record, analyze data, and present results).This constitutes 25% term 3 grade. Each student is required to complete one project.

*The Worcester School Committee requires that the final test/assessment be 10% of a student's grade

Prerequisite Courses:

None

Note to Teachers: In addition to handing out the above syllabus to students, you should also hand out to them your expectations in the following areas:

✓ Homework policy
✓ Make-up policy
✓ Attendance requirements
✓ Any other expectations

Worcester Public Schools
High School Curriculum

Course Syllabus – Part II, Academic Content for the First Semester
Chemistry I

Content/Topics –	Skills/Understandings	Required Papers/Projects, Readings, and Final Assessment/Test	Academic Standards (Worcester Benchmarks and State Frameworks)
		SAMPLE ASSIGNMENTS:	**SKILLS OF INQUIRY**
Introduction to chemical observations.	Record accurately and use precision in their measurement. (conversions, significant digits and scientific notation.	Laboratory experiences and quantification reporting.	SIS1 Observation, Question, Formulate Hypothesis. SSIS2 Design and conduct scientific investigations. SIS3 Analyze and interpret results.
Study of physical and chemical changes, physical and chemical changes, and recognizing elements and compounds.	Distinguish between compounds and physical and chemical changes.	Laboratory experiences and reporting. Diagramming and modeling of elements and compounds.	SIS4 Communicate and apply results. (OM.SC.CH.01-09) Mathematics skills (OM.SC.CH.61-70) Properties of Matter Physical and
Scientific investigations to develop understandings of chemical interactions will be conducted.	Demonstrate the ability to design, conduct, and analyze, interpret, and communicate results of scientific investigations.	Design, conduct, and demonstrate understanding of a chemical principle.	chemical properties reflect the nature of the interactions between molecules and atoms and can be used to classify and describe matter. (Chemistry1.1-1.3) (OM.SCCH.10-14)
Demonstrate and understanding of the evolution of atomic theory.	Describe the atomic models of Dalton, Thompson, Rutherford and Bohr.	Construct a model of an atom attributed to a recognized theorist and explain its structure.	Atomic Structure and Nuclear Chemistry -- Atomic models are used to explain atoms and help us understand the interaction of elements and molecules on a macroscopic scale.(Chemistry 2.1-2.7) (OM.SC.CH.15-21)

Develop an understanding of conservation of matter and knowledge of the states of matter	Explain the states of matter, and demonstrate understanding of the conservation of matter.	Students will demonstrate the changes of matter states using water and use this process to demonstrate matter conservation.	
Understand the electron configuration of an atom	Demonstrate electron through modeling configurations of the elements numbered 1-24.	Students will use modeling and diagrammatic simulations to demonstrate electron configurations.	
Explain the processes of Fission and fusion.	Communicate knowledge and understanding of the process of fission and fusion.	Students will develop a seminar presentation of the importance of fission or fusion and present and participate in a seminar.	
Under stand the organization and function of the periodic table.	Demonstrate elemental relationships, classes, location, electron configuration, reactivity, and behavior using the periodic table.	Students will solve problems using the periodic table.	Periodicity Repeating (periodic) patterns Of physical and chemical properties occur among elements that define families with similar properties. (Chemistry 3.1-3.4) (OM.SC.CH.22-25)
Develop an understanding of the chemical bonding using valence numbers, Lewis structures and chemical formulas to describe covalent, ionic and polar bonding.	Diagram covalent bonds using Lewis structures and explain electro-negativity in covalent bonding using diagrams.	Student will diagram molecules using Lewis structures and developing model of covalent bonds.	Chemical Bonding Atoms bond with each other by transferring or sharing electrons. (Chemistry 4.1-4.6) (OM.SC.CH.26-31)

Worcester Public Schools
High School Curriculum

Course Syllabus– Part II, Academic Content for the Second Semester
Chemistry I

Content/Topics –	Skills	Required Papers/Projects, Readings, and Final Assessment/Test	Academic Standards (Worcester Benchmarks and State Frameworks)
Communicate and demonstrate understanding of valence shell repulsion theory, hydrogen bonding in water, and balancing chemical equations.	Show how to apply the valence repulsion theory, the hydrogen bonding of water, and the ability to balance equations.	Students will use modeling to balance equations and apply the valence shell repulsion theory.	Chemical Reactions and Stoichiometry In a chemical reaction, one or more reactants are transformed into one or more new products. Chemical equations represent the reaction and must be balanced. The conservation of atoms leads to the ability to calculate the amount of product formed and the reactants used. (Chemistry 5.1-5.6) (OM.SC.CH.32-37)
Explain the of classification of chemical reactions.	Be able to classify chemical reactions.	Classify chemical reactions by developing reaction charts.	
Determine empirical, elemental formulas, calculate mass to mass, and determine yield in reactions.	Use elemental formulas, empirical formulas, apply mass to mass, and determine yield.	Students will apply these processes in laboratory experiences and class assignments.	
Use the mole theory and molecular mass to determine elemental and molecular particles.	Demonstrate the ability to use and apply the mole theory and molecular mass to solve problems.	Conduct experiments an apply the mole theory and molecular mass to predict results.	States of matter, Kinetic Molecular Theory, and Thermochemistry Gas particles move independently of each other and are far apart. Their behavior can be modeled by the kinetic molecular theory. In liquids and solids particles are close together. The reorganization of atoms in chemical reactions in the release or absorption of energy. (Chemistry 6.1-6.5) (OM.SC.CH.38-42)
Explain and calculate the behavior according to the gas laws.	Apply the gas laws in solving problems.	Develop diagrams of the gas laws and use calculations to explain them.	
Use the kinetic theory to explain the states of matter	Use the kinetic theory to explain the states of matter.	Develop models and support with kinetic calculations to explain how the kinetic theory applies to the states of matter.	

Describe the law of energy conservation and systematic movement towards entropy.	Understanding of the law of conservation of energy and the movement of systems towards entropy.	Students will write a three to five page paper on the conservation of energy in an industrial system.	Solutions, Rates of Reaction, and Equilibrium. Solids liquids and gasses dissolve to form solutions. Rates of reaction and chemical equilibrium are dynamic processes that are significant in many systems. (Chemistry 7.1-7.6) (OM.SC.CH.43-48)
In solutions the identify solutes and solvents, calculate morality, identify dissolving rates, quantify solutions and solvents.	Describe, identify and quantify solutions.	Through a series of laboratory experiences that require the development of and the description of solutions that will be reported to the class.	
Identify factors that affect chemical reactions and predict shifts in chemical systems.	Describe the factors that affect chemical reactions and predict equilibrium shift in chemical reactions.	Conduct and develop reports that demonstrate reaction factors and alter equilibrium.	Acids and bases are important in numerous chemical processes that occur in and around us. Oxidation reduction reactions transfer electron form one substance to another and are a major class of chemical reactions. (Chemistry 8.1-8.4) (OM.SC.CH.50-55)
Define the Arrhenius and Bronsted-Lowry theories of acids and bases and explain the hydrogen ion relationship.	Describe and explain the Arrhenius and Bronsted-Lowry theories of acids, bases, and hydrogen ion relationships.	Students will develop reports illustrating the importance of acids and bases in the community.	
Develop an understanding of radio active decay.	Demonstrate an understanding of radioactive decay using the C-14 process of dating organic objects.	Students will develop a short paper on the application of the C-14 dating of artifacts	

Appendix D

Daily Lesson Plans

Daily Lesson Plan

<table>
<tr><td>Date: Feb.2, 2012</td><td>Subject: Chemistry</td><td>Grade: 10</td></tr>
<tr><td colspan="3">Learning Standards from MA Curriculum Frameworks Focused on: (4.3) Brief review of using electronegativity to explain the difference between polar and nonpolar covalent bonds.</td></tr>
<tr><td>Topics Covered:
Dipole and molecular polarity</td><td colspan="2">Materials/Resources:
Notebooks, pens, paper</td></tr>
<tr><td colspan="3">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will be able to determine the polarity of a molecule</td></tr>
<tr><td colspan="3">Introduction:
Begin with the definition of a dipole, then mention that they recently learned how to determine the polarity of a bond and now they'll determine the polarity of the whole molecule</td></tr>
<tr><td colspan="3">Activities:

*Lecture on dipoles and determining the polarity of a molecule</td></tr>
<tr><td>Assessment (Evidence of Learning):

*Homework worksheet (Ch. 6.5 Review)</td><td colspan="2">Wrap-Up/Reflection:
*How to determine molecular polarity
*Any questions on what was taught today</td></tr>
<tr><td colspan="3">Comments: Students were confused with calculating the difference in electronegativities to determine the bond type and had trouble focusing on the polarity of the whole molecule</td></tr>
</table>

Daily Lesson Plan

Date: Feb.3, 2012	Subject: Chemistry	Grade: 10
Learning Standards from MA Curriculum Frameworks Focused on:		
Topics Covered: VSEPR and molecular polarity	Materials/Resources: candy, marshmallows, toothpicks, model kits	
Learning Objectives (Knowledge and abilities students will have acquired after the lesson): Students will be able to determine the Lewis dot structures, molecular geometry shape and name, bond angles, and polarity of molecules using model kids or candy and toothpicks		
Introduction: Go around the room and check for homework completed on my grade sheet, then go over answers to homework with the class		
Activities: *Homework correction (Ch. 6.5 Review wks.) *Review molecular polarity with focus on lone pairs of electrons and terminal atoms *VSEPR and molecular polarity lab		
Assessment (Evidence of Learning): *Completed and corrected homework assignment *Progress and assignment of VSEPR and Molecular Polarity Lab worksheet	Wrap-Up/Reflection: *Have students complete lab worksheet for homework	
Comments: Make certain to put students in pairs or groups of three for the lab so that students are less inclined to let others do all the work		

Date: Feb.6, 2012	Subject: Chemistry	Grade: 10

Learning Standards from MA Curriculum Frameworks Focused on:	
Topics Covered: VSEPR and molecular polarity	Materials/Resources: candy, marshmallows, toothpicks, model kits
Learning Objectives (Knowledge and abilities students will have acquired after the lesson): Students will be able to determine the Lewis dot structures, molecular geometry shape and name, bond angles, and polarity of molecules using model kids or candy and toothpicks	
Introduction: Go around the room and check for homework completed (only the Lewis dot structure and polarity columns) on my grade sheet. Announce due date for the lab worksheet (Feb.9th, Thurs.), homework assignment, and a quiz planned for Feb. 8th, Wednesday.	
Activities: *Review lone pairs of electrons (nonbonded electrons) and bonded electrons *VSEPR and molecular polarity lab	
Assessment (Evidence of Learning): *Completed columns of VSEPR and Molecular Polarity Lab worksheet (Lewis dot structures and polarity) *Assign Pg. 211, #37, 39-42	Wrap-Up/Reflection: *Have students complete lab worksheet for homework
Comments: Some students tried to draw the Lewis dot structures for the molecules without tallying the electrons to show how they arrived at the structures and did not draw the right structure and became confused. Students were urged to show their work.	

Daily Lesson Plan

<table>
<tr><td>Date: Feb.7, 2012</td><td>Subject: Chemistry</td><td>Grade: 10</td></tr>
<tr><td colspan="3">Learning Standards from MA Curriculum Frameworks Focused on: (4.5) Identifying how hydrogen bonding in water affects a variety of physical phenomena, such as boiling point</td></tr>
<tr><td>Topics Covered:
Intermolecular Forces</td><td colspan="2">Materials/Resources:
Notebooks, pens, overhead projector</td></tr>
<tr><td colspan="3">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will learn about intermolecular forces, that they exist in all molecules, and the types that exist between polar molecules (dipole-dipole, and hydrogen bonds) and those that exist between nonpolar molecules, diatomic molecules, halogens and noble gases (London dispersion forces)</td></tr>
<tr><td colspan="3">Introduction: Check for completed problems in the book that were assigned for homework, remind students of a quiz tomorrow and briefly state what they should study for the quiz, ask if there are any questions on the homework completed</td></tr>
<tr><td colspan="3">Activities:

*Lecture
*Homework correction (pg. 251, #37, 39-42)
*Quick quiz review</td></tr>
<tr><td>Assessment (Evidence of Learning):
*Completed homework problems assigned in the book on pg. 251, #37, 39-42</td><td colspan="2">Wrap-Up/Reflection:
*Ask if there's any questions about the material taught today or tomorrow's quiz</td></tr>
<tr><td colspan="3">Comments: Students had difficulty understanding what London dispersion forces are. Be prepared to have activities at hand if I finish lecturing before class is over.</td></tr>
</table>

Daily Lesson Plan

<table>
<tr><td colspan="2">Date: Feb.8, 2012</td><td colspan="2">Subject: Chemistry</td><td>Grade: 10</td></tr>
<tr><td colspan="5">Learning Standards from MA Curriculum Frameworks Focused on: (4.2) Draw Lewis dot structures for simple molecules. (4.4) Use VSEPR theory to predict the molecular geometry (linear, trigonal planar, tetrahedral) of simple molecules. (4.5) Identify how hydrogen bonding in water affects boiling point. The college preparatory classes learned (4.6) how to name and write chemical formulas for simple ionic and molecular compounds</td></tr>
<tr><td>Topics Covered:
VSEPR, molecular polarity, intermolecular forces, and introduction to chemical formulas and nomenclature to the college preparatory classes</td><td colspan="4">Materials/Resources:
Quiz, notebooks, pens</td></tr>
<tr><td colspan="5">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students should be able to perform the tasks required of them on their VSEPR and Molecular Polarity lab worksheet and understand the types of intermolecular forces. If time, students will be introduced to chemical formulas and naming binary ionic compounds</td></tr>
<tr><td colspan="5">Introduction: Students will be given their quiz and told to start reading the next chapter to prepare for tomorrow’s lecture, as well as complete the homework problems assigned in the book</td></tr>
<tr><td colspan="5">Activities:

*Quiz on determining the polarity of a molecule, intermolecular forces notes

*Lecture to college preparatory classes (periods 2 and 3) about monatomic ions and binary ionic compounds, and how to name and write the chemical formulas of binary ionic compounds</td></tr>
<tr><td colspan="3">Assessment (Evidence of Learning):
*Graded quizzes
*Assigned book work, p.251 #1-6</td><td colspan="2">Wrap-Up/Reflection:
*Have students start looking over chapter 7 and work on the book problems</td></tr>
<tr><td colspan="5">Comments: As quizzes were being graded, a noticeable error that students made when drawing Lewis dot structures was not showing their work by tallying electrons. Talyce and Gjergji were known to be absent often on days of quizzes or tests, as they were today</td></tr>
</table>

Daily Lesson Plan

<table>
<tr><td colspan="2">Date: Feb.9, 2012</td><td colspan="2">Subject: Chemistry</td><td>Grade: 10</td></tr>
<tr><td colspan="5">Learning Standards from MA Curriculum Frameworks Focused on: (4.6) Name and write the chemical formulas for simple ionic and molecular compounds</td></tr>
<tr><td>Topics Covered: Chemical formulas of and naming of monatomic ions and binary ionic compounds, and the stock system of nomenclature</td><td colspan="4">Materials/Resources:
Notebooks, pens, name tags and charts for game</td></tr>
<tr><td colspan="5">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will be able to name and write the chemical formulas of binary ionic compounds and use the stock system of nomenclature</td></tr>
<tr><td colspan="5">Introduction: Review an example of the criss-cross method for obtaining the chemical formula if students were introduced to the concept yesterday. Begin lecture of chemical formulas, naming binary ionic compounds, and the stock system of nomenclature</td></tr>
<tr><td colspan="5">Activities:

*Lecture
*Go over homework, p.251 #1-6 with periods 2 and 3
*If time, play the “Bond with a Classmate” game (group activity) with the college prep class (Was able to with period 3), where students combine themselves (metal and nonmental) and write the chemical formula and name of the compound on the chart</td></tr>
<tr><td colspan="3">Assessment (Evidence of Learning):
*Corrected homework previously assigned
*Success in playing the group activity
*Assign Homework Worksheet(7.1, Bond with a Classmate Game)- problems for period 2, both sides for period 3
*For period 4 and 7 assign WS 1and #2</td><td colspan="2">Wrap-Up/Reflection:
*Remind students to complete their homework
*Ask students if they have any questions on chemical formulas and naming</td></tr>
<tr><td colspan="5">Comments: Did not have time to go over homework (p.251 #1-6) with period 4 and 7. Students had difficulty understanding the criss-cross method, but their confusion was eliminated. Students had to be reminded of how main group elements obtain their charges. Period 7 did not finish going over stock system examples. Students’ attention was grabbed when they heard their teacher speak German and mention that she almost started writing in German on the board.</td></tr>
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Daily Lesson Plan

<table>
<tr><td colspan="2">Date: Feb.10, 2012</td><td colspan="2">Subject: Chemistry</td><td colspan="2">Grade: 10</td></tr>
<tr><td colspan="6">Learning Standards from MA Curriculum Frameworks Focused on: Period 4 covered:(4.6) Name and write the chemical formulas for polyatomic ions</td></tr>
<tr><td colspan="2">Topics Covered: Naming ionic compounds using the Stock System
Polyatomic ions (period 4)</td><td colspan="4">Materials/Resources:
Notebooks, pens, worksheets, ELMO projector</td></tr>
<tr><td colspan="6">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will be able to name compounds using the Stock System and write the formulas of given compounds</td></tr>
<tr><td colspan="6">Introduction: Period 2 and 3- go over worksheet 7.1, and lecture on Stock System for period 3
Period 4 and 7- Go over homework p.251 #1-6, put up WS 1 and #2 up on the ELMO projector for students to correct on their own and ask questions
Finish lecture on Stock System for period 7 before reviewing homework</td></tr>
<tr><td colspan="6">Activities:

Period 2- WS 7.1, WS 1 and #2
Period 3- Stock System lecture, WS 7.1, WS 1 and #2
Period 4-p.251 #1-6, WS 1 and #2 on ELMO projector, Polyatomic ions lecture
Period 7-Finish Stock System lecture, p.251 #1-6, WS 1 and #2 on ELMO projector, Polyatomic ions lecture</td></tr>
<tr><td colspan="3">Assessment (Evidence of Learning):
Period 2 and 3:WS 1 and #2
Period 4: Assignment #3 #1-12, 26-37
Period 7: p.251 #7,8,16-18</td><td colspan="3">Wrap-Up/Reflection:
*Assign homework
*Ask if any further questions
*Tell students they're doing a good job</td></tr>
<tr><td colspan="6">Comments: Practice projecting voice louder so students in the back of class can hear.
Students' attention effectively grabbed by speaking and writing in German. Make sure to be prepared with alternate assignments and activities to do in class to be flexible with what is covered in lecture and possible disruptions during class</td></tr>
</table>

Daily Lesson Plan

<table>
<tr><td>Date: Feb.13, 2012</td><td colspan="2">Subject: Chemistry</td><td>Grade: 10</td></tr>
<tr><td colspan="4">Learning Standards from MA Curriculum Frameworks Focused on: (4.6) Name and write the chemical formulas for simple ionic and molecular compounds, including those that contain the polyatomic ions: ammonium, carbonate, hydroxide, nitrate, phosphate, and sulfate</td></tr>
<tr><td>Topics Covered: Binary ionic compounds, polyatomic ions</td><td colspan="3">Materials/Resources:
Notebooks, pens, ELMO projector</td></tr>
<tr><td colspan="4">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will understand the difference between binary ionic compounds and polyatomic ions, and be able to write the name of the chemical compounds and their formulas, using the Stock System and other nomenclature guidelines</td></tr>
<tr><td colspan="4">Introduction: Put flow chart for chemical compounds up on the ELMO projector while checking homework, then go over homework. Tell students a few chemistry jokes.</td></tr>
<tr><td colspan="4">Activities:

Period 2: Go over WS 1and #2, then lecture on polyatomic ions, assign homework (Chemical Formula WS first 10 questions of both columns) and announce tomorrow's quiz on binary ionic compounds
Period 3: Same as period 2, except did not get to lecture on polyatomic ions
Period 4: Go over Assignment #3(#1-12, 26-37) worksheet, have students finish Chemical Formula WS (first 10 questions of both columns) for homework and announce a quiz tomorrow
Period 7: Go over p.251, #7,8,16-18, give lecture on polyatomic ions, hand out Assignment #3 worksheet, announce quiz, then have students finish Chemical Formula WS for homework and announce a quiz tomorrow</td></tr>
<tr><td colspan="2">Assessment (Evidence of Learning):
*Understanding of homework corrected
*Assigned Chemical Formula WS (first 10questions of both columns)</td><td colspan="2">Wrap-Up/Reflection:
*Remind students of quiz tomorrow
*Tell students to do Chemical Formula WS
*Announce that I will be staying after school</td></tr>
<tr><td colspan="4">Comments: Students were talkative in most classes and not paying attention because they asked the same questions whose answers I constantly repeated throughout class. Therefore, some action must be taken to call for students' utmost attention. Must be more assertive with students. They do not think they have to work as hard or behave the same as when Mrs. Hall is teaching because they know I'm only a student teacher. I must show them otherwise. Underline important terms on the board in a different color. College prep students did not seem to appreciate corny jokes as much as honor students. Some students, in period 2 Jessica, Jack, Jackson, and Itzia, and in period 3 Jamal, did not pay attention or take notes. In period 4, Dezarae, a new student, seemed to disrupt the left side of the room and distract some of the male students' attention from the lecture, Trevon in particular, who had recently brought up his grades but is now in danger of having them brought back down.</td></tr>
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Daily Lesson Plan

<table>
<tr><td colspan="2">Date: Feb.14, 2012</td><td colspan="2">Subject: Chemistry</td><td colspan="2">Grade: 10</td></tr>
<tr><td colspan="6">Learning Standards from MA Curriculum Frameworks Focused on: (4.6) Name and write the chemical formulas for simple ionic and molecular compounds, including those that contain the polyatomic ions: ammonium, carbonate, hydroxide, nitrate, phosphate, and sulfate</td></tr>
<tr><td colspan="2">Topics Covered:
Polyatomic ions</td><td colspan="4">Materials/Resources:
Quiz, notebook, pens</td></tr>
<tr><td colspan="6">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will better understand how to name and write the chemical formulas for polyatomic ions</td></tr>
<tr><td colspan="6">Introduction: Have students take quiz on binary ionic compounds, check and go over Chemical Formula worksheet, announce a test that will be given on Friday</td></tr>
<tr><td colspan="6">Activities:

*Quiz on binary ionic compounds-naming and writing chemical formulas (all classes)
Per.2-Read aloud answers to Chemical Formula WS and go over ones students had questions on, work on Assignment #3 WS together
Per.3-Lecture on Polyatomic ions after quiz, read aloud Chemical Formula WS and go over ones students did not understand, work on Assignment #3 WS together
Per.4-Read aloud answers to Chemical Formula WS and go over ones students had questions on, work on Assignment #3 WS together (have students come up to board to give answers for #13-16)
Per.7- Read aloud answers to Chemical Formula WS and go over ones students had questions on, play game with students where they break up into two teams, person who raises hand first (or wins rock-paper-scissors) and answers correctly wins point for team. Winning team earned one point on the quiz they just took</td></tr>
<tr><td colspan="3">Assessment (Evidence of Learning):
*Completed h.w. Chemical Formula WS
*Graded quiz
*Per.2: Assignment #3 WS, #1-14
*Per.3: Chemical Formula WS, 1st column
*Per.4: Finish all of Assignment #3 WS
*Per.7: Assignment #3 WS, 1st column</td><td colspan="3">Wrap-Up/Reflection:
*Speak louder, emphasis on important terms/phrases
*Continue using German
*Try getting other students involved
*Students in period 7 enjoyed the game, but were a bit too rowdy. Maybe try a more fair game that doesn't get them overly excited but still intrigued</td></tr>
<tr><td colspan="6">Comments: Grades from the Quizzes A and B: Binary Ionic Compounds showed that the majority of the students in periods 2 and 3 (college prep) were not paying attention to my lessons. Therefore, I must address the issue of their lack in effort due to the fact that I am</td></tr>
</table>

now teaching them, and not Mrs. Hall. Action must be taken to make it clear to the students that I may not be Mrs. Hall but I am still their teacher, here to do my job and all I ask is for the same in return — respect and for them to do their part as students. After teaching for a few weeks it has become apparent that Theodora, An, and Zahra from period 7,and Anthony, Carly, Nam, and Jacqueline from period 4 are the star students who work the hardest and get the highest grades. Islynn from period 4 is also one of the hardest working students I have come across. She often stays after school for extra help. Caleb from period 4 is one of the students who performs the most poorly because of a lack of willingness to put in effort to learning.

Daily Lesson Plan

<table>
<tr><td>Date: Feb.15, 2012</td><td>Subject: Chemistry</td><td>Grade: 10</td></tr>
<tr><td colspan="3">Learning Standards from MA Curriculum Frameworks Focused on: (4.6) Name and write the chemical formulas for simple ionic and molecular compounds, including those that contain the polyatomic ions: ammonium, carbonate, hydroxide, nitrate, phosphate, and sulfate</td></tr>
<tr><td>Topics Covered:
Ternary Ionic Compounds
Binary Molecular Compounds</td><td colspan="2">Materials/Resources:
Notebooks, pens, ELMO projector</td></tr>
<tr><td colspan="3">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will acquire a better understanding of how to name and write the formulas of ternary ionic compounds. They will also learn and be able to write the chemical formulas of and name binary molecular compounds</td></tr>
<tr><td colspan="3">Introduction: Check homework, remind students of their test on Friday, lecture on binary molecular compounds, mixed formula review WS, also announce to those students who did not take the quiz yesterday that they will have to take tomorrow after school</td></tr>
<tr><td colspan="3">Activities:
per2- Put Assignment #3 WS, #1-14 on ELMO projector and answer questions, give lecture on binary molecular compounds, start Binary Molecular Compounds WS #3
per 3- Go over questions students have on 1st column of Chemical Formula WS, after putting up the key on the ELMO projector, then give lecture on binary molecular compounds
per 4- Put Assignment #3 WS on ELMO projector and go over questions students have, lecture on binary molecular compounds, work on Binary Molecular Compounds WS #3 as a class
per 7- Put Assignment #3 WS on ELMO projector and go over questions students have, lecture on binary molecular compounds, work on Binary Molecular Compounds WS #3 as a class</td></tr>
<tr><td colspan="2">Assessment (Evidence of Learning):
*Completed Assignment #3 WS for periods 2,4, and 7, and 1st column of Chemical Formula WS for period 3
*per 2-all of Binary Molecular Compounds WS #3</td><td>Wrap-Up/Reflection:
*Students were encouraged to ask questions
*Students were also advised to participate more in class, do their homework, and come after school if extra help is needed to start bringing up their grades, because some of the</td></tr>
</table>

*per 3- Left side of Binary Molecular Compounds WS #3 *per 4-Mixed Review Formula WS *per 7- finish up Binary Molecular Compounds WS #3 and Mixed Review Formula WS	last quiz grades were a catastrophe *Students continue to show interest when a few German words are interjected during lecture *German praise words on quizzes boosted self-confidence of students
Comments: A good idea might have been to have the test tomorrow and not Friday since some students in the last period of the day will choose to go to the prep rally instead of taking their test, since now they'll have to take it the Monday they come back from vacation.	

Daily Lesson Plan

Date: Feb.16, 1012	Subject: Chemistry	Grade: 10
Learning Standards from MA Curriculum Frameworks Focused on: (4.6) Name and write the chemical formulas for simple ionic and molecular compounds, including those that contain the polyatomic ions: ammonium, carbonate, hydroxide, nitrate, phosphate, and sulfate		
Topics Covered: Review Binary Molecular and ionic compounds as well as ternary compounds	Materials/Resources: Notebooks, pens, ELMO projector	
Learning Objectives (Knowledge and abilities students will have acquired after the lesson): Students will have more practice and become more proficient at naming chemical compounds and writing their formulas.		
Introduction: Remind students of their test tomorrow, check homework, go over homework on the ELMO projector, write summary flow chart on board		

Activities: *Go over homework together *per2- Go over h.w., all of Binary Molecular compounds WS #3 on ELMO projector, 7.1 summary flow chart on board, play game with Mixed Formula Review WS (the one of the two students from two separate teams who wrote the name or chemical formula first on the board won a point for their team, and winning team's players who went up to the board received a point on their test. Students were allowed to bring up their worksheet, periodic table and ion chart WS) *per3- Same as period 2 *per4- Put 7.1 summary flow chart on board, have students check their h.w. (Mixed Formula Review WS) on ELMO projector, use Assignment #4 WS for game that had students play in periods 2 and 3 *per7- Put 7.1 summary flow chart on board, have students check their h.w. (Binary Molecular compounds WS # and Mixed Formula Review WS) on ELMO projector, use Assignment #4 WS for game that had students play in previous periods

Assessment (Evidence of Learning): *Completed homework *Students' competence at the board during the game in giving the right answers	Wrap-Up/Reflection: *Study for test: 7.1 Summary Flow Chart, be able to determine chemical formulas in terms of numbers of atoms of each element

Comments: Some students showed that they had not been paying attention in class because they could not give an answer on the board correctly or had no idea where to start, while others showed that they knew exactly how to determine the answer. Some improvements that could be made in my teaching practice are speaking louder, putting emphasis on important words or phrases, try to get as many students in class involved by calling on them to answer questions, writing in black/blue and drawing arrows or stars in red/pink

Daily Lesson Plan

Date: Feb.17, 2012	Subject: Chemistry	Grade: 10
Learning Standards from MA Curriculum Frameworks Focused on:		
Topics Covered: Test on binary ionic and covalent compounds, as well as ternary compounds (polyatomic ions)	Materials/Resources: Test, pen	
Learning Objectives (Knowledge and abilities students will have acquired after the lesson): Students should be able to demonstrate proficiency in naming and giving the chemical formulas of binary and ternary compounds		

Introduction: Hand out periodic table and ion chart worksheet, then tests
Activities: *Test on Chapter 7.1

Assessment (Evidence of Learning): *Grade on test	Wrap-Up/Reflection: *All finished before class ended *Most of period 7 is taking the make-up test because they chose to go to a pep rally instead

Comments: Some students asked about the short answer because they did not understand the wording. Others also asked where they needed to write Roman numerals or prefixes.

Daily Lesson Plan

Date: Feb.27, 2012	Subject: Chemistry	Grade: 10
Learning Standards from MA Curriculum Frameworks Focused on: (5.3) Use the mole concept to determine number of particles and molar mass for elements and compounds. (5.4) Determine percent compositions		

Topics Covered: Formula and molar mass, percent composition	Materials/Resources: Notebooks, pens, periodic table

Learning Objectives (Knowledge and abilities students will have acquired after the lesson): Students will learn the definitions of molar mass, formula mass, and percent composition. They will be able to calculate the formulas mass, molar mass and percent composition from given chemical formulas.

Introduction: Ask students how their break was. Hand back corrected tests to periods 2,3, 4, and 6 students in period 7, then tell all classes that to increase their test grade by 20 points, they need to come for extra help after school this coming Tuesday and/or Thursday, and get 20 out of the 24 questions on the make-up test correct. Start lecture on Section 7.3, Determining Chemical Formulas
Activities: *Per2 and 3- Lecture on 7.3: Formula mass, molecular mass, percent composition *Per4- Lecture on 7.3: Formula mass, molecular mass, percent composition. Started Ch.7.3 WS #1 Using Chemical Formulas and Ch.7.4 WS#2 Determining Chemical Formulas in class (Question A) *Per7-Students who had gone to the pep rally before break instead of taking the test, took a separate test from what the other students had taken. The six other students who had taken the test were lectured on 7.3: Formula mass, molecular mass, percent composition

Assessment (Evidence of Learning): *Grades on test H.W. assigned: *Per2- Ch.7.3 WS #1 Using Chemical Formulas *Per3- Ch.7.4 WS#2 Determining Chemical Formulas in class (Question A) *Per4- P.244 #1,2,5, percent composition of Ag_2SO_4 *Per7- Ch.7.3 WS #1 Using Chemical Formulas and Ch.7.4 WS#2 Determining Chemical Formulas in class (Question A)	Wrap-Up/Reflection: *Give H.W. *Encourage students to come after school this Tuesday and Thursday for help

Comments: The majority of the students in all classes, with the exception of a few, performed poorly on the test covering Ch.7 Section 1, indicating that they had not studied, have not been paying attention in class, are not taking my teaching seriously, needed extra help but did not come after school, or do not care to learn the material. What can be done to improve grades is encourage students to take the make-up test next week and come after school for help.

Daily Lesson Plan

Date: Feb.28, 2012	Subject: Chemistry	Grade: 10

Learning Standards from MA Curriculum Frameworks Focused on: (5.3) Use the mole concept to determine number of particles and molar mass for elements and compounds. (5.4) Determine percent compositions, empirical formulas

Topics Covered: Formula and molar mass, percent composition, empirical formulas (honors students)	Materials/Resources: ELMO projector, notebooks, pens, periodic table

Learning Objectives (Knowledge and abilities students will have acquired after the lesson): Students will continue practicing calculating formula and molar mass, percent composition by mass, and the honors students will be introduced to determining a compound's empirical formula from its percent composition
Introduction: Periods 2 and 3, check and go over homework (WS #1 and #2A) on ELMO. Period 4-check homework, go over book homework and extra problem, then put WS #1 and #2A on ELMO for students to correct themselves. Period 7- Hand back rest of tests, encourage students to come after school Tuesday or Thursday and take the make-up test, then put WS #1 and #2A on ELMO for students to correct themselves
Activities: Per2-Checked and went over homework (h.w.) WS #1 and #2A, using ELMO Per3-Checked and went over WS #2 A and then WS #1 on ELMO, going over any misunderstandings Per4-Checked and went over h.w., as well as WS #1 and #2A, then lecture on empirical formulas (Ch. 7.4) Per7- Checked h.w. WS #1 and #2A and put on ELMO, brief review for students on yesterday's lecture, then lecture on empirical formulas (Ch. 7.4)

Assessment (Evidence of Learning): *Corrected h.w. Assigned h.w. : Per2- p.244 #1,2,5, %composition of Ag_2SO_4, element project Per3- p.244 #1,2,5, element project Per4-Molecular Formula Problems WS (empirical formula only) Per7- Molecular Formula Problems WS (empirical formula only)	Wrap-Up/Reflection: *Encourage students to come after school today for help for any questions on the material learned today or questions on the test they received back

Comments: Only 6 honors students came after school with questions on calculating empirical formulas and on their tests. Shane in period 2 spilled a cup of iced coffee during class, caused a disruption, and was written up, as drinks, except water, are not permitted in the classroom.

Daily Lesson Plan

Date: Feb.29, 2012	Subject: Chemistry	Grade: 10
Learning Standards from MA Curriculum Frameworks Focused on: (5.4) Determine percent compositions, empirical formulas, and molecular formulas.		

Topics Covered: Percentage compositions, empirical and molecular formulas (covered in honors)	Materials/Resources: Notebooks, pens, periodic table

Learning Objectives (Knowledge and abilities students will have acquired after the lesson): Students will become more proficient in calculating percentage compositions of given chemical formulas, and be able to determine the empirical and molecular formula of compounds when given appropriate known variables
Introduction: Check homework, then go over homework
Activities: Per2-Go over p.244 #1,2,5, and the percent composition of Ag_2SO_4, start lecture on Empirical Formula Per3- Go over p.244 #1,2,5, give entire lecture on Empirical Formula, then have students start on homework WS 7.21 and 7.23 Per4-Go over Molecular Formula Problems WS (empirical formulas only), then give Molecular Formula lecture Per7-Same as Period 4

Assessment (Evidence of Learning): *Checked homework Homework assigned: per2-p.888 #132,136 per3-WS 7.21 and WS 7.23 per4-Molecular Formula Worksheet WS per7-Molecular Formula Worksheet WS	Wrap-Up/Reflection: *Ask if they need any clarifications on what was taught today or if they have any further questions *Remind students to come after school tomorrow for extra help

Comments: Jack from Period 2 answered no when asked if he wanted to learn, although I was told from Mrs. Hall that he is in fact a bright student, who has done well on past tests when he wanted to, without doing any work in class, homework, or studying. *Quotes from Mrs. Hall*: There's never down time, never a dull moment. You always have to be on task, on your toes. Every day is different. One of the jobs of being a teacher is convincing students to accept, believe in it, to buy into what they are learning, that it's something that is important, to work hard, that they can do the work. Chemistry is one of the first classes that they may take where they realize they need to put in a lot of effort. They've got to want it. You don't need to be a genius, you just need to put in a lot of effort and time.

Daily Lesson Plan

Date: March 5, 2012	Subject: Chemistry	Grade: 10
Learning Standards from MA Curriculum Frameworks Focused on: (5.4) Determine percent compositions, empirical formulas, and molecular formulas		

Topics Covered:	Materials/Resources:
Percentage composition, empirical formula, molecular formula	Notebooks, pens, periodic table, ELMO projector

Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will be able to determine empirical formula from the percentage composition of a compound, and then go one step further to calculate the molecular formula from the empirical formula, and the given molar or formula mass

Introduction: Check homework, then go over homework with all classes, answering or writing out the answers on questions students had difficulty with

Activities:

Per2- Go over WS 7.21 and WS 7.23 on ELMO projector, lecture on molecular formulas

Per3- Go over Empirical and Molecular Formulas #1-3 on board, lecture on molecular formulas

Per4- Go over Practice Problems WS (EF and MF): Have 3 students write out answers on board and have class correct their answers, let students work in groups to complete #4,5 on the Empirical and Molecular Formulas Worksheet WS

Per7- same as Period 4

Assessment (Evidence of Learning):	Wrap-Up/Reflection:
*Checked homework Homework assigned: Per2- Empirical and Molecular Formulas WS Per3-Practice Problems WS(EF and MF) Per4- WS-Empirical Formulas WS, #3-6 Per7- same as Period 4	*Ask students if they would like to go over anything they learnt today *Encourage students to come after school tomorrow *Inform students that there will be a quest on Thursday

Comments: In period 2, Jack and Jackson had to be told to pick their heads up off their desks multiple times, therefore, if such a situation happens again, they will be given detentions. Improvements that could be made as far as teaching methods are the following: speaking a little louder for those sitting in the back of the room; being more assertive; getting students who are having more difficulty with concepts up at the board instead of those who have a better grasp of the material; focus on two students in period 2, such as Jack and Itzia, for two days to see if they can be helped and made to participate more during class

Daily Lesson Plan

Date: March 6, 2012	Subject: Chemistry	Grade: 10

Learning Standards from MA Curriculum Frameworks Focused on: (5.3) Use the mole concept to determine number of particles and molar mass for elements and compounds. (5.4) Determine percent compositions, empirical formulas, and molecular formulas

Topics Covered:	Materials/Resources:
Formula and molar mass, percent composition, empirical and molecular formula	Notebooks, pens, periodic table, ELMO projector

Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will review how to calculate formula and molar mass, percent composition, empirical and molecular formula

Introduction: Warn students in periods 2 and 3 that those who put their heads down during class will be given a detention and have to stay after school on Thursday. Check homework then post homework on ELMO projector. Answer questions on homework, and write out the problems students had difficulty with or have students write them out

Activities:

Per2- Go over h.w.(Empirical and Molecular Formulas WS) on projector then pair up students to work on the Problem Solving continued WS, #5 and 6

Per3-Go over Practice Problems WS (EF and MF) on projector. Pair up students to work on a letter from #5 and a problem from #6 on the worksheet Problem Solving continued, then have students write their answers on the board

Per4- Put up WS-Empirical Formulas WS, #3-6 on projector, put the problems up on the board that students had trouble with, then pair up students and assign each pair a question from the homework worksheet (#1,2) and Problem Solving continued WS (#5-11)

Per7- Put up WS-Empirical Formulas WS, #3-6 on projector, have a few students put the problems up on the board that others had trouble with, then pair up students and assign each pair a question from the homework worksheet (#1,2) and Problem Solving continued WS (#5-11)

Assessment (Evidence of Learning):	Wrap-Up/Reflection:
*Checked homework *Assigned homework to all classes: WS#4 Review on Ch.7.3 and Ch.7.4	*Remind students to stay after school today for extra help *Give students a heads up that they will have a quiz on Thursday on Ch. 7.3 and Ch. 7.4

Comments: In period 3, at the end of class, Jack admitted that he liked calculating molecular formulas, which made my day. Others in class also agreed that the work was not too difficult, such as Karolyna. When period 2 and 3 were warned that anyone who put their heads down during class would receive a detention, they listened well and took my teaching seriously. Having students work in pairs in period 2 was an effective teaching method in getting all students to participate in learning the material. Perhaps to get students more involved and communicate better with the students, I can come up with a game of Jeopardy or Fish Bowl, where students pick out a question from a bowl/hat. A motive to successfully get Samira up to the board to write out a problem she had trouble with was telling her that it would count toward participation when taking into account her grade.

Daily Lesson Plan

<table>
<tr><td>Date: March 7, 2012</td><td>Subject: Chemistry</td><td colspan="2">Grade: 10</td></tr>
<tr><td colspan="4">Learning Standards from MA Curriculum Frameworks Focused on: (5.3) Use the mole concept to determine number of particles and molar mass for elements and compounds. (5.4) Determine percent compositions, empirical formulas, and molecular formulas</td></tr>
<tr><td colspan="2">Topics Covered:
Formula and molar mass, percent composition, empirical and molecular formula</td><td colspan="2">Materials/Resources:
Notebooks, pens, ELMO projector, numbered slips of papers with questions, stick of Doublemint gum for each student, electronic beam balance, calculator, slips of paper with a question written on each</td></tr>
<tr><td colspan="4">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will become more competent in calculating formula and molar mass, percent composition, empirical and molecular formula. Period 4 will be practice and apply calculations of percent composition to gum in their lab, with the objective of finding the percent of sugar per stick of gum.</td></tr>
<tr><td colspan="4">Introduction: Inform students that they will be given a test on Friday and to study from yesterday's homework, check homework (WS#4 for all classes), post homework on the projector, then answer any questions and write out problems on the board students requested for because of confusion</td></tr>
<tr><td colspan="4">Activities:

Per2- Discuss and go over homework

Per3- Put up homework on ELMO and go over the questions students did not understand

Per4- Post homework on ELMO, go over homework and answer questions, then have students will execute the lab titled, Lab: Percent Sugar in Doublemint Gum

Per7- Post homework on ELMO, go over homework and answer questions, then split students into same pairs as yesterday and have them answer questions on the numbered slips of paper, having them grab another slip once they have correctly answered the one they were given.</td></tr>
<tr><td colspan="3">Assessment (Evidence of Learning):
*Checked homework
Assigned homework:
~Per2 and Per3- (counting as a quiz grade) p.252 #28b,c and #32c, p.888 #158b
~Per 4 and Per7- p.252 #28b,c and #32c, p.888 #151a and 158b</td><td>Wrap-Up/Reflection:
*Remind students to come after school for help tomorrow</td></tr>
<tr><td colspan="4">Comments: Some valuable teaching insight was gained after observing Mrs. Raazaq's 6th period Precalculus class (See observation notes: 3/7/12). Period 2 was not engaged or actively participating in class. Try to incorporate Mrs. Raazaq's method of putting students in groups to go over homework before giving the class answers to the homework. Henry</td></tr>
</table>

forgot his homework in period 2 at home, but was given a chance to bring it in tomorrow, as he has been putting a lot of effort into learning and participating in class. He is also working many hours, which has been affecting his study efforts in school. In period 7, Samira gave some attitude and made a rude remark. She will be pulled aside before or after class tomorrow and told that I considered what she said yesterday to be disrespectful and that if she does it again I'd go to the administrators, take action, as disrespect is not tolerated.

Daily Lesson Plan

<table>
<tr><td colspan="2">Date: March 8, 2012</td><td>Subject: Chemistry</td><td>Grade: 10</td></tr>
<tr><td colspan="4">Learning Standards from MA Curriculum Frameworks Focused on: (5.3) Use the mole concept to determine number of particles and molar mass for elements and compounds. (5.4) Determine percent compositions, empirical formulas, and molecular formulas</td></tr>
<tr><td>Topics Covered:
Formula and molar mass, percentage composition, empirical and molecular formula</td><td colspan="3">Materials/Resources:
Notebooks, pens, ELMO projector, numbered slips of papers with questions, numbered cards with pictures, stick of Doublemint gum for each student, electronic beam balance, calculator, slips of paper with a question written on each</td></tr>
<tr><td colspan="4">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students in Period 4 will prepare, in pairs, for the test tomorrow by calculating formula and molar mass, percent composition, empirical and molecular formula that the questions on the slips of paper ask. Periods 2, 3, and 7 will practice and apply calculations of percent composition to gum in their lab, with the objective of finding the percent of sugar per stick of gum.</td></tr>
<tr><td colspan="4">Introduction: Remind students to come after school to take the makeup test for the formula test, which most students performed poorly on. Also announce to students that there will be a test tomorrow. Check homework and post answers on ELMO for period 2, and read the answers aloud to the honors level classes (periods 4 and 7). Answer questions on homework.</td></tr>
<tr><td colspan="4">Activities:

Per. 2: Have students correct their own homework when posting answers on the ELMO, then collect the homework to be counted as a quiz grade. Have students do the Percent Sugar in Gum lab, then collect their lab worksheets. Put students into groups of 4 by row for the lab. The lab had to be read aloud to all students and everyone had to complete each step in the procedure before the class could move on. This lab was done as a class so that everyone would not make a mistake in following the directions.

Per. 3: The wrong page was assigned to students, p. 232 instead of 252, so most with the exception of a few did not do the homework on that page. Therefore, yesterday's assigned homework would be reassigned and collected tomorrow. Put students into groups of 4 by row before executing the lab. The lab is to be done as a class, and as they are completing their lab, I will go around to each lab bench and make sure they are on task and answer questions they may</td></tr>
</table>

<table>
<tr><td colspan="2">have.

Per. 4: As students walk into class, hand each of them a numbered card with a picture. Read homework answers aloud and clarify any misunderstandings. Tell the students to pair up with the other person who has the card with the same picture on it. Hand out question slips that contained a question. Tell students to check their answers with me, then, once they answered that question correctly, to bring up the question to the front desk and grab another.

Per. 7: Read homework answers aloud. Split students into groups of 5 by row, handed out gum, then have students work on lab. Warn students that if they do not follow directions, they will get a zero for the lab. Also tell them to make sure they show all their work on the lab worksheet, as they will be collected and graded.</td></tr>
<tr><td><u>Assessment (Evidence of Learning):</u>
*Checked homework
*Collected lab worksheets
Homework given:
*All students were to study for the test tomorrow on Ch. 7.3 and Ch. 7.4
Period 3-(counting as a quiz grade) p.252 #28b,c and #32c, p.888 #158b</td><td><u>Wrap-Up/Reflection:</u>
*Remind students of their test tomorrow
*Tell the students that those who came after school last week on either Tuesday or Thursday, or this Tuesday, may come after school today and take the makeup test on formulas, and earn up to 20 points on their original test.</td></tr>
<tr><td colspan="2"><u>Comments:</u> When Samira was pulled aside before class started, she admitted that she was wrong yesterday, apologized, and vowed not to do the same again. Going through and reading aloud each step to the college level classes was necessary and effective in order for them to complete the lab on time and without confusion. Handing out the picture cards to period 4 as a means of putting them in pairs also proved effective.</td></tr>
</table>

Daily Lesson Plan

<table>
<tr><td>Date: March 9, 2012</td><td>Subject: Chemistry</td><td>Grade: 10</td></tr>
<tr><td colspan="3">Learning Standards from MA Curriculum Frameworks Focused on: (5.3) Use the mole concept to determine number of particles and molar mass for elements and compounds. (5.4) Determine percent compositions, empirical formulas, and molecular formulas</td></tr>
<tr><td>Topics Covered: Formula and molar mass, percentage composition, molecular and empirical formulas</td><td colspan="2">Materials/Resources:
Test, pen, calculator</td></tr>
<tr><td colspan="3">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will demonstrate their proficiency in calculating the topics covered in chapter 7, sections 3 and 4, which includes molar and formula mass, percentage composition, empirical and molecular formulas</td></tr>
<tr><td colspan="3">Introduction: Hand students their homework due Wednesday as they come into class, then hand out tests</td></tr>
<tr><td colspan="3">Activities:

*All classes took the Ch.7 section 3 and section 4 Test</td></tr>
<tr><td>Assessment (Evidence of Learning):
*Test
Homework assigned to all classes:
DeComposition: Taking the News Apart-writing assignment (picking apart an article on a scientific topic)</td><td colspan="2">Wrap-Up/Reflection:
*Collect tests</td></tr>
<tr><td colspan="3">Comments: In period 2, Jackson and Jessica continued to talk during the exam after they had passed theirs in. They were spoken to after class and informed that for their misconduct, they have been given a detention, and will be expected to stay after school on Tuesday. Students in the other three classes had to be told to stop talking while others were still testing. In period 7, Sam was caught looking at another student's test. After Megi was confronted after class, she admitted that Sam was asking her for answers to the test, therefore it was decided that Sam would be warned on Monday that if he does the same on the next test, action will be taken, and reported to the administrators. Walker asked if he could make up the test and if he could look at his notes a few minutes before taking the test. However, he was not allowed to because although he had been out for a few days, he was</td></tr>
</table>

given the work he missed, which was his responsibility to complete and study. He failed the exam. Gjergji was caught cheating during the exam. A small scrap of paper was found on his desk, with the answer to the last question written on it. He was reprimanded after class by Mrs. Hall, who finally, after arguing with Gjergji, got him to admit that he got the answer from a friend. He received a zero on the exam. He would not confess who the other student was who gave him the answer. Mrs. Hall informed him that she would bring up his act of cheating on the test with the administrators on Monday.

Daily Lesson Plan

<table>
<tr><td>Date: March 12, 2012</td><td>Subject: Chemistry</td><td>Grade: 10</td></tr>
<tr><td colspan="3">Learning Standards from MA Curriculum Frameworks Focused on: Central concepts: In a chemical reaction, one or more reactants are transformed into one or more new products. Chemical equations represent the reaction and must be balanced. The conservation of atoms in a chemical reaction leads to the ability to calculate the amount of products formed and reactants used (stoichiometry). (5.1) Balance chemical equations by applying the laws of conservation of mass and constant composition (definite proportions).</td></tr>
<tr><td>Topics Covered:
*Introduction to Ch. 8 Section 1: Describing Chemical reactions
*Chemical equations
*Writing word equations and balanced formula equations, using coefficients</td><td colspan="2">Materials/Resources:
Notebooks, pens, periodic table</td></tr>
<tr><td colspan="3">Learning Objectives (Knowledge and abilities students will have acquired after the lesson):
Students will be introduced to the concept of a chemical equation and how to write word equations and balanced formula equations, using the knowledge they gained from Chapter 7 on how to write the correct formulas for chemical compounds</td></tr>
<tr><td colspan="3">Introduction: The language of chemists, how chemical equations are their sentence, etc... Use the analogy of making apple sauce (recipe) to get across the importance of writing the correct chemical formula.</td></tr>
<tr><td colspan="3">Activities:

*Period 7: Introductory lecture to Chapter 8, Section 1: Describing Chemical Reactions</td></tr>
</table>

Assessment (Evidence of Learning): Assigned Homework: *Page 290 #1-6	Wrap-Up/Reflection: *Ask students if they have any questions about the lesson taught today
Comments: Students were quiet most of the time. The students that stood out being the most talkative during the lecture were Samira, Alexandra, and Mackenzie. Alexandra and Mackenzie were told to stop being disruptive in class and asked to answer a question that was addressed to the class. Alexandra answered correctly, which indicated that she was paying attention.	

Appendix E

Lecture Notes

2/13/12

(Ionic) Chemical Compounds

↓

Chemical Formulas

Binary

↓

2 Elements

↓

Metal and Nonmetal

Main Group

↓

Form only 1 type of ion

↓

Use Periodic Table

End in -ide

Stock System

↓

Transition Metals

↓

Form more than 1 ion!!

↓

Roman Numeral gives charge

Cu^{+} Cu^{2+}

Copper(I) Copper(II)

Ternary

↓

more than 2 elements (usually have 3)

↓

Contain Polyatomic ions (+ and (-))

↓

Chart p.226

↓

Most end in -ate or -ite

↓

Exceptions:

OH^{-} hydroxide

NH_4^{+} Ammonium

CN^{-} cyanide

Dipole → 2 poles (+) + (−)

2/2/12

* Dipole = a molecule with positively and negatively charged regions
(+) & (−) charged ends

(molecule has molecular Polarity) ↓ below *

↓

created by equal, but opposite charges

↓

*

[One molecule & another are separated by very short distance

Bond

~ For instance :

1.9 = EN diff - ionic

Q: What kind of molecule?

1 Diatomics → HF - diatomic molecule

*3 take the polarity of their bond

2 - only one bond

~~- Bond polarity causes the molecule itself to be Polar.~~

4 - Bond is polar any of diff. in EN

5 - Molecule is polar cuz of (−) + (+) end

* Bond ~ Molecules with a ⊕ and ⊖ end [Net Imbalance of Charge] have a Molecular Polarity

~~~ If bond = polar, whole molecule = Polar~~

(+) H − F (−)

$\longmapsto$

6
~~~

Molec. w/ +2 atoms

ex: (-) O I 3.5 > 1.0 EN diff polar bond
2.5
H — C — H
(+)

2/2/12

~ Dipole points to the more EN atom (its Negative Pole)

Bond

EN dif → 0.8 ∴ polar covalent

ex: δ+ 2.1 3.0 δ- ← polar bond and Polar molecule! (because molecule has a dipole) (+) + (-) end

H − Cl

Dipole → $+\!\!\longrightarrow$

(crossed tail @ ⊕ Pole)

[Here Cl atom is pulling e^- away from H and owns them more.

Q: Why is there a dipole?

A: Because of the uneven distribution of charge (electrons)]

GO to P. 9 ⟶

~ Negative region in one polar molecule attracts positive area in a near-by molecule

[So one molecule with a dipole will attract another similar to it

↳ HCl will attract HF]

ex's: H − H
2.1 2.1
0

$+\!\!\longrightarrow$
H − F
\+ −

Bond is polar & Molecule = polar because molecule has (+) and (-) end

[College Prep: Mention there are other intermolecular forces, such as Dipole-dipole forces, but we're not focusing on them]

(Honors: Dipole-Dipole forces notes below)

Board

★ Dipole - Dipole Forces

↓

Forces of attraction between polar molecules

↓

short-range forces (btwn nearby molecules)

Dipole-Dipole forces - strong
- involves polar molecules

Hydrogen bond-making

↓

H — : O

Other Polar Molecules
ex: HCl

0 — 0.3 — 1.7 — 4.0 Start w/ I., p.5

Nonpolar ~ Polar, ionic

Covalent

2/2/12

Determining the Polarity of a Molecule

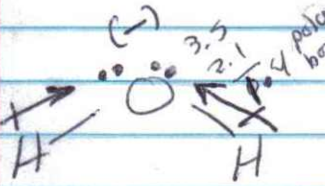
Molecule

Polar	Nonpolar
Not symmetrical	symmetrical
~ Has lone pairs on central atom and/or	~ No lone pairs on central atom
~ Terminal atoms differ	~ All terminal atoms are identical

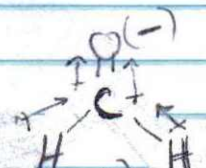
Polar Molecules:

Follow the pull! (of e-) The one pulling is more Negative

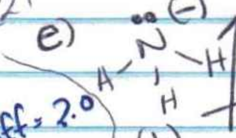
(2) a)



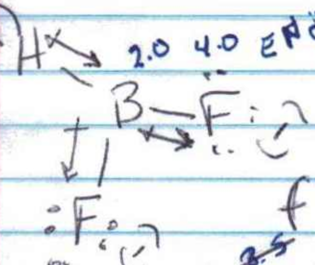
b)



(2) e)

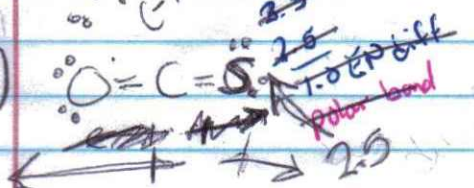


(2) c)



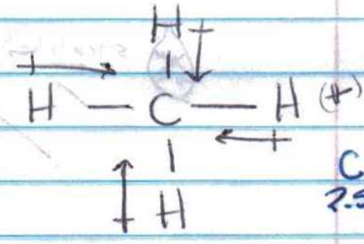
f) N≡C−H

d)



ex's: EN Diff

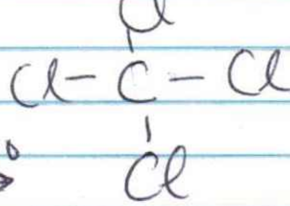
A)



C − H
2.5 − 2.1 = .4
polar bond

Bond polarities cancel out each other's effect

B)



Cl C
3.0 − 2.5 = 0.5
polar bond

E) O=C=O

C) :N≡N:

D) :O=O:

} Nonpolar bonds

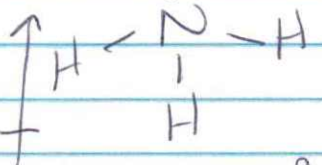
9

Review 2/3/12

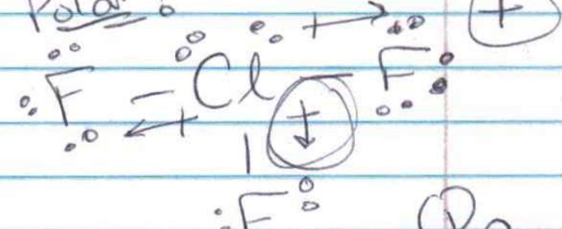
Molecular Polarity

Polar	Nonpolar
1) asymmetrical not symmetrical	1) symmetrical
2) Lone pairs on central atom and/or	2) No Lone Pairs on central atom
3) Terminal atoms differ	3) All terminal atoms = same

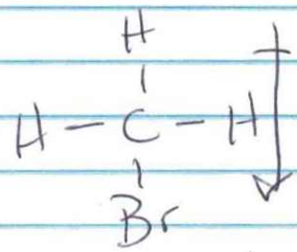
Polar!



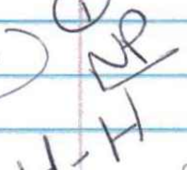
Polar!



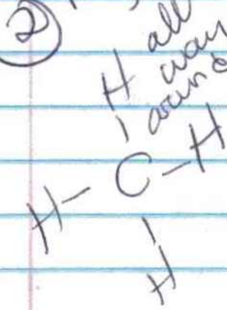
Polar!



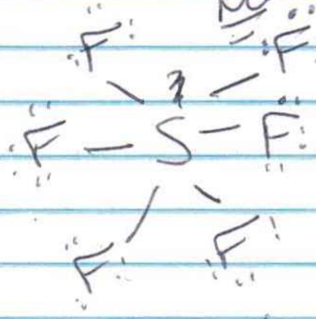
① NP



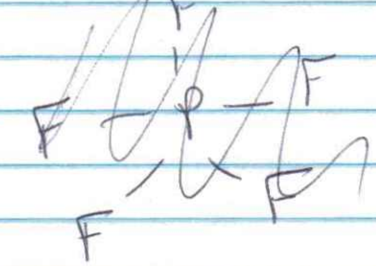
② molecule same all way around



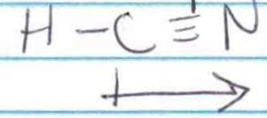
Non Polar!

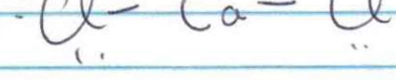


Non Polar



Polar!





2

H_2O diagram: Hydrogens, ⊕ end, are attracted to oxygen's Lone pairs. H's electrons are pulled toward the more EN atom

- H_2O boils @ a higher Temp. than other molecules of similar size b/c of its strong H-bonds.
  - other molecs. boil @ temps in the negatives ~~H_2S~~ CH_4 -162°C NH_3 -33°C

4

-Under Nonpolar IFs

London dispersion forces exist in ALL molecules, but are only predominant forces in Nonpolar molecules (Halogens, Noble gases)

↳ Not predominant force in covalent + ionic bonds

6

Q: What holds a molecule of O_2 together?

→ No pull of e^- in one direction

A: London dispersion forces (Nonpolar molecule)

Review after finish Notes (use overhead Pictures) 1

H-bond, IF analog:
Holding hands with friends and ea. of you is a molecule

Q: What holds H_2O molecs. together in a droplet?
A: H-bonds → surface tension = force that pulls together adjacent H_2O molecules + decreases the surface area to the smallest size

3

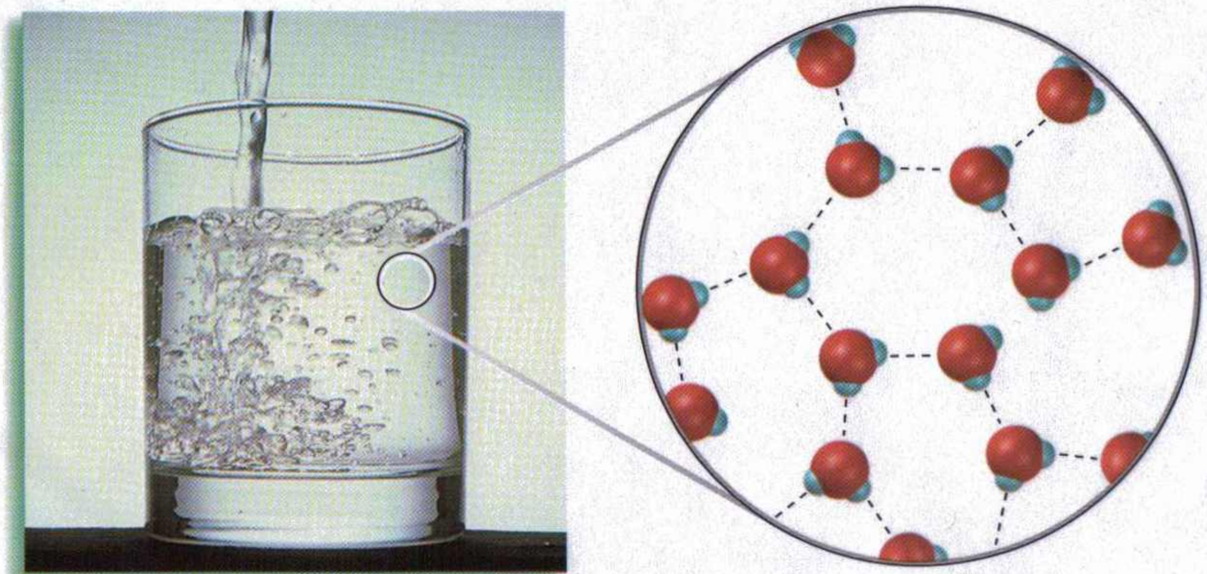
Under "Polar Molecules"
↳ Stronger than IFs in Nonpolar molecules; deals w/ dipoles, so there's (+) and (−) ends
↳ There's diff kinds of IFs found in Polar molecules; H-bonds are important; Dipole-dipole is another example

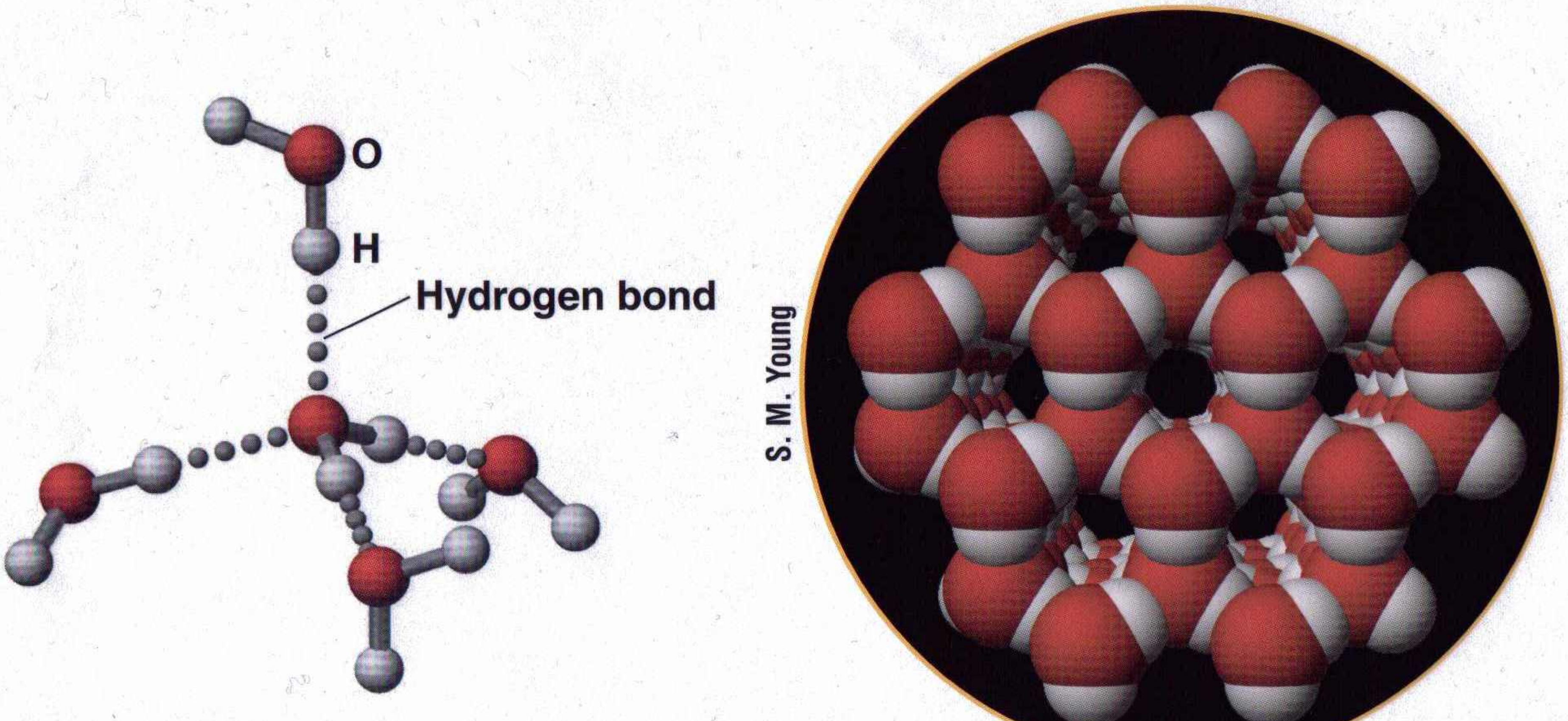
5

More about L.D.Fs - formed by temporary dipole in that
↓
At any instant, there may be more e^- on one side of the nucleus than on the other, so the atom has an instantaneous (short-lived) dipole
*And when atoms are close together, this temporary dipole (causes) induces a dipole in its neighboring atom (to form)

Hydrogen Bonding Between Water Molecules

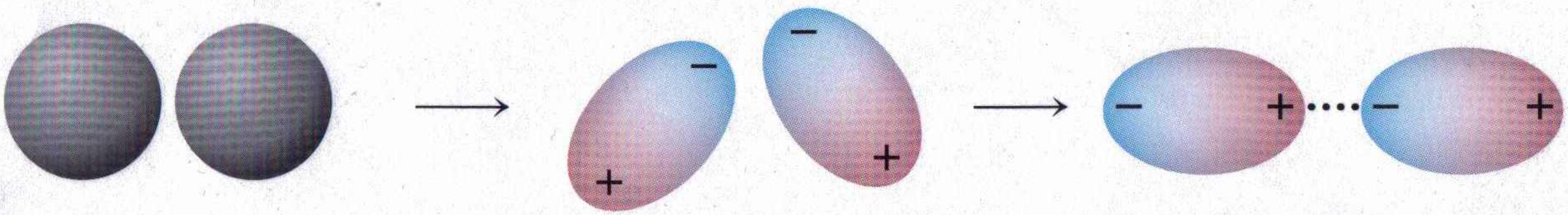
Space-filling models illustrate hydrogen bonding between water molecules. The dotted lines indicate the attraction between electronegative oxygen atoms and electropositive hydrogen atoms of neighboring molecules.





(a) (b)

Transparency 76 | Figure 13.7



Two nonpolar atoms or molecules (depicted as having an electron cloud that has a time-averaged spherical shape).

Momentary attractions and repulsions between nuclei and electrons in neighboring molecules lead to induced dipoles.

Correlation of the electron motions between the two atoms or molecules (which are now dipolar) leads to a lower energy and stabilizes the system.

2/7/12

Intermolecular Forces (IFs)

☆ Forces of attraction <u>between</u> molecules

↓

Holds molecules together

↓

Weaker than ionic, covalent, and metallic bonds

Strongest ⟶ Weakest

Ionic bonds - Covalent bonds - IFs

2 Types of Intermolecular Forces

↙ ↘

Polar Molecules   Nonpolar Molecules

Polar Molecules

↓

Dipole-dipole Forces

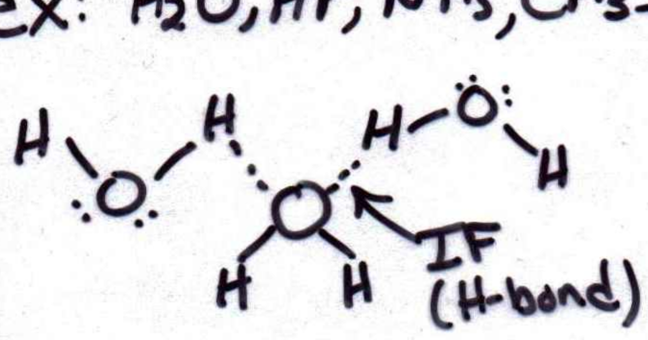
* Forces of attraction between Polar molecules

↓

Hydrogen Bond

* very strong IF in which H atom is attracted to the unshared pair of e^- of a highly electronegative atom (N, O, F) in a nearby molecule

ex: H_2O, HF, NH_3, CH_3I



* H-bond gives high bpt. for such a small molecule (H_2O)

Nonpolar Molecules

↓

London Dispersion Forces

↓

weaker than dipole-dipole forces

↓

Due to constant movement of e^-

↓

Forms temporary dipoles

* In any atoms/molecules, e^- are always moving!

Nonpolar molecules continued...

Halogens

least e^-

F_2 } (g)
Cl_2 } (g)
Br_2 (l)
I_2 (s)

most e^-

Noble gases

↓

Low b.pts.

ex: Ne, Ar

* As # of e^-/molar mass ↑, strength of IF ↑, and thus the b.pt. ↑

∴ b.pt. of $I_2 > F_2$

2/9/12

Ch. 7 sect. 1 2/8/12

Chemical Formula

↓

Name and number of atoms in compound

↓

molecule: shows types and number of atoms of each element in a molecule

↓

ionic compound: simplest ratio of compound's cations and anions (one formula unit)

* subscripts - only refer to elements they follow

Al_2O_3 Honors ← start here

subs ref. ion/atom mole CO_2 $NaCl$

↓

ionic compd

ex's C_8H_{18}

a) 8 C, 18 H } in 1 molecule C_8H_{18}

b) $Al_2(SO_4)_3$ 2 Al, 3 S, 12 O

c) $(NH_4)_2SO_4$ 2 N, 8 H, 1 S, 4 O

d) $CaBr_2$ 1 Ca : 2 Br atoms

2/9/12
2/8/12

Monatomic Ions

↓

* ions formed from a single atom
  [single-atom ions]

↓

Main group element's charge is predicted from the group it's in

1	2	13	14	15	16	17	18
1+	2+	3+	4±	3-	2-	1-	0

↓

Metals keep their name

↓

Nonmetals change the ending to -ide

ex's Main Group:

metal	Nonmetal	Name of compound
sodium	chlorine	sodium chloride
Lithium	oxygen	lithium oxide
Calcium	phosphorous	calcium phosphide

Binary Ionic Compounds

↓

* Compounds composed of 2 elements (metal + nonmetal)

↓

overall charge of zero

↓

Total number of (+) and (−) charges must be equal

2/8/12
2/9/12

Ex's:

1) Na^+ Cl^- → NaCl Sodium chloride
1+ 1- = 0 ✓ or
to check ↗ Na^+ Cl^-
(Method I) Criss-Cross method

2) Mg^{2+} Br^-
Br^- (method 2)
2^+ 2^- = 0 Magnesium Bromide
to check ↗
or Mg^{2+} Br^- [How many negs need to add up to zero?]
$MgBr_2$

3) Al^{3+} O^{2-}

Al_2O_3 Aluminum oxide

To check: Al^{3+} O^{2-}
Al^{3+} O^{2-}
O^{2-}
6+ 6− = 0

Or to check
Method 2: $Al_2^{3+}O_3^{2-}$

charge × subscript
Al: (3+) × 2 = 6+
O: (2−) × 3 = 6−
0 ✓

→ Divide subscripts by GCF
★ Want smallest whole # ratio of ions in chemical formula → charges add up to zero

2/19/12
2/8/12

4) $Pb^{4+} O^{2-}$

Pb_2O_4 want formula to have smallest ratio of ions
$\downarrow \div 2$

PbO_2 lead ox<u>ide</u>

5) $Ca^{2+} N^{3-}$ Calcium Nitr<u>ide</u>

step 1 Ca_3N_2 step 2 check: Ca^{2+}_{3} N^{3-}_{2}

Ca : $(2+) \times 3 = 6+$
N : $(3-) \times 2 = 6-$
[charges add to zero] 0 ✓
lowest ionic ratio ✓

5) $Be^{2+} S^{2-}$

$Be_2S_2 \Rightarrow$ Divide subscripts by GCF (2) to get smallest whole # ratio of ions

$\Downarrow$

BeS Beryllium ~~sulphide~~ sulfide

quiz

2/9/12

[Transition metals – d-block elements – form more than one ion of different charges ex $Cu \rightarrow Cu^{+}, Cu^{2+}$

– exceptions Pb^{2+}, Pb^{4+} (lead) } Group 14]
Sn^{2+}

Stock system of Nomenclature

used to distinguish elements that form 2 or more cations (metals)

Roman numeral shows ion's charge

Place numeral in ( ) and place immediately after metal's name

ex: a) $CuCl_2$ from $Cu^{2+}Cl^{-}$

Copper (II) chloride

b) $Fe^{3+}O^{2-} \rightarrow$ iron (III) oxide

Hg^{2+} = Mercury (II)

Hg_2^{2+} (diatomic ion) = Mercury (I)

ex: $Hg_2^{2+}N^{3-} \Rightarrow (Hg_2)_3N_2$ GO to P.9

Mercury (I) nitride

ex $Hg^{2+}S^{2-} \rightarrow HgS \Rightarrow$ Mercury (II) sulfide

2/9/12

Stock System ~~ex's of~~ Binary Ionic Compound ex's

a) Zinc + Bromine = $ZnBr_2$

b) cesium + sulfur = Cs_2S

c) K_3N = Potassium Nitride

d) Cu^+ O^{2-} = Cu_2O = copper (I) oxide

e) V^{3+} Br^- = VBr_3 = Vanadium (III) bromide

2/13/12
Feb. 10, 2012

7.1

* Polyatomic ion = Compound composed of two or more atoms [$\oplus$ + $\ominus$ ions]

↓

Whole ion carries charge

↓

bonded covalently

↓

Have an overall net charge of zero

↓

Most are negatively charged and oxyanions = polyatomic ions containing oxygen

↓

Most end in -ite or -ate "Binary ionic compds end in -ide"

* Exceptions: OH^- hydroxide
NH_4^+ Ammonium
CN^- cyanide

"Don't have to memorize all polyatomics for test - will have chart"

ex's: SO_4^{2-} sulfate (oxyanion w/ greater # of O atoms)
SO_3^{2-} sulfite (ion w/ smaller # oxygen atoms)

["Some elements combine w/ oxygen to form +1 type of oxyanion. Oxyanion's name depends on how many O atoms it contains"]

2/13/12

Nomenclature of Polyatomic Ions 2/10/12

↳ Name cation 1st, then anion

Ending does NOT change

["Binaries change to -ide"]

ex: $MgSO_4$ - Magnesium Sulfate

Na_2CrO_4 - Sodium chromate

"~ Note: Polyatomic ions are enclosed in ( ) to show when multiple polyatomic ions are present"

ex: $Ba(OH)_2$: 1 Ba^+

2 OH^-

** Table 2, p.226 Common Polyatomic Ions

OH^- hydroxide

O_2^{2-} peroxide

NO_3^- nitrate

NO_2^- nitrite

ClO^- hypochlorite

ClO_2^- chlorite

ClO_3^- chlorate

ClO_4^- perchlorate

PO_4^{3-} phosphate

Smart Jokes of the Day

Q1: What did the bartender say when oxygen, hydrogen, sulfur, and phosphorous walked into his bar?

A1: OH SNaP!

Q2: What did one ion say to the other?

A2: I've got my ion you.

Q3: What do you call a tooth in a glass of water?

A3: One molar solution

Q4: Two chemists go into a restaurant.
The first one says, "I think I'll have an H_2O."
The second one says, "I think I'll have an H_2O too."
---and he died...

Q5: What do you do with a dead chemist?

A5: Barium

Chapter 7 Section 3

Using Chemical Formulas

2/27/12

"Chemical formula - indicates the elements and # of atoms/ions of each element present in a compound

Objectives of this section:

To calculate: formula mass
(of a given chemical compound) molar mass
percentage composition"

(I.) Formula Mass [of any molecule, formula unit, or ion]

↓

sum of the atomic masses of all atoms in a compound "represented in its formula

↓

unit: amu "(round to 2 decimal places)" #of sig figs
follow sig figs

"Mass of a water molecule $\xrightarrow{\text{called}}$ molecular mass"

~~ex: (NH4)~~

ex: NaCl

1 Na × 22.99 amu = 22.99 amu
1 Cl × 35.45 amu = + 35.45 amu

$\boxed{58.44 \text{ amu}}$

~~Molecular mass~~

~~ex: H₂O~~

~~1 H × 1.01 = 1.01~~
~~2 O × 16.00 = 32.00 amu~~

~~33.01 amu~~

ex: C MnO_4^- : 1 Mn × 54.94
4 O × 16.00 = 64
+ 118.94 amu

ex: B $HClO_3$ 2/27/12

Atoms		Atomic Masses	
1 H	×	1.01 amu	= 1.01
1 Cl	×	35.45	= 35.45
3 O	×	16.00	= +48.00 amu

$\boxed{84.46\text{ amu}}$

(Formula mass of $HClO_3$)

II.) Molar Masses

Mass in grams of one mole of a pure substance (element/compd)

"Compound's molar mass is numerically equal to its formula mass"

∴ Formula mass of ~~$HClO_3$: 84.46 amu~~
MnO_4^- : 118.94 amu

Molar mass of MnO_4^- is 118.94 g/mol

"How to calculate molar mass → add up masses of the elements present in one mole of the molecules/formula units that make up the compound"

ex: a
$(NH_4)_2CO_3$

Molar mass of $(NH_4)_2CO_3$

2N = 2 × 14.01 = 28.02
8 H = 8 × 1.01 = 8.08
1 C = 1 × 12.01 = 12.01
3 O = 3 × 16.00 = + 48.00

$\boxed{96.11 \text{ g/mol}}$

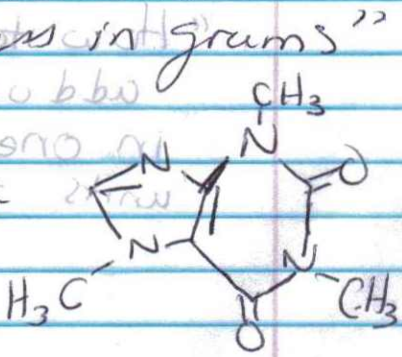
ex: b : $Mg_3(PO_4)_2$

3 Mg : 3 × 24.31 = 72.93 g Mg
2 P : 2 × 30.97 = 61.94 g P
8 O = 8 × 16.00 = 128.00 g O
+

Molar mass of $Mg_3(PO_4)_2$: $\boxed{262.87 \text{ g/mol}}$

"Eventually we'll use conversion factors and review/look back on Chapter 2, when we're relating an amount in moles of a substance to a mass in grams"

ex: c $C_8H_{10}N_4O_2$ Caffeine



8 C : 8 × 12.01 = 96.08
10 H : 10 × 1.01 = 10.10
4 N : 4 × 14.01 = 56.04
2 O : 2 × 16.00 = 32.00

$\boxed{194.22 \text{ g/mol}}$ Caffeine

III) Percentage Composition 2/27/12

"Let's say you ~~were~~ casually extracted caffeine from tea bags, but you wanted to know the percent ~~composition~~ of oxygen in your end product. How would you go about doing that?"

↳ We want to find the percentage by (mass %) mass of oxygen in $C_8H_{10}N_4O_2$

↳ How →
$$\frac{\text{mass of element in the sample of compound}}{\text{Mass of sample of Compound}} \times 100$$

= % element in compound

↓

☆ percent by mass of each element in a compound

"tell % of ea. atom in a compd &" How much of the compound's weight is due to ea. of elements present

$$\frac{\text{mass in 1 mole of Compound}}{\text{Molar Mass of Cmpd}} \times 100$$

= % element in compound

H.W. p. 244 section review #1, 2, 5, calc. % comp. of $NaNO_3$, Ag_2SO_4 (p. 243 teacher book)

formula molar mass

moles of atm

3

ex's: SO_2 NH_4NO_3 2/27/12
CH_4
$LiOH$
H_2SO_4

compare, which cmpd $Ca(NO_2)_2$ or $Fe(NO_2)_3$ has higher % of Nitrogen?

ex: 1 Calculate the % Composition of:

a) $C_{13}H_{18}O_2$ ibuprofen

1) Find molar mass of compound
2) Find mass of each element present in one mole of the compound
3) Divide $\frac{\text{mass of element}}{\text{mole compound}}$ by molar mass of compd.
4) Check to see if results add up to 100%

$13\,C = 156.13\ g$ $\quad 13\ \cancel{\text{atom}}\ \text{moles}\ C \times \frac{12.01\,g\,C}{1\,mol\,C}$

$18\,H = 18.18\ g$

$2\,O = 32.00$

$206.31\ g$ total molar mass of $C_{13}H_{18}O_2$

% C : $\frac{156.13\ g}{206.31\ g} \times 100 = \boxed{75.68\%\ C}$

% H : $\frac{18.18\ g/mol}{206.31\ g/mol} \times 100 = \boxed{8.81\%\ H}$

% O : $\frac{32.00\ g}{206.31\ g} \times 100 = \boxed{15.5\%\ O}$

75.68 C
8.81 H
+ 15.50
99.99% ✓

ex: ♡₂ ☺₃ ☺ find % comp.

2♡ × 3 pts = 6 pts
3☺ × 1 pt = 3 pts
1☺ × 10 pt = 10 pts
+ 19 pts

♡% = $\frac{6}{19} \times 100 = x\%$

%☺ = $3/19 \times 100 = y\%$

%☺ = $10/19 \times 100 = z\%$

4

Ch. 7, Sect. 7.4 Determining Chemical Formulas

(per 4+7)
2/28/12

p 888
1221
136

I) Empirical Formula

subscript indicates the simplest whole # ratio of one type of atom to another within a compound

	Molecular formula		Empirical Formula
ex: glucose	$C_6H_{12}O_6$	$\longrightarrow$	CH_2O
	H_2O_2	$\longrightarrow$	HO
	$C_2H_6O_2$	$\longrightarrow$	CH_3O 1 : 3 : 1

"Importance: In some cases you're only given % composition, which is all you have to determine the formula of the substance after using certain analytical techniques.
For ex, if you wanted to make a candle smell like sugar and you found its % composition, then all you'd have to do is write the molecular formula of ~~the~~ sugar to make it synthetically"

Introduce Mole = chemist's counting unit, subatomic unit
ex. dozen = baker's counting unit, macroscopic unit
we're learning mass (g) → moles

(Per. 4+7)

2/28/12

To find Empirical Formula:

* Assume have 100g sample = 100%

% composition → grams → moles

↓ Divide by smallest of #s present

smallest whole # ratio

=

subscripts in Empirical Formula (lowest ratio)

Note:
Molar mass = mass of 1 mole of a pure substance (elemnt/cmpd.)

2/29 per. 2 stopped here

Conversion factors

$$\frac{X\text{g}}{} \left| \frac{1\text{ mole}}{(\text{molar mass})\text{ g}} \right.$$

ex: $\frac{1\text{ mole Ca}}{40.0\text{g}}$ or $\frac{40.0\text{g Ca}}{1\text{ mole Ca}}$

1 mole = molar/formula mass

$\frac{1\text{ mol } H_2O}{18.0\text{g}}$ or $\frac{18.0\text{g } H_2O}{1\text{ mol } H_2O}$

ex: The percentage composition of a compd ~~Nitrogen trioxide~~ is 22.5% N and 77.5% O. Empirical Formula?

$22.5\%\text{ N} \rightarrow 22.5\text{g N} \times \frac{1\text{ mol N}}{14.01\text{g N}} = 1.61\text{ mol N} \div 1.61 = 1$

$75.5\%\text{ O} \rightarrow 75.5\text{g O} \times \frac{1\text{ mol O}}{16.00\text{g O}} = 4.84\text{ mol O} \div 1.61 = 3$

ratio 1N : 3O

$\boxed{\therefore NO_3 = \text{emp. formula}}$

ex 2: 36.70% K
33.27% Cl
30.03% O
Find Empirical Formula of compound:

step 1: % → grams | step 2 grams → moles

$36.7\%K \rightarrow 36.7g\,K \left| \frac{1\,mol\,K}{39.10g\,K} \right. = 0.9386\,mol\,K$

$33.27\%Cl \rightarrow 33.27g\,Cl \left| \frac{1\,mol\,Cl}{35.45g\,Cl} \right. = 0.9385\,mol\,Cl$

$30.03\%O \rightarrow 33.03g\,O \left| \frac{1\,mol\,O}{16\,g\,O} \right. = 1.877\,mol\,O$

step 3: smallest whole # mole ratio of atoms

$K: \frac{0.9386}{0.9385} \approx 1$

$Cl: \frac{0.9385}{0.9385} = 1$

$O: \frac{1.877}{0.9385} \approx 2$

1K : 1Cl : 2O

empirical formula
$KClO_2$

Note: If given mass composition 1st (g of ea. elmt) go straight to Step #2 !

2/28/12 (per. 4)

Sample Problem M p. 247

Analysis of a 10.150g sample of a compound containing P and O indicates a P content of 4.433g. What's the empirical formula of this compound?

Given: sample mass: 10.150g

$$P_{mass} = 4.433g$$

$$O_{mass} = 5.717g$$

Unknown: emp. formula

g → mol → smallest whole # atom ratio

P $\frac{4.433\,g\,P}{} \Big| \frac{1\,mol\,P}{30.97\,g\,P} = 0.1431\,mol\,P$

$\frac{5.717\,g\,O}{} \Big| \frac{1\,mol\,O}{16.00\,g\,O} = 0.3573\,mol\,O$

Smallest whole # ratio:

$\frac{0.1431\,mol\,P}{0.1431\,mol\,P} = 1 \qquad \frac{0.3573\,mol\,O}{0.1431} = 2.497\,mol\,O$

not close to whole #

∴ multiply each # in ratio by 2

$1P \times 2 : 2.497\,O \times 2$

$\underset{mol\,P}{2} : 4.994\,mol\,O \approx 5$

$\boxed{\text{Emp. Form: } P_2O_5}$

(go to p. 8) 7.1

3/5 per. 2+3

II) Molecular Formula

2/29

↓

✪ shows the # + kinds of atoms in a molecule
(actual formula of a molecular compound)

↓

x (empiral formula) = molecular formula

↓ aka whole # multiple of empirical formula

Want to know what multiple of the empirical formula your molecular formula is.

so, $\text{Ratio} = \dfrac{\text{molecular formula mass}}{\text{empirical formula mass}}$

✪ multiply subscripts in Emprical formula by Ratio calculated

"remember - cmpd's molecular formula mass is Numerically equal to its molar mass"

so can find using amu for molecular + empirical or molar mass.

3/5 per 2+3
2/29.

1) write knowns + unknows
2) write formula
3) find empirical mass
4) calculate x
5) mult. subscripts in emp. by "x"

ex: A Compound given: OCNCl
(1) molar mass 232.41 g/mol
Molecular formula: ?

(2) $x = \frac{\text{molecular formula mass}}{\text{empirical formula mass}}$

(3) empirical:
O 16.00 [illegible]
C 12.01
N 14.01
Cl 35.45 amu
+ 77.47 amu

(4) $x = \frac{232.41 \text{ amu}}{77.47 \text{ amu}} = 3$

(5) Molecular Formula: $O_3C_3N_3Cl_3$

ex: B Molecular Formula?
NH_2 = empirical formula
formula mass 32.06 amu
$x = \frac{\text{molec}}{\text{empir}}$

1N x 14.01
2H x 1.01 > 16.03 amu empir. mass

$x = \frac{32.06 \text{ amu}}{16.03 \text{ amu}} = 2 \Rightarrow \boxed{N_2H_4}$

2/29

Ex: Find the empirical and molecular formula if you have 40.0% of carbon, 6.70% of hydrogen, & 53.3% of oxygen. The molecular mass of the compound is 90.0 amu.

A Molecular mass: 90.0 amu

$40\% \, C = 40.0 g C \times \frac{1 mol C}{12.01 g C} = 3.33 mol C$

$6.70\% \, H = 6.70 g H \left| \frac{1 mol H}{1.01 g H} \right. = 6.63 mol H$

$53.3\% \, O = 53.3 g O \left| \frac{1 mol O}{16.00 g O} \right. = 3.33 mol O$

B $\frac{3.33 mol C}{3.33 mol C} = 1$

$\frac{6.63 mol H}{3.33} = 2$

$\frac{3.33 mol O}{3.33} = 1$

$\boxed{\text{Empirical Formula: } CH_2O}$

Stopped here 2/29 (per. 4)

C $x = \frac{\text{molecular mass}}{\text{empirical mass}} = \frac{90.0 amu}{30.03 amu} \approx 3$

$C = 14.01$
$2H = 2 \times 1.01$
$1 O_{xy} = 16$
total 32.03 amu

$\boxed{\therefore \text{Molec. formula } C_3H_6O_3}$

2-15-12

Binary Molecular Compounds

↓

*Composed of 2 or more $\boxed{\text{Nonmetals}}$

↓

Use prefixes to tell # of atoms of each element

↓

end in -ide

Prefixes:

1* Mono-
2 Di-
3 Tri-
4 Tetra-
5 Penta-
6 Hexa-
7 Hepta-
8 Octa-
9 Nona-
10 Deca-

**Do NOT use "mono" prefix in front of 1st element

ex's: CO_2 carbon monoxide

N_2O_5 dinitrogen pentoxide

(Drop "a" or "o" at end of prefix if word following begins with a vowel)

Examples: Binary Molecular Compounds

No "Mono" for 1st atom

SO_3 sulfur trioxide

CO carbon monoxide

N_2O_4 dinitrogen tetroxide

P_4O_{10} tetraphosphorous decoxide

CCl_4 carbon tetrachloride

Per. 7 lecture
3/12/12

Ch. 8.1 Describing Chemical Reactions
- letters = symbols
- words = formulas
- sentences = equations

* Chemical Equation
↓
has correct symbols + formulas
for reactants + products in a chem. Rxn.

"recipe analogy" - making apple sauce

Diatomic molecules - $\underbrace{H_2, N_2, O_2, F_2, Cl_2, Br_2, I_2}_{\text{Free state "alone"}}$

* Word Equation
↓
uses "words" for names of R_s + P_s
↓
uses + for "reacts with"
uses → " yield (to make)

Given: hydrogen and oxygen gas react to form water

Word eq 1: Hydrogen + oxygen → water

word eq 2: Aluminum + oxygen gas → Aluminum oxide

3/12/12

(Ch.4)

* All reactions obey Law of Conservatn. of Mass
↳ Reactant mass = Product mass

*coefficient - small whole # placed in FRONT of eq. formula
- Used to balance atoms to obey Law of cons. of Mass

$\underline{4}\ Al + \underline{3}\ O_2 \longrightarrow \underline{2}\ Al_2O_3$

4Al ✓   6O ✓   4Al ✓ 6O ✓

(** coefficients × subscripts)

* * * Never change subscripts to balance eq.

To Write Balanced Formula Eq.
1) write word eq.
2) write formula eq. - correct formulas R+P
↳ write symbol + charge for each ion !!!

3) Balance - Law of cons. of Mass

3/12/12

Example:

Given: Sodium sulfate reacts with Calcium phosphate to make sodium phosphate and Calcium sulfate

① Word Eq.

Sodium sulfate + calcium phosphate →
sodium phosphate + calcium sulfate

② Formula Eq. ⓐ write symbol & charge for ea. ion!

$Na^{+}SO_4^{2-} + Ca^{2+}PO_4^{3-} \rightarrow Na^{+}PO_4^{3-} + Ca^{2+}SO_4^{2-}$

ⓑ (write) make formulas

$Na_2SO_4 + Ca_3(PO_4)_2 \rightarrow Na_3PO_4 + CaSO_4$

③ Balance Eq. Distribute (coef. x subscript)

$3\,Na_2SO_4 + Ca_3(PO_4)_2 \rightarrow 2\,Na_3PO_4 + 3\,CaSO_4$

- balance Na 1st
- # & types of atoms on both sides of eqn. must be Equal

H.W. ~~p.274 #1-5~~
1-6 p.290

Appendix F

Homework Worksheets

Name ____ Period ____ Date______________

Worksheet B ~ Mixed Review (Binary Ionic Compounds and Polyatomic Ions)

Name the following Ionic Compounds:

____________________1. K_3PO_4

____________________2. $Ga(OH)_3$

____________________3. Co_3N_2

____________________4. SnS

____________________5. $Al(C_2H_3O_2)_3$

____________________6. Mg_3P

____________________7. $CsNO_2$

____________________8. $CaMnO_4$

____________________9. SnF_4

____________________10. $Fe_2(SO_3)_3$

Write the chemical formula for the following:

1. Nickel (II) peroxide ______
2. Vanadium (IV) chloride ______
3. Lithium bromate ______
4. Aluminum cyanide ______
5. Ammonium sulfate ______
6. Francium oxide______
7. Mercury (I) nitrate ______
8. Nickel (I) sulfide______
9. Ammonium carbonate ______
10. Iron (III) fluoride ______

Name______________________________________ Period______ Date_____________

I. Find the formula mass of the following:

a. $C_2H_3O_2^{\,-}$

b. $C_8H_9NO_2$ (acetaminophen/Tylenol)

c. $C_{10}H_8O_4$ (Polyethylene terephthalate, found in food/beverage containers)

II. Determine the molar mass of the following:

d. H_2O_2

e. $Cu_3(PO_4)_2$

f. $BiAsO_4$

III. Calculate the percentage composition of the following:

g. $FeCl_2$

h. AgOH

i. $CoCr_2O_7$

Name_________________________________ Period_____ Date____________

A. Find the percentage composition of the following compounds:

1. Sn_3N_2 Sn:_______ N: _______

2. $NaIO_3$ Na:_______ I: _______ O:_______

B. Given that the percentage composition of a compound is 10.2 % C, 2.1 % H, and 87.7 % O, (a) find the empirical formula of the compound. (b) Given that the molecular mass of the compound is 329.97 g/mol, determine the molecular formula of the compound. {Hint: need the empirical formula to calculate the molecular formula}

5. Determine the molecular formulas for compounds having the following empirical formulas and molar masses:
   a. C_2H_4S; experimental molar mass 179
   b. C_2H_4O; experimental molar mass 176
   c. $C_2H_3O_2$; experimental molar mass 119
   d. C_2H_2O, experimental molar mass 254
6. Use the experimental molar mass to determine the molecular formula for compounds having the following analyses:
   a. 41.39% carbon, 3.47% hydrogen, and 55.14% oxygen; experimental molar mass 116.07
   b. 54.53% carbon, 9.15% hydrogen, and 36.32% oxygen; experimental molar mass 88
   c. 64.27% carbon, 7.19% hydrogen, and 28.54% oxygen; experimental molar mass 168.19
7. A 0.400 g sample of a white powder contains 0.141 g of potassium, 0.115 g of sulfur, and 0.144 g of oxygen. What is the empirical formula for the compound?
8. A 10.64 g sample of a lead compound is analyzed and found to be made up of 9.65 g of lead and 0.99 g of oxygen. Determine the empirical formula for this compound.
9. A 2.65 g sample of a salmon-colored powder contains 0.70 g of chromium, 0.65 g of sulfur, and 1.30 g of oxygen. The molar mass is 392.2. What is the empirical formula of the compound?
10. Ninhydrin is a compound that reacts with amino acids and proteins to produce a dark-colored complex. It is used by forensic chemists and detectives to see fingerprints that might otherwise be invisible. Ninhydrin's composition is 60.68% carbon, 3.40% hydrogen, and 35.92% oxygen. What is the empirical formula for ninhydrin?
11. Histamine is a substance that is released by cells in response to injury, infection, stings, and materials that cause allergic responses, such as pollen. Histamine causes dilation of blood vessels and swelling due to accumulation of fluid in the tissues. People sometimes take *anti*histamine drugs to counteract the effects of histamine. A sample of histamine having a mass of 385 mg is composed of 208 mg of carbon, 31 mg of hydrogen, and 146 mg of nitrogen. The molar mass of histamine is 111 g/mol. What is the molecular formula for histamine?
12. You analyze two substances in the laboratory and discover that each has the empirical formula CH_2O. You can easily see that they are different substances because one is a liquid with a sharp, biting odor and the other is an odorless, crystalline solid. How can you account for the fact that both have the same empirical formula?

WS #4 Review on Ch.7.3 and Ch.7.4

Name____ Period______
Date_______________

A. Find the formula mass of the following:

1. SiO_3^{2-}

2. $(NH_4)_2CrO_4$

B. Determine the molar mass of the following:

3. $MgSO_3$

4. KI

C. Calculate the percentage composition of:

5. $NaIO_3$

6. Find the empirical formula of a compound containing 37.7% carbon, 2.20% hydrogen, 18.5% nitrogen, and 42.3% oxygen:

7. What is the molecular formula of a compound that has an empirical formula of C_4H_8 and a formula mass of 168.36 amu?

8. A compound is 29% sodium, 40.5% sulfur, and 30.4% oxygen by mass. The molar mass of the compound is 316.24 g/mol. Determine the molecular formula of the compound:

9. A compound is 75.46% C, 4.43% H, and 20.10% O by mass. The compound's molar mass is 318.31 g/mol. What is the compound's molecular formula?

10. A compound analyzed was found to contain 13.5% calcium, 10.8% oxygen, and 0.675% hydrogen. The formula mass of the compound was 74.21 amu. What is the molecular formula of the compound?

A. Rewrite the following word equations as formula equations (unbalanced):

1. Hydrogen reacts with chlorine to produce hydrogen chloride gas

____

2. Gallium and iron (III) oxide react to produce gallium oxide and iron

____

3. Magnesium fluoride and nitrogen react to yield magnesium nitride and fluorine gas

____

4. Mercury (II) sulfide and sodium oxide react to yield mercury (II) oxide and sodium sulfide

____

5. Ammonium hydroxide and lead (IV) carbonate react to produce ammonium carbonate and lead (IV) hydroxide

____

6. Aluminum peroxide and potassium sulfite react to produce aluminum sulfite and potassium peroxide

____

B. Rewrite the following unbalanced formula equations as word equations:

7. $CsCN + Sr_3(AsO_4)_2 \rightarrow Cs_3AsO_4 + Sr(CN)_2$

____

____

8. $Ag_3N + Br_{2(g)} \rightarrow Ag_2Br + N_{2(g)}$

9. $SnO + I_{2(g)} \rightarrow SnI_2 + O_{2(g)}$

10. $Hg_2(ClO_2)_2 + RbC_2H_3O_2 \rightarrow Hg_2(C_2H_3O_2)_2 + RbClO_2$

11. $LiCl + Ca(OH)_2 \rightarrow LiOH + CaCl_2$

12. $H_{2(g)} + CuO \rightarrow H_2O + Cu$

Worksheet 7.1 Date ________

1. Give the name and formula of the compound formed from the following elements:

a) Sodium and nitrogen. Name Formula

b) Oxygen and strontium

c) Aluminum and chlorine

d) Magnesium and nitrogen

e) Iodine and cadmium

f) sulfur and cesium

g) strontium and fluorine

Bond with a Classmate Name ____________________

When you find another ion with which you can bond, write in each symbol and charge. Then write the new compound formed by combining the two. Give the compound's name.
Remember - Positive ions can only bond with negative ions and vice versa!

+ Ion	- Ion	Compound	Name
Mg^{2+}	Cl^{1-}	$MgCl_2$	Magnesium Chloride

Charge Table for Monatomic and Polyatomic Ions

refixes	+1		+2		+3		+4	
o = 1	ammonium	NH_4^+	barium	Ba^{2+}	aluminum	Al^{3+}	lead (IV) plumbic	Pb^{4+}
= 2	copper (I) cuprous	Cu^+	beryllium	Be^{2+}	bismuth	Bi^{3+}	tin (IV) stannic	Sn^{4+}
= 3	hydrogen	H^+	calcium	Ca^{2+}	chromium (III) chromic	Cr^{3+}		
a = 4	silver	Ag^+	chromium, chromous	Cr^{2+}	cobalt (III) cobaltic	Co^{3+}		
a = 5			cobalt (II) cobaltous	Co^{2+}	iron (III) ferric	Fe^{3+}		
a = 6			copper (II) cupric	Cu^{2+}				
ta = 7			iron (II) ferrous	Fe^{2+}				
a = 8			lead (II) plumbous	Pb^{2+}				
a = 9			magnesium	Mg^{2+}				
ca = 10			mercury (II) mercuric	Hg^{2+}				
			nickel (II)	Ni^{2+}				
			strontium	Sr^{2+}				
			tin (II) stannous	Sn^{2+}				
			zinc	Zn^{2+}				
			mercury (I) mercurous	Hg_2^{+2}				

	-1	-1		-2		-3		Organic Prefixes
	$C_2H_3O_2^-$ or	hydroxide	OH^-	carbonate	CO_3^{2-}	arsenate	AsO_4^{3-}	1- meth-
le	Br^-	hypochlorite	ClO^-	chromate	CrO_4^{2-}	arsenite	AsO_3^{3-}	2- eth-
te	ClO_3^-	iodide	I^-	chromite	CrO_3^{2-}	borate	BO_3^{3-}	3- prop-
le	Cl^-	nitrate	NO_3^-	dichromate	$Cr_2O_7^{2-}$	nitride	N^{3-}	4- but-
e	ClO_2^-	nitrite	NO_2^-	oxalate	$C_2O_4^{2-}$	phosphate	PO_4^{3-}	5- pent-
e	CN^-	perchlorate	ClO_4^-	oxide	O^{2-}	phosphide	P^{3-}	6- hex-
e	F^-	permanganate	MnO_4^-	peroxide	O_2^{2-}	phosphite	PO_3^{3-}	7- hept-
				silicate	SiO_3^{2-}			8- oct-
e	CH_3COO^-	iodate	IO_3^-	sulfate	SO_4^{2-}			9- non-
				sulfide	S^{2-}			10- dec-
				sulfite	SO_3^{2-}			

MASSACHUSETTS DEPARTMENT OF EDUCATION
MCAS
MASSACHUSETTS COMPREHENSIVE ASSESSMENT SYSTEM

Periodic Chart of Ions

Table of Polyatomic Ions

-1		-2		-3	
acetate	$C_2H_3O_2^-$	carbonate	CO_3^{2-}	arsenate	AsO_4^{3-}
bicarbonate	HCO_3^-	chromate	CrO_4^{2-}	arsenite	AsO_4^{3-}
chlorate	ClO_3^-	chromite	CrO_3^{2-}	borate	BO_3^{3-}
chlorite	ClO_2^-	dichromate	$Cr_2O_7^{2-}$	phosphate	PO_4^{3-}
hypochlorite	ClO^-	oxalate	$C_2O_4^{2-}$	phosphite	PO_3^{3-}
perchlorate	ClO_4^-	peroxide	O_2^{2-}		
cyanide	CN^-	silicate	SiO_3^{2-}		
hydroxide	OH^-	sulfate	SO_4^{2-}		
iodate	IO_3^-	sulfite	SO_3^{2-}		
nitrate	NO_3^-				
nitrite	NO_2^-				
permanganate	MnO_4^-				

+1	
ammonium	NH_4^+
hydronium	H_3O^+

	1+ 1A 1	2+ 2A 2	3B 3	4B 4	5B 5	6B 6	7B 7	8B 8	8B 9	8B 10	1B 11	2B 12	3+ 3A 13	4± 4A 14	3− 5A 15	2− 6A 16	1− 7A 17	0 8A 18
1	1.01 H 1 Hydrogen																	4.00 He 2 Helium
2	6.94 Li 3 Lithium	9.01 Be 4 Beryllium											10.81 B 5 Boron	12.01 C 6 Carbon	14.01 N 7 Nitrogen	16.00 O 8 Oxygen	19.00 F 9 Fluorine	20.18 Ne 10 Neon
3	22.99 Na 11 Sodium	24.31 Mg 12 Magnesium											26.98 Al 13 Aluminum	28.09 Si 14 Silicon	30.97 P 15 Phosphorus	32.06 S 16 Sulfur	35.45 Cl 17 Chlorine	39.95 Ar 18 Argon
4	39.10 K 19 Potassium	40.08 Ca 20 Calcium	44.96 Sc 21 Scandium	47.88 Ti 22 Titanium	50.94 V 23 Vanadium	52.00 Cr 24 Chromium	54.94 Mn 25 Manganese	55.85 Fe 26 Iron	58.93 Co 27 Cobalt	58.69 Ni 28 Nickel	63.55 Cu 29 Copper	65.39 Zn 30 Zinc	69.72 Ga 31 Gallium	72.59 Ge 32 Germanium	74.92 As 33 Arsenic	78.96 Se 34 Selenium	79.90 Br 35 Bromine	83.80 Kr 36 Krypton
5	85.47 Rb 37 Rubidium	87.62 Sr 38 Strontium	88.91 Y 39 Yttrium	91.22 Zr 40 Zirconium	92.91 Nb 41 Niobium	95.94 Mo 42 Molybdenum	(98) Tc 43 Technetium	101.07 Ru 44 Ruthenium	102.91 Rh 45 Rhodium	106.42 Pd 46 Palladium	107.87 Ag 47 Silver	112.41 Cd 48 Cadmium	114.82 In 49 Indium	118.71 Sn 50 Tin	121.75 Sb 51 Antimony	127.60 Te 52 Tellurium	126.91 I 53 Iodine	131.29 Xe 54 Xenon
6	132.91 Cs 55 Cesium	137.33 Ba 56 Barium		178.49 Hf 72 Hafnium	180.95 Ta 73 Tantalum	183.85 W 74 Tungsten	186.21 Re 75 Rhenium	190.23 Os 76 Osmium	192.22 Ir 77 Iridium	195.08 Pt 78 Platinum	196.97 Au 79 Gold	200.59 Hg 80 Mercury	204.38 Tl 81 Thallium	207.2 Pb 82 Lead	208.98 Bi 83 Bismuth	(209) Po 84 Polonium	(210) At 85 Astatine	(222) Rn 86 Radon
7	(223) Fr 87 Francium	(226) Ra 88 Radium		(267) Rf 104 Rutherfordium	(268) Db 105 Dubnium	(271) Sg 106 Seaborgium	(272) Bh 107 Bohrium	(277) Hs 108 Hassium	(276) Mt 109 Meitnerium	(281) Ds 110 Darmstadtium	(280) Rg 111 Roentgenium							

Lanthanide Series														
138.91 La 57 Lanthanum	140.12 Ce 58 Cerium	140.91 Pr 59 Praseodymium	144.24 Nd 60 Neodymium	(145) Pm 61 Promethium	150.36 Sm 62 Samarium	151.96 Eu 63 Europium	157.25 Gd 64 Gadolinium	158.93 Tb 65 Terbium	162.50 Dy 66 Dysprosium	164.93 Ho 67 Holmium	167.26 Er 68 Erbium	168.93 Tm 69 Thulium	173.04 Yb 70 Ytterbium	174.97 Lu 71 Lutetium

Actinide Series														
(227) Ac 89 Actinium	232.04 Th 90 Thorium	231.04 Pa 91 Protactinium	238.03 U 92 Uranium	(237) Np 93 Neptunium	(244) Pu 94 Plutonium	(243) Am 95 Americium	(247) Cm 96 Curium	(247) Bk 97 Berkelium	(251) Cf 98 Californium	(252) Es 99 Einsteinium	(257) Fm 100 Fermium	(258) Md 101 Mendelevium	(259) No 102 Nobelium	(262) Lr 103 Lawrencium

Key

2/15/12

Naming binary molecular compounds
Worksheet#3.

Binary molecular compounds are made from a combination of 2 different atoms, or in the case of diatomic molecules one kind of atom, ie. Br I N Cl H O F.

When naming a binary molecular compound you need to use prefixes

1 = mono	6 = hexa
2 = di	7 = hepta
3 = tri	8 = octa
4 = tetra	9 = nona
5 = penta	10 = deca

The prefixes indicate how many atoms of each element are in the compound.

The only time you do not use the prefix mono is when the first element in the compound has only one atom. Example: CO = carbon monoxide, not monocarbon monoxide.

When naming the second element drop the elements ending and add "IDE". Example: Oxygen = Oxide

Name the following binary molecular compounds:

1. CO_2 carbon dioxide
2. NO_3 Nitrogen trioxide
3. SO sulfur monoxide
4. SO_2 sulfur dioxide
5. SO_4 sulfur tetroxide
6. SO_3 sulfur trioxide
7. CF_4 carbon tetrafluoride
8. H_2O_2 dihydrogen dioxide
9. H_2O dihydrogen monoxide
10. S_8Cl_4 octasulfur tetrachloride
11. NH_3 Nitrogen trihydride
12. N_6O_6 hexanitrogen hexaoxide

Write the formula for the following binary molecular compounds:

1. Heptachlorine dioxide Cl_7O_2
2. Trisulfur octaoxide S_3O_8
3. Pentaphosporus decaoxide P_5O_{10}
4. Nitrogen hexafluoride NF_6
5. Disulfur dibromide S_2Br_2
6. Nitrogen monoiodide NI
7. Phosphorus trichloride PCl_3
8. Dinitrogen monoxide N_2O
9. Sulfur hexafluoride SF_6
10. Dinitrogen tetrahydride N_2H_4
11. Dinitrogen pentaoxide N_2O_5
12. Boron trichloride BCl_3
13. Diphosphorus trioxide P_2O_3
14. Carbon tetrabromide CBr_4

Name Key 2/16/12

Mixed Formula Review

Convert the following names to chemical formulas.

iron(III) sulfate	$Fe_2(SO_4)_3$
potassium cyanide	KCN
dinitrogen monoxide	N_2O
copper(II) nitrate	$Cu(NO_3)_2$
sulfur tetrachloride	SCl_4
magnesium acetate	$Mg(C_2H_3O_2)_2$
antimony triiodide	SbI_3
silver (I) perchlorate	$AgClO_4$
oxygen difluoride	OF_2
mercury(I) iodide	Hg_2I_2
nickel(II) chloride	$NiCl_2$
dihydrogen monoxide	H_2O
boron trifluoride	BF_3
sodium hypochlorite	$NaClO$
calcium hydrogen carbonate	$Ca(HCO_3)_2$
zinc (II) arsenate	$Zn_3(AsO_4)_2$
cesium perchlorate	$CsClO_4$
ammonium phosphate	$(NH_4)_3PO_4$
aluminum hypochlorite	$Al(ClO)_3$
cobalt (II) nitrite	$Co(NO_2)_2$
lead (IV) sulfite	$Pb_{\cancel{2}}(SO_3)_{\cancel{4}\,2}$
dinitrogen tetraoxide	N_2O_4
potassium carbonate	K_2CO_3

Convert the following formulas to names.

p.231 in back $Mg(HCO_3)_2$	→ ~~Mercury (II)~~ Magnesium bicarbonate
S_2Cl_2	disulfur dichloride
$KMnO_4$	Potassium permanganate
$Mg_3(PO_4)_2$	Mercury (II) Phosphate
$LiNO_2$	Lithium Nitrite
SF_6	sulfur hexafluoride
XeF_5	Xenon ~~hepta~~ pentafluoride
$KHSO_4$	Potassium hydrogen Sulfate
$Al(ClO_4)_3$	Aluminum perchlorate
CCl_4	Carbon tetrachloride
$FeCl_2$	Iron (II) chloride
Li_2O	Lithium Oxide
Hg_2Cl_2	Mercury (I) chloride
$(NH_4)_2Cr_2O_7$	Ammonium dichromate
SbF_5	Antimony pentafluoride
$Ba(CN)_2$	Barium cyanide
$LiOH$	Lithium Hydroxide
$NaClO_3$	Sodium Chlorate
$NaC_2H_3O_2$	Sodium Acetate
PCl_5	~~PO~~ Phosphorus pentachloride
$PbCrO_4$	Lead (II) chromate
KBr	Potassium Bromide
PbS	Lead (II) sulfide
~~AgN~~ Ag_3N	Silver Nitride
$Hg_3(PO_4)_2$	Mercury (II) phosphate
BBr_3	Boron Bromide
$Cr_2(SO_4)_3$	Chromium (III) sulfate

Chemical Element Poster Project!
Due Feb. 29, 2012

You have been assigned an element from the periodic table to research. You will create a poster to display your element. This poster could be a Wanted" poster or a poster to "sell" your element. An alternate project would be to design a trifold "brochure" about your element. Your project should be designed in a way that catches the eye of your viewers. This is an opportunity to exercise your creativity and artistic ability, too.
In order to research your element, you may use the web, library books, and your textbook to gather information on your element. Facts must be listed as bullet points.

Use the graphic organizer below to gather your information, then transfer the information NEATLY to your poster. A couple of starting sites that you might find useful are : **www.chemicalelements.com** and **www.webelements.com**
YOU CANNOT USE WIKIPEDIA!!!!

Make sure you include all units with measurements-no naked numbers!

Your poster must include:

- A WANTED or ELEMENT FOR SALE title
- Your name and class period.
- Element's full name
- Chemical symbol. When the element was discovered and who discovered it.
- Atomic number
- Average atomic mass
- Isotope symbol. Number of naturally occurring isotopes.
- Metal, nonmetal, or metalloid
- Chemical state (solid, liquid, or gas) at room temp, melting point and boiling point
- A hand- drawing of the nucleus (include total numbers of protons & neutrons)
- Period, Group, and block (spdf)
- Complete electron configuration and number of valence electrons.
- List periodic trends for this element-ionization energy, electronegativity and atomic radius
- What is the elements reactivity?
- List the most common ion that this element forms.
- Similar elements in its group.
- List the chemical formula and name of some compounds that contain this element.
- 3 or more color pictures of objects that contain your element (ex. silver jewelry for silver, thermometer for mercury)
- 3 or more uses for your element (everyday, industrial etc.)
- 3 Additional physical or chemical characteristics (color, odor, reactivity, density etc.)
- 4 or more additional interesting facts
- A copy of the periodic table with your element's box shaded in showing its location.
- Bibliography-properly cited. At least 3 sources.
- **The rubric/graphic organizer must be passed in with your project.**

This project will count as one "test" grade. You will be penalized 10pts each day this project is late. After 3 days, zero grade will be earned.

My element is: ______________________________

Chemical Element Poster Project Rubric

Name: ____________________ Period _____ Date _______

Element: ____

Poster/brochure

A proper **title**- Element Wanted or Element for Sale title:	_______	3 points
Your name/period:	_______	2 points
Element's name:	_______	2 points
Chemical symbol,when discovered/by whom?	_______	5 points
Atomic number:	_______	3 points
Average atomic mass:	_______	3 points
Isotope symbol. Number of naturally occurring isotopes:	_______	3 points
Metal, nonmetal, or metalloid:	_______	2 points
Chemical state (solid, liquid, gas), melting point and boiling point	_______	3 points
Picture/drawing of the nucleus:	_______	8 points
Period Group/Family and block (spdf)	_______	4 points
Complete electron configuration and number of valence electrons	_______	4 points
Periodic trends	_______	4 points
Reactivity	_______	2 points
Most common ion	_______	2 points
Similar elements in the group/family:	_______	4 points
3 or more color pictures of objects containing your element:	_______	3 points
3 or more uses (everyday, industrial etc.):	_______	3 points
3 or more additional physical or chemical characteristics (color, odor, reactivity, density etc.):	_______	3 points
4 or more Interesting facts:	_______	4 points
The copy of the periodic table with your element's box shaded in:	_______	5 points
Spelling, grammar and punctuation are correct:	_______	6 points
Poster/brochure is neat (no uneven edges, rips, wrinkles,cross-outs) and organized:	_______	8 points
Content is well-researched and accurate.	_______	6 points
Bibliography listed on the back of your poster.	_______	2 points
Complete rubric/graphic organizer	_______	6 points
TOTAL:	_______	/ 100 points

Worksheet: % Composition and Name ____________________

Empirical Formulas

Part 1: % Composition

Calculate the percent composition of the following compounds. SHOW ALL WORK.

HCl

K_2CO_3

Part 2: Empirical Formulas

Work each of the following problems. SHOW ALL WORK.

1. A compound is found to contain 63.52 % iron and 36.48 % sulfur. Find its empirical formula.

2. In the laboratory, a sample is found to contain 1.05 grams of nickel and 0.29 grams oxygen. Determine the empirical formula.

Worksheet: More Practice with % Composition and Empirical Formulas Name______________

Part 1: % Composition

Calculate the percent composition of the following compounds.

$Ca(OH)_2$

Na_3PO_4

Part 2: Empirical Formulas

Work each of the following problems. SHOW ALL WORK.

1. Determine the empirical formula of a compound containing 63.50 % silver, 8.25 % nitrogen, and the remainder oxygen.

2. A compound is found to contain 63 % manganese, Mn, and 37 % oxygen. What is the compound's empirical formula?

Empirical and Molecular Formulas Worksheet

per. 3 Frid.

Objectives:
- be able to calculate empirical and molecular formulas

Empirical Formula

1) What is the empirical formula of a compound that contains 0.783g of Carbon, 0.196g of Hydrogen and 0.521g of Oxygen?

$0.783g\ C \,/\, \frac{1 mol\ C}{12.0g} = \frac{0.0652 mol\ C}{0.0326} = 2$

$0.196g\ H \,/\, \frac{1 mol\ H}{1.01g} = \frac{0.194 mol\ H}{0.0326} = 6$

$0.521g\ O \,/\, \frac{1 mol\ O}{16.0g} = \frac{0.0326 mol\ O}{0.0326} = 1$

$\boxed{C_2H_6O}$

2) What is empirical formula of a compound which consists of 89.14% Au and 10.80% of O?

$89.14g\ Au \,/\, \frac{1 mol\ Au}{197.0g} = \frac{0.452 mol\ Au}{0.452} = 1 \times 2 = 2$

$10.80g\ O \,/\, \frac{1 mol\ O}{16.0g} = \frac{0.675 mol\ O}{0.452} = 1.49 \times 2 = 3$

Au_2O_3

3) What is empirical formula if compound consists of 21.2%N, 6.1%H, 24.2%S and 48.5%O?

$N_2H_8SO_4$

$21.2g\ N \,/\, \frac{1 mol\ N}{14.0g} = \frac{1.51 mol\ N}{0.756} = 2$

$24.2g\ S \,/\, \frac{1 mol\ S}{32.0g} = \frac{0.756 mol\ S}{0.756} = 1$

$6.1g\ H \,/\, \frac{1 mol\ H}{1.01g} = \frac{6.04 mol\ H}{0.756} = 8$

$48.5g\ O \,/\, \frac{1 mol\ O}{16.0g} = \frac{3.03 mol\ O}{0.756} = 4$

Molecular Formula

4) Empirical formula of a substance is CH_2O. Molar mass is 180. What is the molecular formula?

$CH_2O = 30.0g$ = Empirical Mass
(12+2+16)

$\# = \frac{180}{30} = 6\,(CH_2O) = C_6H_{12}O_6$

5) Sample (3.585g) contains 1.388g of C, 0.345g of H, 1.850g O and its molar mass is 62g. What is molecular formula of this substance?

$1.388g\ C \,/\, \frac{1 mol\ C}{12.0g} = \frac{0.116 mol\ C}{0.1156} = 1$

$0.345g\ H \,/\, \frac{1 mol\ H}{1.01g} = \frac{0.342 mol\ H}{0.1156} = 3$

$CH_3O = 31g$
(12+3+16)

$1.850g\ O \,/\, \frac{1 mol\ O}{16.0g} = \frac{0.1156 mol\ O}{0.1156} = 1$

$\# = \frac{62}{31} = 2$

$C_2H_6O_2$

Per. 4+7 Hon. Friday (No college)

Practice Problems

Show your work.

1. A compound contains 30.45% nitrogen and 69.55% oxygen. If its molecular mass is 92.02 g/mol, what are its empirical and molecular formulae?

$$\frac{30.45g\ N}{} \Big| \frac{1 mol\ N}{14.0g} = \frac{2.175\ mol\ N}{2.175} = 1$$

$$(14+32)$$
$$= NO_2 = 46g$$

$$\frac{69.55g\ O}{} \Big| \frac{1 mol\ O}{16.0g} = \frac{4.35 mol\ O}{2.175} = 2$$

$$\text{Molecular formula} = \frac{92.02}{46} = 2(NO_2) = N_2O_4$$

2. A compound contains 42.56 g of palladium and 0.80 grams of hydrogen. The molecular molar mass was found to be 216.8 g. What are the empirical and molecular formulae of the compound?

$$\frac{0.80g\ H}{} \Big| \frac{1 mol\ H}{1.01g} = \frac{0.792 mol\ H}{0.400} = 2$$

$$= PdH_2$$

$$\frac{42.56\ Pd}{} \Big| \frac{1 mol\ Pd}{106.4g} = \frac{0.400\ mol\ Pd}{0.400} = 1$$

$$(106.4+1.01)$$
$$PdH_2 = 107.4g$$

$$\text{Molecular formula} = \frac{216.8g}{107.4g} = 2(PdH_2) = Pd_2H_4$$

3. Octane, a compound of hydrogen and carbon found in gasoline has a molecular molar mass of 114.25 g. If the mass percent of hydrogen in octane is 15.75 %, what are the empirical and molecular formulae?

$$\frac{84.25g}{} \Big| \frac{1 mol\ C}{12.0g} = \frac{7.02 mol\ C}{7.02} = 1$$

$$= CH_2 = 14g$$

$$\frac{15.75g}{} \Big| \frac{1 mol\ H}{1.01g} = \frac{15.6 mol\ H}{7.02} = 2$$

$$\frac{114.25}{14} = 8(CH_2) = C_8H_{16}$$

Name: Key Date: ______ Period: ______

Scan

WS - Empirical Formulas

Directions: Solve the following problems on a separate sheet of paper. Show all of your work. No work = no grade!!!

1. Determine the empirical formula for the compounds that have the following analysis.
   a. 39.02% potassium, 12.03% carbon, and 1.02% hydrogen, and 47.93% oxygen.
   b. 0.57% hydrogen, 72.1% iodine, and 27.3% oxygen
   c. 27.9% iron, 24.1% sulfur and 48.0% oxygen

2. Determine the empirical formula for compounds that have the following analysis.
   a. 0.858 g sample of unknown substance is composed of 0.537 g copper and 0.321 g of fluorine
   b. 13.07 g sample of unknown substance is composed of 9.48 g of barium, 1.66 g of carbon, and 1.93 g of nitrogen
   c. 46.25 g sample of an unknown substance contains 14.77 g of potassium, 9.06 g of oxygen, and 22.42 g of tin.

3. Determine the molecular formula of a compound with empirical formula C_2H_2O and experimental gram molecular mass of 254 g/mol.

4. A compound which is 41.39% carbon, 3.47% hydrogen, and 55.14% oxygen and has an experimental gram molecular mass of 116.07 g/mol. What is the molecular formula of this compound?

5. A compound which is 64.27% carbon, 7.19% hydrogen, and 28.54% oxygen with experimental gram molecular mass of 168.19 g/mol. What is the molecular formula of this compound?

6. Determine the molecular formula of a compound that has a gram molecular mass of 180.18 g and its empirical formula is CH_2O.

5. Determine the molecular formulas for compounds having the following empirical formulas and molar masses:
   a. C_2H_4S; experimental molar mass 179
   b. C_2H_4O; experimental molar mass 176
   c. $C_2H_3O_2$; experimental molar mass 119
   d. C_2H_2O, experimental molar mass 254
6. Use the experimental molar mass to determine the molecular formula for compounds having the following analyses:
   a. 41.39% carbon, 3.47% hydrogen, and 55.14% oxygen; experimental molar mass 116.07
   b. 54.53% carbon, 9.15% hydrogen, and 36.32% oxygen; experimental molar mass 88
   c. 64.27% carbon, 7.19% hydrogen, and 28.54% oxygen; experimental molar mass 168.19
7. A 0.400 g sample of a white powder contains 0.141 g of potassium, 0.115 g of sulfur, and 0.144 g of oxygen. What is the empirical formula for the compound?
8. A 10.64 g sample of a lead compound is analyzed and found to be made up of 9.65 g of lead and 0.99 g of oxygen. Determine the empirical formula for this compound.
9. A 2.65 g sample of a salmon-colored powder contains 0.70 g of chromium, 0.65 g of sulfur, and 1.30 g of oxygen. The molar mass is 392.2. What is the empirical formula of the compound?
10. Ninhydrin is a compound that reacts with amino acids and proteins to produce a dark-colored complex. It is used by forensic chemists and detectives to see fingerprints that might otherwise be invisible. Ninhydrin's composition is 60.68% carbon, 3.40% hydrogen, and 35.92% oxygen. What is the empirical formula for ninhydrin?
11. Histamine is a substance that is released by cells in response to injury, infection, stings, and materials that cause allergic responses, such as pollen. Histamine causes dilation of blood vessels and swelling due to accumulation of fluid in the tissues. People sometimes take *anti*histamine drugs to counteract the effects of histamine. A sample of histamine having a mass of 385 mg is composed of 208 mg of carbon, 31 mg of hydrogen, and 146 mg of nitrogen. The molar mass of histamine is 111 g/mol. What is the molecular formula for histamine?

Name KEY Per. ______ Date 3/7/12

Lab: Percent Sugar in Bubble Gum

Objective: To determine the percentage of sugar in bubble gum.

Problem: What percent of bubble gum is sugar?

Hypothesis: Make a one-sentence statement predicting the percentage of sugar in your piece of bubble gum.

____

Experiment:

Materials:

5 pieces of sugared bubble gum
electronic balance

Procedure:

Note: Chewed gum cannot be placed directly on the balance pan; it must be wrapped in paper and the mass of the paper subtracted out. Most balances are not sensitive enough to measure the mass of one wrapper so all mass measurements will be of your entire group's wrappers and gum.

1. Your teacher will give you one piece of bubble gum. Place the wrapped pieces of gum of everyone in your group on the balance.
   Record the combined mass of all the wrappers and all the unchewed gum.
2. Unwrap your piece of gum put the gum in your mouth. **Do not throw the wrapper away!!!!!**
3. Place everyone's empty gum wrappers on the balance. Record the combined mass of all the wrappers. **Do not throw the wrappers away!!!!**
4. Chew your gum for 15 minutes.
5. After 15 minutes, put your wrapper up to your mouth and gently spit your gum into the wrapper. Try not to get too much saliva on the gum.
6. Place the wrapped, chewed gum of everyone in your group on the balance. Record the combined mass.
7. Throw away the gum and wrappers.

KEY

1. Find the empirical formula: 8.04 percent lithium, 91.96 percent bromide.
   Ans. LiBr

2. 70.9 percent potassium, 29.1 percent sulfur (K_2S)

3. A compound was found to contain 55.2 percent xenon and 44.8 percent chlorine. Find the empirical formula. XeCl3

4. 51.28 percent C, 9.40 percent H, 27.35 percent O, 11.97 percent N. The molecular mass is 234. Find the empirical and molecular formulas. C5H11O2N

5. 33.18 percent C, 4.60 percent H, 29.49 percent O, 32.72 percent Cl, The molecular mass is 108.5. Find the empirical and molecular formulas
C3H5O2Cl (both)

6. A 10g sample of a compound contains 4.00g C, 0.667g H, and 5.33g O. Find the empirical and molecular formulas. The molecular mass 180 amu.
CH2O C6H12O6

7. Find the formula mass of $Mg(OH)_2$

$1Mg = 24.31g + (2O \times 16g)_{32.0} + 2g\,H = 58.31$ amu

8. Find the molar mass of $(NH_4)_2SO_4$

$2N = 28$, $8H = 8$ + $1S = 32$, $4O = 64$ $= 132g$ or $132g/mol$

9. Find the percentage composition of $(NH_4)_2SO_4$

10. Find the percentage composition of $Ga_2(SO_3)_3$

9) $\%N = \frac{28g}{132} \times 100 = 21.2\%$ $\%S = \frac{32g}{132g} \times 100 = 24.2\%$

$\%H = \frac{8g}{132g} \times 100 = 6.06\%$ $\%O = \frac{64g}{132g} \times 100 = 48.5\%$

10) $2Ga \times 69.72g = 139.44$
$3S \times 32.0g \quad 96.00$
$9O \times 16.0g \quad 144.00$
379.44

$\%Ga = \frac{139.44}{379.44} \times 100 = \boxed{36.7\%\ Ga}$

$\%S = \frac{96.0}{379.44} \times 100 = \boxed{25.3\%\ S}$

$\%O = \frac{144.00}{379.44} \times 100 = \boxed{37.95\%\ O}$

Assigned 3/9

Due Wed. 3/14

DeComposition: Taking the News Apart

Select a newspaper or magazine article to read. It must be a scientific topic, preferably one with a chemistry focus. If possible, attach the article to a piece of paper with a heading (name, date...) and on a separate sheet write an analysis of the article. *Of the following items, every article should have items **1**, **2**, and **4**. Items* listed under '**3**' should be completed as they apply to your particular article. You should have at least three paragraphs.

1. List the title of the article, along with the author and the source of the article.

2. What three factual details (names, places, technical words, etc.) from your article are most worth remembering?

3. If your article is about a <u>problem</u>,

Choose correct one

   a. *What is the problem?*
   b. What are the possible causes of the problem?
   c. What will happen if the problem continues?
   d. What are possible solutions?
   e. *Which solutions do you favor and why?*

If your article is about a <u>controversy or disagreement</u>,

   a. What is the issue?
   b. Explain the two points of view
   c. Does the article give equal coverage to both (all) sides?
   d. If the article only covers one side, what information is needed to fully explain the story?
   e. Which side do you tend to agree with and why?

If your article is about a <u>new idea</u>,

   a. *What problem will the new idea help solve?*
   b. Why do you think that this new idea had not come up before now?
   c. What problems do you see that might prevent this new idea from being carried out?
   d. Might a different set of problems arise out of this new idea?

4. What questions do you have that were not answered in this article? What more would you like to know about the topic in this article?

Name ______________________ Date ______________ Class ______________

CHAPTER 6 REVIEW

Chemical Bonding

SECTION 6-5

SHORT ANSWER **Answer the following questions in the space provided.**

1. Identify the major assumption of the VSEPR theory that is used to predict the shape of atoms.

Pairs of valence e⁻ on the central atom repel eachother as far apart as possible

2. In water, two hydrogen atoms are bonded to one oxygen atom. Why isn't water a linear molecule?

it has 2 pairs of lone pair electrons on the central atom that "push" terminal atoms

~~3.~~ What orbitals combine together to form sp^3 hybrid orbitals around a carbon atom?

skip

4. What two factors determine whether or not a molecule is polar?

It must have "lone pairs" on central atom OR terminal atoms must differ. Dipole exists

5. Arrange the following types of attractions in order of increasing strength, with 1 being the weakest and 4 the strongest.

______ covalent

______ ionic

______ dipole-dipole

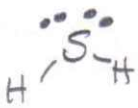
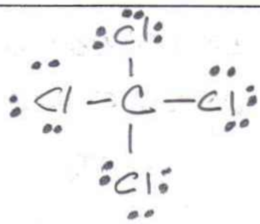
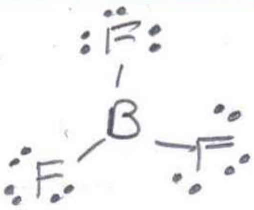
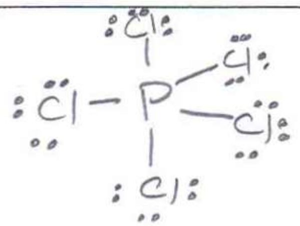
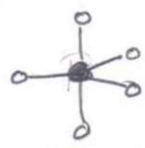
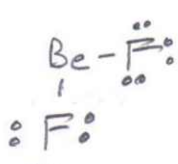
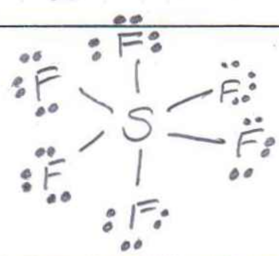
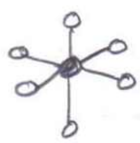
______ London dispersion

6. How are dipole-dipole attractions, London dispersion forces, and hydrogen bonding similar?

Name ______________________ Date ____________ Class ____________

SECTION 6-5 continued

7. Complete the following table:

Formula	**Lewis structure**	(VSEPR) Ball + stick and **Geometry** name	YES/NO **Polar**?	size Bond angle
H_2S 2+6=8 −4 4		 BENT AB_2E_2		105
CCl_4 4+28 ↓ 32−8= 24		 AB_4 Tetrahedral		109.5
BF_3 3+21=24 −6 18		 AB_3 Trigonal Planar		120
H_2O 2+6=8 −4 4		 AB_2E_2 Bent		105
PCl_5 5+35=40 −10 30		 AB_5 Trigonal bi-pyramid		90 120
BeF_2 2+14=16 −4 12		 AB_2 Linear		180°
SF_6 6+42=48 −12 36		 AB_6 octahedral		90°

Homework Ch. 7.3 Assigned on 2/27/12

Q: Find the percentage composition of Ag_2SO_4:

1) Find formula mass of each element
2) add up the results from (1)
3) divide each element's total formula mass in the compound by the total ~~empirica~~ formula mass of the compound

(1) amu

2 Ag : 2 × 107.87 = 215.74 amu
1 S : 1 × 32.06 = 32.06 "
4 O : 4 × 16.00 = 64.00 "
(2) + 311.8 amu for Ag_2SO_4

(3) $\frac{\text{mass of each element}}{\text{Total mass of compd}} \times 100$

Ag: $\frac{215.74}{311.8} \times 100 = \boxed{69.19\%\ Ag}$

S: $\frac{32.06}{311.8} \times 100 = \boxed{10.28\%\ S}$

O: $\frac{64.00}{311.8} \times 100 = \boxed{20.53\%\ O}$

Charge Table for Monatomic and Polyatomic Ions

Prefixes	+1		+2		+3		+4	
mono = 1	ammonium	NH_4^+	barium	Ba^{2+}	aluminum	Al^{3+}	lead (IV) plumbic	Pb^{4+}
di = 2	copper (I) cuprous	Cu^+	beryllium	Be^{2+}	bismuth	Bi^{3+}	tin (IV) stannic	Sn^{4+}
tri = 3	hydrogen	H^+	calcium	Ca^{2+}	chromium (III) chromic	Cr^{3+}		
tetra = 4	silver	Ag^+	chromium, chromous	Cr^{2+}	cobalt (III) cobaltic	Co^{3+}		
penta = 5			cobalt (II) cobaltous	Co^{2+}	iron (III) ferric	Fe^{3+}		
hexa = 6			copper (II) cupric	Cu^{2+}				
hepta = 7			iron (II) ferrous	Fe^{2+}				
octa = 8			lead (II) plumbous	Pb^{2+}				
nona = 9			magnesium	Mg^{2+}				
deca = 10			mercury (II) mercuric	Hg^{2+}				
			nickel (II)	Ni^{2+}				
			strontium	Sr^{2+}				
			tin (II) stannous	Sn^{2+}				
			zinc	Zn^{2+}				
			mercury (I) mercurous	Hg_2^{+2}				

-1		-1		-2		-3		Organic Prefixes
acetate	$C_2H_3O_2^-$ or	hydroxide	OH^-	carbonate	CO_3^{2-}	arsenate	AsO_4^{3-}	1- meth-
bromide	Br^-	hypochlorite	ClO^-	chromate	CrO_4^{2-}	arsenite	AsO_3^{3-}	2- eth-
chlorate	ClO_3^-	iodide	I^-	chromite	CrO_3^{2-}	borate	BO_3^{3-}	3- prop-
chloride	Cl^-	nitrate	NO_3^-	dichromate	$Cr_2O_7^{2-}$	nitride	N^{3-}	4- but-
chlorite	ClO_2^-	nitrite	NO_2^-	oxalate	$C_2O_4^{2-}$	phosphate	PO_4^{3-}	5- pent-
cyanide	CN^-	perchlorate	ClO_4^-	oxide	O^{2-}	phosphide	P^{3-}	6- hex-
fluoride	F^-	permanganate	MnO_4^-	peroxide	O_2^{2-}	phosphite	PO_3^{3-}	7- hept-
				silicate	SiO_3^{2-}			8- oct-
Acetate	CH_3COO^-	iodate	IO_3^-	sulfate	SO_4^{2-}			9- non-
				sulfide	S^{2-}			10- dec-
				sulfite	SO_3^{2-}			

Per. 4+7: in class 2/29

2/28/12

Molecular Formula Problems

Molecular formula problems are solved just like empirical formula problems. The only extra step involves the molar mass of the molecule that is given in the problem.

Sample Problem:

What is the molecular formula of a substance that has an empirical formula of $AgCO_2$ and a molar mass of 304?

Solution:

Find the empirical formula if it is not given - in this case, it is. The mass of the empirical formula is 152 (Ag + C + O + O). If you divide 304 by 152, you get 2. So, the molecular formula is 2 times the empirical formula. $(AgCO_2)_2$ or $Ag_2C_2O_4$. This is silver oxalate.

Practice Problems:

From the percent composition data, calculate the empirical formula, then the molecular formula for the following compounds.

1. A compound has the following percent composition by mass: 26.7% C, 2.2% H, and 71.1% O. The molar mass of the molecule is 90 grams.

2. A compound has the following percent composition by mass: 54.6% C, 9.0% H, and 36.4% O. The molar mass of the molecule is 176 grams.

3. A compound has the following percent composition by mass: 80.0% C and 20.0% H. The molar mass of the molecule is 30 grams.

4. A compound has the following percent composition by mass: 24.3% C, 4.1% H, and 71.6% Cl. The molar mass of the molecule is 99 grams.

5. A compound has the following percent composition by mass: 49.0% C, 2.7% H, and 48.2% Cl. The molar mass of the molecule around 150 grams.

6. A compound has the following percent composition by mass: 30.5% N and 69.5% O. The molar mass of the molecule is 92 grams.

h.w. per: 4 #7

Molecular Formula Worksheet

Molecular formula – a formula showing the types and numbers of atoms combined in a single molecule of a molecular compound. It is a whole number multiple of the empirical formula.

The relationship between a compound's empirical and molecular formula can be written as:

x(empirical formula) = molecular formula

also

x(empirical formula mass) = molecular formula mass

1. To determine the molecular formula of a compound, you must know the compound's formula mass.
2. Divide the molecular mass by the empirical formula mass to determine the whole number multiple (x). You may have to find the empirical formula in order to obtain the empirical formula mass.

Problems:

1. In a previous problem, the empirical formula of a compound of phosphorus and oxygen was found to be P_2O_5. Experimentation shows that the molar mass of this compound is 283.89g. What is the compounds molecular formula.

2. Determine the molecular formula of the compound with an empirical formula of CH and a formula mass of 78.110amu.

3. A sample with a formula mass of 34.00 amu is found to consist of 0.44g H and 6.92g O. Find its molecular formula.

2.3 subscripts

4. If 4.04g of N combine with 11.46g O to produce a compound with a formula mass of 108.0 amu, what is the molecular formula of this compound? $\boxed{\text{emp: } N_2O_5}$ 28.02+80 = 108.02 amu emp form mass

$\frac{4.04g \mid 1 mol N}{\mid 14.01} = 0.2884$ $\frac{0.2884}{0.2884} = 1 mol N \times 2 = 2 mol N$ $\frac{11.46}{16} = \frac{0.7163}{0.2884} = 2.5 \times 2 = 5 mol O$ $\frac{108}{108.02} \approx 1$ ∴ molec for = N_2O_5

5. The empirical formula for trichloroisocyanuric acid, the active ingredient in many household bleaches, is OCNCl. The molar mass of this compound is 232.41g. What is the molecular formula of trichloroisocyanuric acid. Same as ex: ApQ in notes $\boxed{N_2H_4}$

6. The molar mass of a compound is 92g. Analysis of a sample of the compound indicates that it contains 0.606g N and 1.390g O. Find its molecular formula.

VSEPR and Molecular polarity Lab Name ______________________________ Per. ____ Date: __________

Molecule	Lewis Dot Structure (Tally e⁻)	Number of Atoms Bonded to Central Atom	Lone Pairs of Electrons on central atom	Molecular Geometry shape (AB geometry and name)	Bond Angle(s)	Polar or Nonpolar?
Example H_2S	.. .. S : : H H	2	2	AB_2E_2 Bent	105	Polar
1. NH_3						
2. CH_3I						
3. CO_2						
4. SiH_4						
5. HCN						

6. SF_6						
7. H_2O						
8. PH_5						
9. NH_2Cl						
10. CH_2O						

Post Lab Questions: Answer on a separate piece of paper:

1. Define VSEPR. How is VSEPR theory used to determine the shape of molecules?
2. Define dipole. How is a dipole in a molecule represented?
3. What is meant by a polar molecule?
4. What two factors determine whether or not a molecule is polar?
5. The presence of an unshared electron pair in a molecules causes the bond angles to be slightly larger/smaller than normal.
6. What is meant by an expanded octet- Give an example.
7. Give an example of each and AB_4, AB_3E and AB_2E_2 molecule. Explain what causes the difference in the geometry of each molecule.
8. How do "lone pair/unshared pair" electrons cause a change in the geometries of different molecules?

Chemistry Binary Ionic Compounds WS#2

Name ______________________________ Period ______ Date ________

Binary Ionic Compounds contain Group I, II, and III metals with non-metal ions. Show the correct name for the following compounds.

Give correct names for these binary compounds

HCl	
K_2O	
CaO	
$MgCl_2$	
NaH	
Li_2O	
ZnS	
$RbBr$	
Al_2O_3	
Na_3N	
Ca_2P_3	
KI	
AlP	
Ba_3As_2	
Rb_2O	

Give correct formulas for these binary compounds

calcium iodide	
calcium hydride	
magnesium fluoride	
strontium bromide	
sodium nitride	
rubidium oxide	
barium nitride	
lithium chloride	
gallium sulfide	
aluminum nitride	
cesium fluoride	
lithium phosphide	
aluminum iodide	
cesium arsenide	
rubidium selinide	
Barium phosphide	

Name________________________________ Per. ______

Stock system Worksheet 1

Write the name of each of the following compounds using the **Stock System:** Make sure you include the Roman numeral in the name.

1. Cu_2S ____________________	7. Fe_2O_3 ____________________
2. HgO ____________________	8. PbO_2 ____________________
3. CrN ____________________	9. $SnCl$ ____________________
4 NiF_2 ____________________	10. CuO ____________________
5. $FeCl_2$ ____________________	11. PbF_2 ____________________
6. Hg_2Cl_2 ____________________	12. MnO ____________________

Write the formula of each of the following compounds. Remember, the Roman numeral indicates the charge of the cation.

13. copper (II) oxide __________

14. nickel (II) sulfide __________

15. cobalt (II) chloride __________

16. manganese (IV) fluoride __________

17. chromium (III) bromide __________

18. iron (III) oxide __________

19. copper (I) nitride __________

20. iron (II) selenide __________

21. lead (II) phosphide __________

22. tin (IV) chloride __________

Appendix G

Tests and Quizzes

Name____ Period______ Date______________

Quiz A Binary Ionic Compounds

Name the following Ionic Compounds:

________________________1. AlP

________________________ 2. K_2O

________________________ 3. Co_3N_2

_________________________4. SnI_4

_________________________5. $BaCl_2$

Write the chemical formula for the following:

6. Sodium oxide ________________

7. Calcium sulfide ______________

8. Mercury (II) bromide_________

9. Iron (III) nitride__________________

10. Vanadium (IV) chloride_________

Name____ Period______
Date______________

Quiz B Binary Ionic Compounds

Name the following Ionic Compounds:

__________________________ 1. Li_2O

___________________________2. MgS

__________________________ 3. $PbBr_4$

___________________________4. Cu_3N_2

___________________________ 5. BeI_2

Write the chemical formula for the following:

6. Nickel (II) phosphide____________

7. Strontium chloride______________

8. Tin (II) oxide___________________

9. Potassium sulfide_____________

10. Cobalt (III) fluoride____________

Name____ Period______ Date______________

Make up Quiz Binary Ionic Compounds

Write the chemical formula for the following:

1. Lead (IV) bromide________________

2. Aluminum oxide ______________

3. Mercury (II) nitride_________

4. Magnesium selenide__________________

5. Barium sulfide _________

Name the following Ionic
Compounds:

_______________________6. NaF

_______________________ 7. FeP

_______________________ 8. AgCl

________________________9. CuI_2

________________________10. Sr_2O

Name____ Period______ Date______________

Honors Chapter 7, Section 7.1 TEST A

Name the following chemical formulas:

1. $Mg_3(PO_3)_2$____________________________

2. Cr_3As_2____________________________

3. ZnO_2____________________________

4. $Fe_3(IO_3)_2$____________________________

5. CO_3____________________________

6. $Sn(NO_3)_2$____________________________

7. Si_4F____________________________

8. N_3Cl_6____________________________

9. PO_2____________________________

10. C_5S_7____________________________

11. CrI_3____________________________

12. Na_3P____________________________

13. AlN____________________________

14. SrC_2O_4____________________________

15. BCl_3____________________________

Write the chemical formula for the following compounds:

1. Calcium oxide ________________

2. Cobalt (III) hydroxide ______________

3. Ammonium chromate _________

4. Copper (I) chloride__________________

5. Trisulfur octabromide_________

6. Iodine decoxide____________________________

7. Nonacarbon trinitride______________________________

8. Iron (II) chlorite______________________________

9. Hexanitrogen monoiodide______________________________

10. Aluminum phosphide______________________________

11. Nickel (II) selenide______________________________

12. Rubidium silicate______________________________

13. Chromium nitride______________________________

14. Tin (IV) sulfide______________________________

15. Lithium borate______________________________

Short Answer: How many atoms of each element are present in the following chemical formulas?

a) $(NH_4)_3AsO_4$ b) $Al_2(Cr_2O_7)_3$

**Bonus!

A) Identify the element that has the electron configuration: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^4$

B) Predict the formula of the compound the element from part A would form when it bonds with krypton. Show your work and/or explain your answer.

C) Predict the formula of the compound the element from part A would form when it bonds with arsenic. Show your work and/or explain your answer.

Name____ Period______ Date______________

Honors Chapter 7, Section 7.1 <u>TEST B</u>

Name the following chemical formulas:

1. $LiClO_3$ ______________________

2. $NiCrO_3$ ______________________

3. $CaCO_3$ ______________________

4. $Zn(CN)_2$______________________

5. N_2O______________________

6. H_7Se_3______________________

7. AsI_5______________________

8. Cl_4Br_{10}______________________

9. $Hg(NO_3)_2$______________________

10. CuF______________________

11. $BaSiO_3$______________________

12. $Co(ClO_3)_3$______________________

13. $GaAsO_4$______________________

14. NH_4Cl______________________

15. Cs_2O______________________

Write the chemical formula for the following compounds:

1. Tin (IV) hypochlorite ________________

2. Potassium phosphite ______________

3. Iron (II) sulfate _________

4. Beryllium permanganate__________________

5. Diiodine heptaphosphide_________

6. Bromine difluoride______________________

7. Pentacarbon octachloride______________________

8. Disulfur decoxide______________________

9. Chromium (III) nitride______________________

10. Mercury (I) perchlorate______________________

11. Silver hydroxide______________________

12. Lead (IV) oxalate_____________________

13. Indium iodate______________________

14. Sodium dichromate______________________

15. Zinc iodide ______________________

Short Answer: How many atoms of each element are present in the following chemical formulas?

a) $(NH_4)_2C_2O_4$

b) $Pb(CH_3COO)_4$

**Bonus!

A) Identify the element that has the electron configuration: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^6$

B) Predict the formula of the compound the element from part A would form when it bonds with sulfur. Show your work and/or explain your answer.

C) Predict the formula of the compound the element from part A would form when it bonds with argon. Show your work and/or explain your answer.

Name____ Period______ Date______________

Honors Chapter 7, Section 7.1 Make-Up TEST

Name the following chemical formulas:

1. $Mg_3(PO_3)_2$____________________________
2. Cr_3As_2____________________________
3. ZnO_2____________________________
4. $Fe(IO_3)_2$____________________________
5. Sb_2S_3____________________________
6. SiCl____________________________
7. N_6Se_4____________________________
8. $Al(HCO_3)_3$____________________________
9. BaS____________________________
10. I_5P_9____________________________
11. $Co(MnO_4)_3$____________________________
12. C_4F____________________________
13. $Sn(SiO_3)_2$____________________________
14. $BiBO_3$____________________________
15. HgC_2O_4____________________________

Write the chemical formula for the following compounds:

1. Mercury (I) hypochlorite ________________
2. Gallium Arsenide ______________
3. Heptabromide hexoxide _________
4. Strontium dichromate__________________
5. Lead (IV) chromate_________

6. Nonanitrogen tetraiodide______________________________

7. Thalium sulfite______________________________

8. Barium carbonate______________________________

9. Mercury (II) peroxide______________________________

10. Ammonium chromite______________________________

11. Tin (II) nitrite______________________________

12. Copper (II) arsenate______________________________

13. Silver nitride______________________________

14. dicarbon monoxide______________________________

15. Iron (III) acetate______________________________

Short Answer: How many atoms of each element are present in the following chemical formulas?

a) $(NH_4)_2Cr_2O_7$

b) $Cu_3(PO_3)_2$

College: Chapters 7.3 and 7.4 Test **A**

Name____ Period______ Date_______________

Use the following atomic masses for all calculations:

H: 1.0 **C**: 12.0 **O**: 16.0 **Cl**: 35.5 **Na**: 23.0 **Ca**: 40.0 **I**: 126.9 **Ga**: 69.7

A. Show all your work on the following problems in order to receive full credit. Round all final ANSWERS to ONE decimal place. **(15pts)**

Circle your final answers.

1. Find the molar mass of NaI. Use correct units:

2. Find the formula mass of $Ca(OH)_2$. Use correct units:

3. Calculate the percent composition of C_6H_{12}.

B. Show all your work on the following problems in order to receive full credit.
Circle your final answer(s). **(25pts)**

1. Determine the empirical formula of a compound containing 80.0% carbon and 20.0% hydrogen.

2. A compound has a percent composition by mass of 54.6% C, 9.0% H, and 36.4% O. The formula mass of the molecular is 176 amu. What is the compound's molecular formula?

3. The empirical formula of a substance is CH_2O. The molar mass is 180 g/mol. What is the molecular formula?

4. The molecular formula of a compound is $C_2H_4Cl_2$. Give one example of a possible empirical formula based on this molecular formula.

Bonus: Determine the empirical formula of a compound that is 74.39% Ga and 25.61% O.

College: Chapters 7.3 and 7.4 Test B

Name____ Period______ Date______________

Use the following atomic masses for all calculations:

H: 1.0	**C**: 12.0	**O**: 16.0	**Cl**: 35.5	**Na**: 23.0	**Ca**: 40.0	**I**: 126.9	**Ga**: 69.7

A. Show all your work on the following problems in order to receive full credit. Round all final ANSWERS to ONE decimal place. **(15pts)**

Circle your final answers.

1. Find the molar mass of NaI. Use correct units:

2. Find the formula mass of $Ca(OH)_2$. Use correct units:

3. Calculate the percent composition of C_6H_{12}.

B. Show all your work on the following problems in order to receive full credit.
Circle your final answer(s). **(25pts)**

1. Determine the empirical formula of a compound containing 80.0% carbon and 20.0% hydrogen.

2. A compound has a percent composition by mass of 54.6% C, 9.0% H, and 36.4% O. The formula mass of the molecular is 176 amu. What is the compound's molecular formula?

3. The empirical formula of a substance is CH_2O. The molar mass is 180 g/mol. What is the molecular formula?

4. The molecular formula of a compound is $C_2H_4Cl_2$. Give one example of a possible empirical formula based on this molecular formula.

Bonus: Determine the empirical formula of a compound that is 74.39% Ga and 25.61% O.

Honors: Chapters 7.3 and 7.4 Test **A**

Name____ Period______ Date______________

Use the following atomic masses for all calculations:

H: 1.0 **C**: 12.0 **O**: 16.0 **Cl**: 35.5 **Na**: 23.0 **Ca**: 40.1 **I**: 126.9 **K**: 39.1 **P**: 31.0 **Ga**: 69.7

A. Show all your work on the following problems in order to receive full credit. Round all final ANSWERS to ONE decimal place. **(15pts)**

Circle your final answers.

1. Find the molar mass of NaI. Use correct units:

2. Find the formula mass of $Ca(OH)_2$. Use correct units:

3. Calculate the percent composition of K_3PO_4.

B. Show all your work on the following problems in order to receive full credit.
Circle your final answer(s). **(50pts)**

1. Find the empirical formula of a compound containing 64.27% C, 7.19% H, and 28.54% O.

2. A compound has a percent composition by mass of 54.6% C, 9.0% H, and 36.4% O. The formula mass of the molecular is 176 amu. What is the compound's molecular formula?

3. The empirical formula of a substance is CH_2O. The molar mass is 180 g/mol. What is the molecular formula?

4. The molecular formula of a compound is $C_2H_4Cl_2$. Give one example of a possible empirical formula based on this molecular formula.

5. Determine the molecular formula of a compound that is 74.39% Ga and 25.61% O. The molar mass of the compound is 735.2 g/mol.

Honors: Chapters 7.3 and 7.4 Test **B**

Name____ Period______ Date______________

Use the following atomic masses for all calculations:

H: 1.0 **C**: 12.0 **O**: 16.0 **Cl**: 35.5 **Na**: 23.0 **Ca**: 40.1 **I**: 126.9 **K**: 39.1 **P**: 31.0 **Ga**: 69.7

A. Show all your work on the following problems in order to receive full credit. Round all final ANSWERS to ONE decimal place. **(15pts)**

Circle your final answers.

1. Find the molar mass of NaI. Use correct units:

2. Find the formula mass of $Ca(OH)_2$. Use correct units:

3. Calculate the percent composition of K_3PO_4.

B. Show all your work on the following problems in order to receive full credit.
Circle your final answer(s). **(50pts)**

1. Find the empirical formula of a compound containing 64.27% C, 7.19% H, and 28.54% O.

2. A compound has a percent composition by mass of 54.6% C, 9.0% H, and 36.4% O. The formula mass of the molecular is 176 amu. What is the compound's molecular formula?

3. The empirical formula of a substance is CH_2O. The molar mass is 180 g/mol. What is the molecular formula?

4. The molecular formula of a compound is $C_2H_4Cl_2$. Give one example of a possible empirical formula based on this molecular formula.

5. Determine the molecular formula of a compound that is 74.39% Ga and 25.61% O. The molar mass of the compound is 735.2 g/mol.

Appendix H

Answer Keys

WS # 3 CH.7.4 Empirical and Molecular Formula Practice

Answer Key

5. a. $C_6H_{12}S_3$
   b. $C_8H_{16}O_4$
   c. $C_4H_6O_4$
   d. $C_{12}H_{12}O_6$
6. a. $C_4H_4O_4$
   b. $C_4H_8O_2$
   c. $C_9H_{12}O_3$
7. $K_2S_2O_5$, potassium metabisulfite
8. Pb_3O_4
9. $Cr_2S_3O_{12}$ or $Cr_2(SO_4)_3$, chromium(III) sulfate
10. $C_9H_6O_4$
11. $C_5H_9N_3$, the empirical formula and the molecular formula are the same
12. The molecular formulas of the compounds are different multiples of the same empirical formula. (FYI: The first could be acetic acid, $C_2H_4O_2$, and the second could be glucose, $C_6H_{12}O_6$, or some other simple sugar.)

Name ____ Period ____ Date________________

Worksheet B ~ Mixed Review (Binary Ionic Compounds and Polyatomic Ions)

Name the following Ionic Compounds:

Potassium phosphate 1. K_3PO_4

Gallium hydroxide 2. $Ga(OH)_3$

Cobalt (II) nitride 3. Co_3N_2

Tin (II) sulfide 4. SnS

Aluminum acetate 5. $Al(C_2H_3O_2)_3$

Magnesium phosphide 6. Mg_3P

Cesium nitrite 7. $CsNO_2$

Calcium permanganate 8. $CaMnO_4$

Tin (IV) fluoride 9. SnF_4

Iron (III) sulfate 10. $Fe_2(SO_3)_3$

Write the chemical formula for the following:

1. Nickel (II) peroxide NiO_2
2. Vanadium (IV) chloride VCl_4
3. Lithium bromate $LiBrO_3$
4. Aluminum cyanide $Al(CN)_3$
5. Ammonium sulfate $(NH_4)_2SO_4$
6. Francium oxide Fr_2O
7. Mercury (I) nitrate $Hg_2(NO_3)_2$
8. Nickel (I) sulfide Ni_2S
9. Ammonium carbonate $(NH_4)_2CO_3$
10. Iron (III) fluoride FeF_3

Name______KEY___________________________________ Period______
Date______________

Quiz A Binary Ionic Compounds

Name the following Ionic Compounds:

_Aluminum Phosphide ____1. AlP

_Potassium Oxide_________ 2. K_2O

__Cobalt (II) Nitride________ 3. Co_3N_2

__Tin (IV) Iodide____________4. SnI_4

__Barium chloride__________5. $BaCl_2$

Write the chemical formula for the following:

6. Sodium oxide ______Na_2O

7. Calcium sulfide ______CaS

8. Mercury (II) bromide___$HgBr_2$

9. Iron (III) nitride_______FeN

10. Vanadium (IV) chloride___VCl_4

Name__________________KEY_________________________ Period______
Date______________

Quiz B Binary Ionic Compounds

Name the following Ionic Compounds:

_____Lithium oxide_________1. Li_2O

_____Magnesium sulfide____2. MgS

_____Lead (IV) bromide____ 3. $PbBr_4$

_____Copper (II) nitride_____4. Cu_3N_2

_____Beryllium iodide______ 5. BeI_2

Write the chemical formula for the following:

6. Nickel (II) phosphide___ Ni_3P_2___

7. Strontium chloride____$SrCl_2$____

8. Tin (II) oxide______SnO_________

9. Potassium sulfide_____K_2S_____

10. Cobalt (III) fluoride___CoF_3

Name________________KEY______________________ Period______
Date_____________

Make-up Quiz Binary Ionic Compounds

Write the chemical formula for the following:

1. Lead (IV) bromide_______________ $PbBr_4$

2. Aluminum oxide _____________Al_2O_3

3. Mercury (II) nitride_________ Hg_3N_2

4. Magnesium selenide_________________ MgSe

5. Barium sulfide _________ BaS

Name the following Ionic Compounds:

______________________6. NaF Sodium fluoride

______________________ 7. FeP Iron (III) phosphide

______________________ 8. AgCl Silver chloride

_______________________9. CuI_2 Copper (II) iodide

_______________________10. Sr_2O Strontium oxide

Name ____________KEY____________________ Period______ Date______________

Honors Chapter 7, Section 7.1 TEST A

Name the following chemical formulas:

1. PbF_2 Lead (II) fluoride

2. Na_2SO_3 sodium sulfite

3. $Hg_2(C_2H_3O_2)_2$ Mercury (I) acetate

4. Ag_3PO_4 Silver phosphate

5. $MgCO_3$ Magnesium carbonate

6. $Sn(NO_3)_2$ Tin (II) nitrate

7. Si_4F tetrasilicon monofluoride

8. N_3Cl_6 trinitrogen hexachloride

9. PO_2 phosphorous dioxide

10. C_5S_7 pentacarbon heptasulfide

11. CrI_3 chromium (III) iodide

12. Na_3P sodium phosphide

13. AlN aluminum nitride

14. SrC_2O_4 Strontium oxalate

15. BCl_3 boron chloride

Write the chemical formula for the following compounds:

1. Calcium oxide ________________ CaO

2. Cobalt (III) hydroxide ______________ $Co(OH)_3$

3. Ammonium chromate _________ $(NH_4)_2CrO_4$

4. Copper (I) chloride__________________ CuCl

5. Trisulfur octabromide_________S_3Br_8

Name__________KEY________________________________ Period______ Date_______________

Honors Chapter 7, Section 7.1 TEST B

Name the following chemical formulas:

1. $LiClO_3$ Lithium chlorate

2. $NiCrO_3$ Nickel (II) chromite

3. $CaCO_3$ Calcium carbonate

4. $Zn(CN)_2$ zinc cyanide

5. N_2O dinitrogen monoxide

6. H_7Se_3 heptahydrogen triselenide

7. AsI_5 aresenic pentiodide

8. Cl_4Br_{10} tetrachlorine decabromide

9. $Hg(NO_3)_2$ mercury (II) nitrate

10. CuF Copper (I) fluoride

11. $BaSiO_3$ Barium silicate

12. $Co(ClO_2)_3$ Cobalt (III) chlorite

13. $GaAsO_4$ Gallium arsenate

14. NH_4Cl Ammonium chloride

15. Cs_2O Cesium oxide

Write the chemical formula for the following compounds:

1. Tin (IV) hypochlorite __________________ $Sn(ClO)_4$

2. Potassium phosphite ________________ K_3PO_3

3. Iron (II) sulfate __________$FeSO_4$

4. Beryllium permanganate____________________ $Be(MnO_4)_2$

5. Diiodine heptaphosphide__________I_2O_7

Name__________KEY______________________________ Period______ Date_______________

Honors Chapter 7, Section 7.1 KEY <u>Make-Up TEST</u>

Name the following chemical formulas:(15pts)

1. $Mg_3(PO_3)_2$__________________________ Magnesium Phosphite
2. Cr_3As_2______________________________ Chromium arsenide
3. ZnO_2_______________________________ Zinc peroxide
4. $Fe(IO_3)_2$___________________________ Iron (II) iodate
5. Sb_2S_3____________________________ diantimony trisulfide
6. SiCl____________________________ Silicon monochloride
7. N_6Se_4___________________________ Hexanitrogen tetraselenide
8. $Al(HCO_3)_3$________________________ Aluminum bicarbonate
9. BaS_____________________________ Barium sulfide
10. I_5P_9___________________________ pentaiodine nonaphosphide
11. $Co(MnO_4)_3$______________________ Cobalt (III) permanganate
12. C_4F______________________________ tetracarbon monofluoride
13. $Sn(SiO_3)_2$__________________________ Tin (IV) silicate
14. $BiBO_3$____________________________ Bismuth Borate
15. HgC_2O_4___________________________ Mercury (II) oxalate

Write the chemical formula for the following compounds:(15pts)

1. Mercury (I) hypochlorite _________________ $Hg_2(ClO)_2$
2. Gallium Arsenide _______________ GaAs
3. Heptabromide hexoxide __________ Br_7O_6
4. Strontium dichromate______________ $SrCr_2O_7$
5. Lead (IV) chromate__________$Pb(CrO_4)_2$

Problem Solving continued- EF and MF

5.a. $C_6H_{12}S_3$
   b. $C_8H_{16}O_4$
   c. $C_4H_6O_4$
   d. $C_{12}H_{12}O_6$
6. a. $C_4H_4O_4$
   b. $C_4H_8O_2$
   c. $C_9H_{12}O_3$
7. $K_2S_2O_5$, potassium metabisulfite
8. Pb_3O_4
9. $Cr_2S_3O_{12}$ or $Cr_2(SO_4)_3$, chromium(III) sulfate
10. $C_9H_6O_4$
11. $C_5H_9N_3$, the empirical formula and the molecular formula are the same

Honors: Chapters 7.3 and 7.4 Test **A**

Name____ Period______ Date______________

Use the following atomic masses for all calculations:

H: 1.0 **C**: 12.0 **O**: 16.0 **Cl**: 35.5 **Na**: 23.0 **Ca**: 40.1 **I**: 126.9 **K**: 39.1 **P**: 31.0 **Ga**: 69.7

A. Show all your work on the following problems in order to receive full credit. Round all final ANSWERS to ONE decimal place. **(15pts)**

Circle your final answers.

1. Find the molar mass of NaI. Use correct units:

149.9 g/mol

2. Find the formula mass of $Ca(OH)_2$. Use correct units:

73.1 amu

3. Calculate the percent composition of K_3PO_4.

59.8% K 15.8% P 24.5% O

B. Show all your work on the following problems in order to receive full credit.
Circle your final answer(s). **(50pts)**

1. Find the empirical formula of a compound containing 64.27% C, 7.19% H, and 28.54% O.

C_3H_4O

2. A compound has a percent composition by mass of 54.6% C, 9.0% H, and 36.4% O. The formula mass of the molecular is 176 amu. What is the compound's molecular formula?

$C_8H_{16}O_4$

3. The empirical formula of a substance is CH_2O. The molar mass is 180 g/mol. What is the molecular formula?

$C_6H_{12}O_6$

4. The molecular formula of a compound is $C_2H_4Cl_2$. Give one example of a possible empirical formula based on this molecular formula.

Possible Answers: $C_4H_8Cl_4$

CH_2Cl

5. Determine the molecular formula of a compound that is 74.39% Ga and 25.61% O. The molar mass of the compound is 735.2 g/mol.

E.F. Ga_2O_3 M.F. Ga_8O_{12}

College: Chapters 7.3 and 7.4 Test **KEY**

Name____ Period______ Date______________

Use the following atomic masses for all calculations:

H: 1.0	**C**: 12.0	**O**: 16.0	**Cl**: 35.5	**Na**: 23.0	**Ca**: 40.0	**I**: 126.9	**Ga**: 69.7

A. Show all your work on the following problems in order to receive full credit. Round all final ANSWERS to ONE decimal place. **(15pts)**

Circle your final answers.

1. Find the molar mass of NaI. Use correct units:

149.9 g/mol

2. Find the formula mass of $Ca(OH)_2$. Use correct units:

73.1 amu

3. Calculate the percent composition of C_6H_{12}.

85.7% C 14.3% H

B. Show all your work on the following problems in order to receive full credit.
Circle your final answer(s). **(25pts)**

1. Determine the empirical formula of a compound containing 80.0% carbon and 20.0% hydrogen.

CH_3

2. A compound has a percent composition by mass of 54.6% C, 9.0% H, and 36.4% O. The formula mass of the molecular is 176 amu. What is the compound's molecular formula?

$C_8H_{16}O_4$

3. The empirical formula of a substance is CH_2O. The molar mass is 180 g/mol. What is the molecular formula?

$C_6H_{12}O_6$

4. The molecular formula of a compound is $C_2H_4Cl_2$. Give one example of a possible empirical formula based on this molecular formula.

Possible Answers: $C_4H_8Cl_4$

CH_2Cl

Bonus: Determine the empirical formula of a compound that is 74.39% Ga and 25.61% O.

E.F. Ga_2O_3

WS- Empirical Formulas (Key) 2/29/12

1a Find Empirical formula

a. 39.02% K → $\frac{39.02 g K}{39.10 g/mol} = \frac{0.998 mol K}{0.998} = 1 mol K$

12.03% C → $\frac{12.03 g C}{12.01 g/mol} = \frac{1 mol C}{0.998} = 1 mol C$

$\frac{1.02\% H}{1.01} = 1 mol H / 0.998 = 1 mol H$

~~0.57% H → 0.57 g H / 1.01 = 0.564~~

47.93% → g O $\frac{}{16 g/mol O} = \frac{3 mol O}{0.998} = 3 mol O$

∴ empirical formula $\boxed{KCHO_3}$

b.
0.57% H → g H $\frac{}{1.01 g/mol H} = \frac{0.564 mol H}{0.564} = 1 mol H$

72.1% I → g × $\frac{1 mol I}{126.9/g I} = \frac{0.568 mol I}{0.564} = 1 mol I$

27.3% O → g O $\frac{}{16 g/mol O} = \frac{1.71 mol O}{0.564}$ = 3 mol O

$\boxed{∴ HIO_3}$

c. 27.9% → g Fe $\frac{}{55.85 g/mol Fe} = \frac{0.5 mol Fe}{0.5} = 1 mol Fe \times 2 = 2 mol Fe$

24.1% S → g S $\frac{}{32.06 g/mol S} = \frac{0.752 mol S}{0.5} = 1.5 mol S \times 2 = 5 mol S$

48% O → g O $\frac{}{16 g/mol O} = \frac{3 mol O}{0.5} = 6 mol O \times 2 = 12 mol O$

$\boxed{∴ Fe_2S_5O_{12}}$

2. Find Empirical Formula

a. $\frac{0.537\,g\,Cu}{} \left| \frac{1\,mol\,Cu}{63.55\,g\,Cu} \right. = \frac{0.0085\,mol\,Cu}{0.0085} = 1\,mol\,Cu$

$\frac{0.321\,g\,Fl}{} \left| \frac{1\,mol\,F}{19\,g\,F} \right. = \frac{0.017\,mol\,F}{0.0085} = 2\,mol\,F$

$\therefore CuF_2$ empirical formula

b. $\frac{9.48\,g\,Ba}{} \left| \frac{1\,mol\,Ba}{137.33\,g\,Ba} \right. = \frac{0.069\,mol\,Ba}{0.069} = 1\,mol\,Ba$

$\frac{1.66\,g\,C}{} \left| \frac{1\,mol\,C}{12.01\,g\,C} \right. = \frac{0.138\,mol\,C}{0.069} = 2\,mol\,C \Rightarrow$

$\frac{1.93\,g\,N}{} \left| \frac{1\,mol\,N}{14.01\,g\,N} \right. = \frac{0.138\,mol\,N}{0.069} = 2\,mol\,N$

$\therefore BaC_2N_2$ Emp form

c. $\frac{14.77\,g\,K}{} \left| \frac{1\,mol\,K}{39.10\,g\,K} \right. = \frac{0.378\,mol\,K}{0.189} = 2\,mol\,K$

$\frac{9.06\,g\,O}{} \left| \frac{1\,mol\,O}{16\,g\,O} \right. = \frac{0.566\,mol\,O}{0.189} = 3\,mol\,O \Rightarrow$

$\therefore$ empirical formula K_2O_3Sn

$\frac{22.42\,g\,Sn}{} \left| \frac{1\,mol\,Sn}{118.71\,g\,Sn} \right. = \frac{0.189\,mol\,Sn}{0.189} = 1\,mol\,Sn$

3. Molecular Formula?

· molecular mass = 254 g/mol

empirical mass = ?

emp. formula = C_2H_2O

$X = ?$

$\therefore$ 2 C × 12.01 g/mol = 24.02 g/mol

2 H × 1.01 " 2.02

1 O × 16 " + 16

42.04 g/mol = empirical mass

$x = \frac{\text{molecular mass}}{\text{Empirical mass}} = \frac{254\,g/mol}{42.04\,g/mol} = 6$

Molecular Form.

$\therefore C_{12}H_{12}O_6$ or $(C_2H_2O)_6$

1.5

4. (3.) Molecular Formula?

(1) Empirical Formula? → given % comp.

Molecular Mass: 116.07 g/mol

(2) Empirical mass: ?

$X = \frac{\text{Molecular Mass}}{\text{Empirical mass}}$

$(\text{Molecular Formula})_X$ = answer

$$\frac{41.39\%C \to g \mid 1 mol C}{\mid 12.01 g C} = \frac{3.45 mol C}{3.45} = 1 mol C$$

$$\frac{3.47\% H \to g \mid 1 mol H}{\mid 1.01 g H} = \frac{3.45 mol H}{3.45} = 1 mol H$$

$$\frac{55.14\% O \to g \mid 1 mol O}{\mid 16 g O} = \frac{3.45 mol O}{3.45} = 1 mol O$$

(1) ∴ Emp. Form: CHO

(2) " " mass: 1 C = 12.01 g/mol
1 H = 1.01
1 O = 16
+ 29.02 g/mol

(3) $X = \frac{116.07 g/mol}{29.02 g/mol} = \underline{4}$

⇓

$\boxed{\therefore C_4H_4O_4 \text{ is the molecular Formula}}$

5. Given:
64.27 %C, 7.19% H, 28.54% O
Molecular mass = 168.19 g/mol = amu

Unknown
Empirical formula/mass
(1) ? (2) ?

(3) X = ?
(4) Molecular formula = ?

Calculate:

$$\frac{64.27 g C \mid 1 mol C}{\mid 12.01 g C} = \frac{5.31 mol C}{1.78} = \underline{3 mol C}$$

$$\frac{7.19 g H \mid 1 mol H}{\mid 1.01 g H} = \frac{7.12 mol H}{1.78} = \underline{4 mol H}$$

$$\frac{28.54 g O \mid 1 mol O}{\mid 16 g O} = \frac{1.78 mol O}{1.78} = \underline{1 mol O}$$

⇓

(1.) ∴ Emp form. of C_3H_4O

C 3 × 12.01 amu = 36.03 amu
4 H × 1.01 amu = 4.04 amu
1 O × 16 = 16 amu
+ 56.07 amu

(2) ← empirical mass

(3) $X = \frac{168.19 amu}{56.07 amu} = \underline{3}$

(4) ∴ $(C_3H_4O)_3$ or
Molec. Form. $C_9H_{12}O_3$

6. Given: molecular mass - 180.18g
Empirical Formula: CH_2O

Unknown: (3) Molecular formula
(2) $X = ?$
(1) Empirical formula mass = ?

1) $1C \times 12.01g = 12.01g$
$2H \times 1.01g = 2.02g$
$1O \times 16g = 16g$
$+$
$30.03g$

2) $X = \frac{180.18\cancel{g}}{30.03\cancel{g}} = \underline{\underline{6}}$

3) Molecular Formula:
$\boxed{(CH_2O)_6 \text{ or } C_6H_{12}O_6}$

2.5

Key
WS #4 3/6/12

Review/Study Guide Ch. 7.3 and 7.4

A. Find the formula mass of:

1. SiO_3^{2-}

Si : 28.09 amu
3O : + 48 "

$\boxed{76.09 \text{ amu}}$

2. $(NH_4)_2CrO_4$: 2N = 28.02 amu
8H = 8.08 amu
1Cr = 52 "
4O = 64 " +

$\boxed{152.1 \text{ amu}}$

B. Determine the molar mass of:

3. $MgSO_3$: 1Mg = 24.31 g/mol
1S = 32.06
3O = 48
+

$\boxed{104.37 \text{ g/mol}}$

4. KI = 39.10 g/mol
+ 126.91

$\boxed{166.01 \text{ g/mol}}$

C. Calculate the percentage composition of

5. $NaIO_3$

1Na = 23 amu
1I × 126.91 = 126.91 amu
3O × 16 = 48 amu
+

Total Formula mass: 197.91 amu

%O = $\boxed{24.3\% O}$

$\%Na = \frac{23}{197.91} \times 100 = \boxed{11.6\% Na}$ $\%I = \frac{126.91}{197.91} \times 100 = \boxed{64.1\% I}$

D.6 Find the empirical formula of a compound containing 37.0% C
2.20% H
18.5% N
42.3% O

g ⟶ mol ⟶ ÷ by smallest # in ratio

$\frac{37\,g\,C}{} \Big| \frac{1\,mol\,C}{12.01\,g} = 3.08\,mol\,C \div 1.32 = 7$

$\frac{2.20\,g\,H}{} \Big| \frac{1\,mol\,H}{1.01\,g\,H} = 2.18\,mol\,H \div " = 5$

$\frac{18.5\,g\,N}{} \Big| \frac{1\,mol\,N}{14.01\,g\,N} = 1.32\,mol\,N \div " = 3$

$\frac{42.3\,g\,O}{} \Big| \frac{1\,mol\,O}{16\,g\,O} = 2.64\,mol\,O \div " = 6$

$\boxed{\text{emp. form: } C_7H_5N_3O_6}$

E 7. What is the molecular Formula of a compound that has an empirical formula of C_4H_8 and a formula mass of 168.36 amu?

$$x = \frac{\text{molecular mass}}{\text{empirical mass}} = \frac{168.36\,\text{amu}}{56.12\,\text{amu}} = 3$$

C $4 \times 12.01 = 48.04$ amu
H $8 \times 1.01 = 8.08$
+ 56.12 amu

$\boxed{\therefore C_{12}H_{24}}$

(Honors / Difficult)
8. A compound is 29% sodium, 40.5% sulfur and 30.4% oxygen by mass. The molar mass of the compound is 316.24 g/mol. Determine the molecular formula of the compound

$\frac{29\,g\,Na}{23\,g/mol} = 1.26$ mol Na $\frac{1.26}{1.26} = 1$ mol Na $\times 2$ = 2 mol Na

$\frac{40.5\,g\,S}{32.06\,g/mol} = \frac{1.26\,mol\,S}{1.26} = 1$ mol S $\times 2 =$ 2 mol S

$\frac{30.4\,g\,O}{16.0\,g/mol} = \frac{1.9\,mol\,O}{1.26} \approx 1.51$ mol O $\times 2 = 3$ Oxygen

Not whole #, get rid of fraction $\frac{3}{2}$!

$\therefore$ Emp. Form: $Na_2S_2O_3$

" " mass $= 2(23\,\text{amu}) + 2(32.06\,\text{amu}) + 3(16\,\text{amu})$
$= 158.12$ amu emp. mass

g/mol = amu

$x = \frac{316.24\,\text{amu}}{158.12\,\text{amu}} = 2$ $\boxed{\therefore Na_4S_4O_6}$

(Difficult)

9. A compound is 75.46% carbon, 4.43% hydrogen, and 20.10% oxygen by mass. The compound's molar mass is 318.31 g/mol. What is the compound's molecular formula?

$\frac{75.46\,g\,C}{12.01\,g/mol} = \frac{6.28\,mol\,C}{1.26} = 5\,mol\,C \times 2 = 10\,mol\,C$

$\frac{4.43\,g\,H}{1.01\,g/mol} = \frac{4.39\,mol\,H}{1.26} = 3.5\,mol\,H \times 2 = 7\,mol\,H$

$\frac{20.10\,g\,O}{16\,g/mol} = \frac{1.26\,mol\,O}{1.26} = 1\,mol\,O \times 2 = 2\,mol\,O$

E.F. = $C_{10}H_7O_2$

E.F. mass = 120.1 + 7.07 + 32 = 159.17 g/mol

$x = \frac{318.31\,g/mol}{159.17\,g/mol} = 2$

Molecular Formula
∴ $C_{20}H_{14}O_4$

4

(easy)

10. A compound analyzed was found to contain 13.5% calcium, 10.8% Oxygen, and 0.675% hydrogen. The formula mass of the compound was 74.21 amu. What is the molecular formula of the compound?

$g \longrightarrow mol \xrightarrow[\text{smallest \# of moles calculated}]{\text{divide by}}$ smallest whole # ratio (subscript)

$\frac{13.5g\ Ca}{40.08 g/mol} = \frac{0.337 mol\ Ca}{0.337} = \underline{1 mol\ Ca}$

$\frac{10.8g\ O}{16 g/mol} = \frac{0.675 mol\ O}{0.337} = \underline{2\ mol\ O}$

$\frac{0.675g\ H}{1.01 g/mol\ H} = \frac{0.668 mol\ H}{0.337} = \underline{2\ mol\ H}$

Empirical Formula:
CaO_2H_2

Emp. form mass:
$40.08\ amu + 2(16\ amu) + 2(1.01\ amu) = 74.1\ amu$

$x = \frac{\text{molecular mass (or formula mass)}}{\text{Empirical formula mass}}$

$x = \frac{74.21 amu}{74.1 amu} \approx 1$

$\boxed{\therefore CaO_2H_2 \text{ molecular Formula}}$

5

Data:

	Mass (g)
Wrappers and unchewed gum	
Wrappers only	
Unchewed gum only	
Wrappers and chewed gum	
Chewed gum	
Number of people in group	
Brand of gum:	Double mint

Per 4
5 rows of 4

Calculations and Questions: (show all work for calculations)

1. Subtract the mass of the wrappers from the mass of the unchewed gum and wrappers. Record the mass of the unchewed gum in the data table.

Mass unchewed gum + wrappers − mass wrappers = Mass unchewed gum

2. Subtract the mass of the wrappers from the mass of the chewed gum and wrappers. Record the mass of the chewed gum in the data table.

(Mass chewed gum + wrappers) − mass wrapper = Mass Chewed Gum

3. What is the total mass of sugar dissolved by chewing?

Total mass sugar = Mass unchewed gum #1 − Mass Chewed Gum #2

4. What is the average mass of sugar dissolved by chewing in each piece of gum?

$\frac{\text{Total amount of sugar \#3}}{\text{4 sticks}}$

5. What is the percentage of sugar in a piece of gum?
(per stick)

divide by 5

$\frac{\text{average mass sugar \#3}}{\text{total mass unchewed gum}} \times 100 = \%$ sugar

% error = $\frac{\text{exp. \%}}{\text{actual \%}} \times 100$

package: ea piece 2.7g
carbs = 2g

$\frac{2}{2.7} \times 100 = 74.07\%$

Why differ − Assume all you ingest is sugar

Name KEY Per. ______ Date 3/7/12

Lab: Percent Sugar in Bubble Gum

Objective: To determine the percentage of sugar in bubble gum.

% 20

Doublemint

Problem: What percent of bubble gum is sugar?

Hypothesis: Make a one-sentence statement predicting the percentage of sugar in your piece of bubble gum.

(3) ____

Experiment:

Materials:

-2 for No sentence

5 pieces of sugared bubble gum
electronic balance - zero - press tare or zero

-1 total if missing units

Procedure:

-1 if no % sign

Note: Chewed gum cannot be placed directly on the balance pan; it must be wrapped in paper and the mass of the paper subtracted out. Most balances are not sensitive enough to measure the mass of one wrapper so all mass measurements will be of your entire group's wrappers and gum.

$\frac{1}{2}$ for using amu, and not g

1. Your teacher will give you one piece of bubble gum. Place the wrapped pieces of gum of everyone in your group on the balance.
   Record the combined mass of all the wrappers and all the unchewed gum.
2. Unwrap your piece of gum put the gum in your mouth. **Do not throw the wrapper away!!!!!**
3. Place everyone's empty gum wrappers on the balance. Record the combined mass of all the wrappers. **Do not throw the wrappers away!!!!**
4. Chew your gum for 15 minutes.
5. After 15 minutes, put your wrapper up to your mouth and gently spit your gum into the wrapper. Try not to get too much saliva on the gum.
6. Place the wrapped, chewed gum of everyone in your group on the balance. Record the combined mass.
7. Throw away the gum and wrappers.

Data:

	Mass (g)
Wrappers and unchewed gum	
Wrappers only	
Unchewed gum only	
Wrappers and chewed gum	
Chewed gum	
Number of people in group	
Brand of gum:	Double mint

Per 4
5 rms of 4

(7)

(10)

Calculations and Questions: (show all work for calculations)

1. Subtract the mass of the wrappers from the mass of the unchewed gum and wrappers. Record the mass of the unchewed gum in the data table.

Mass unchewed gum + wrappers - mass wrappers = Mass unchewed Gum

2. Subtract the mass of the wrappers from the mass of the chewed gum and wrappers. Record the mass of the chewed gum in the data table.

(Mass chewed gum + wrappers) - mass wrapper = Mass Chewed Gum

3. What is the total mass of sugar dissolved by chewing?

Total mass sugar = Mass unchewed gum #1 - Mass Chewed Gum #2

4. What is the average mass of sugar dissolved by chewing in each piece of gum?

$\frac{\text{Total amount of sugar \#3}}{\text{4 sticks}}$

5. What is the percentage of sugar in a piece of gum?
(per stick)

divide by 5

$\frac{\text{average mass sugar \#3}}{\text{total mass unchewed gum}} \times 100 = \%\text{ sugar}$

package: ea piece 2.7g
Carbs = 2g

$\frac{2}{2.7} \times 100 = 74.07\%$

$\%\text{ error} = \frac{\text{exp. \%}}{\text{actual \%}} \times 100$

Why differ - Assume all you ingest is sugar

Go thru pt - 10

Chemistry Makeup Questions for Formula Test

Name ______________________ Per. ______ Date max 20pt

Write formulas for the following compound names (DO ONLY 10)

1. mercury (II) phosphate $Hg_3(PO_4)_2$
2. aluminum oxide Al_2O_3
3. copper (I) carbonate Cu_2CO_3
4. calcium sulfide CaS
5. tin (IV) hydroxide $Sn(OH)_4$
6. sulfur trioxide SO_3
7. sodium nitride Na_3N
8. iron (II) sulfite $FeSO_3$
9. potassium nitrate KNO_3
10 .strontium phosphide Sr_3P_2
11. ammonium permanganate NH_4MnO_4
12. tetraphosphorus dinitride P_4N_2

Name the following chemical formulas (DO ONLY 10)

1. FBr_6 Fluorine hexabromide
2. $HgBr_2$ Mercury (II) bromide
3. $Al(OH)_3$ Aluminum hydroxide

4. Fe_2O_3 Iron (III) oxide

5. PbF_4 Lead (IV) fluoride

6. Li_2S Lithium sulfide

7. CsI cesium iodide

8. Ba_3N_2 barium nitride

9. $CuClO_4$ copper (I) perchlorate

10. NH_4ClO_2 Ammonium chlorite

11. $Sn(CN)_2$ Tin (II) cyanide

12. $NaHCO_3$ sodium ~~hydroxide~~ bicarbonate

13. P_4O_{10} tetra phosphorus decoxide

Assigned on 2/28

Molecular Formula Problems WS

Answer Key

1. 1st Find Empirical Formula

2nd Find Molecular Formula

1) Given: 26.7% C

2.2% H

71.1% O

Empirical Formula ?

$\% \xrightarrow{1} g \xrightarrow{2} mol \xrightarrow[\text{Divide by smallest \# moles present}]{3}$ smallest whole # ratio of atoms

" subscripts in Empirical formula (lowest ratio)

$$26.7\% C \xrightarrow{1} \frac{26.7\,\cancel{g}\,C}{} \left| \frac{1\,mol\,C}{12.01\,\cancel{g}\,C} \right. = 2.22\,mol\,C$$

$$2.2\% H \rightarrow \frac{2.2\,g\,H}{} \left| \frac{1\,mol\,H}{1.01\,g\,H} \right. = 2.18\,mol\,H$$

$$71.1\% O \rightarrow \frac{71.1\,g\,O}{} \left| \frac{1\,mol\,O}{16\,g\,O} \right. = 4.44\,mol\,O$$

3

$$\frac{2.22\,mol\,C}{2.18} \approx 1\,mol\,C$$

$$\frac{2.18\,mol\,H}{2.18} = 1\,mol\,H$$

$$\frac{4.44\,mol\,O}{2.18} \approx 2\,mol\,O$$

$\boxed{\therefore \text{ empirical formula is } CHO_2}$

II) Empirical formula found: CHO_2

$$x = \frac{\text{molecular formula mass}}{\text{empirical formula mass}}$$

Empirical formula mass = ? (of CHO_2)

1 C × 12.01 amu = 12.01 amu

1 H × 1.01 " = 1.01 "

2 O × 16.00 " = 32.00 "

\+ 45.02 amu

Given:

molar mass of compd (molecule) = ~~[illegible]~~ 90 g = 45.02amu

$$x = \frac{90\,\text{amu}}{45.02\,\text{amu}} \approx 2$$

∴ ~~empirical~~ Molecular formula is 2 times empirical formula

$$\boxed{\text{Molecular Formula: } C_2H_2O_4}$$

I)

2. Given: 54.6% C

9.0% H

36.4% O

Unknown: Empirical Formula

$54.6\% C \rightarrow \frac{54.6 g C}{} \left| \frac{1 mol C}{12.01 g C} \right. = \frac{4.55 mol C}{2.28} = \underline{2 mol C}$

$9.0\% H \rightarrow \frac{9.0 g H}{} \left| \frac{1 mol H}{1.01 g H} \right. = \frac{8.91 mol H}{2.28} = \underline{4 mol H}$

$36.4\% O \rightarrow \frac{36.4 g O}{} \left| \frac{1 mol O}{16.00 g O} \right. = \frac{2.28 mol O}{2.28} = \underline{1 mol O}$

smallest # of moles

$\boxed{\therefore \text{Empirical formula} = C_2H_4O}$

II) Given: molecular formula mass = 176g = 176 amu

Unknown: molecular formula

Known: Empirical formula of C_2H_4O

" " mass = ?

$2C \times 12.01 = 24.02 amu$

$4H \times 1.01 = 4.04 amu$

$1O \times 16 = + 16 amu$

44.06

$X = \frac{176 amu}{44.06 amu} = 4$

multiply: $(C_2H_4O)_4$

Molecular Formula

$\therefore C_8H_{16}O_4$

3

3. Known: 80.0% C

I.) 20.0% H

Unknown: Empirical formula

% → g → mol → smallest whole # ratio

$80.0\%\,C \rightarrow \frac{80.0\,g\,C \mid 1\,mol\,C}{\mid 12.01\,g\,C} = 6.66\,mol\,C \quad \frac{6.66}{6.66} = 1\,mol\,C$

$20.0\%\,H \rightarrow \frac{20.0\,g\,H \mid 1\,mol\,H}{\mid 1.01\,g\,H} = 19.8\,mol\,H \quad \frac{19.8}{6.66} = 3\,mol\,H$

∴ Empirical formula = $\boxed{CH_3}$

II.) Known: empirical formula: CH_3

molar mass of molecule: 30 g = 30 amu

Unknown: mass of emp. formula = ?

molecular formula

$1\,C \times 12.01 = 12.01\,amu$

$3\,H \times 1.01 = 3.03\,amu$

$+ \quad 15.04\,amu$

$x = \frac{\text{molecular formula mass}}{\text{empirical formula mass}} = \frac{30\,amu}{15.04\,amu} = 2$

∴ C_2H_6 is the molecular formula

4. I) Known: 24.3% C   unknown: empirical formula
4.1% H
71.6% Cl

24.3% C $\longrightarrow$ $\frac{24.3\,g\,C}{} \Big| \frac{1\,mol\,C}{12.01\,g\,C} = \frac{2\,mol\,C}{2} = 1\,mol\,C$ (2.023)

4.1% H $\rightarrow$ $\frac{4.1\,g\,H}{} \Big| \frac{1\,mol\,H}{1.01\,g\,H} = \frac{4\,mol\,H}{2} = 2\,mol\,H$

71.6% Cl $\rightarrow$ $\frac{71.6\,g\,Cl}{} \Big| \frac{1\,mol\,Cl}{35.45\,g\,Cl} = \frac{2\,mol\,Cl}{2} = 1\,mol\,Cl$ (2.020)

$\boxed{\therefore \text{Empirical formula: } CH_2Cl}$

II) Known: emp. form: CH_2Cl
molar mass of molecule: 99g
~~mol~~ unknown = molar mass of empirical formula
molecular formula

$1\,C \times 12.01 = 12.01\,g$
$2\,H \times 1.01 = 2.02\,g$
$1\,Cl \times 35.45 = 35.45\,g$
+
$49.48\,g$ = emp. molar mass

$x = \frac{\text{molecular molar mass}}{\text{empirical " "}} = \frac{99\,g}{49.48\,g} \approx 2$

$\therefore C_2H_4Cl_2$ is Molecular Formula

5

I) Find empirical formula

5. $49.0\% \ C \rightarrow \dfrac{49.0g\ C}{} \Big| \dfrac{1 mol\ C}{12.01 g\ C} = 4.08 mol\ C$

$2.7\% \ H \rightarrow \dfrac{2.7g\ H}{} \Big| \dfrac{1 mol\ H}{1.01 g\ H} = 2.67 mol\ H$

$48.2\% \ Cl \rightarrow \dfrac{48.2g\ Cl}{} \Big| \dfrac{1 mol\ Cl}{35.45 g\ Cl} = 1.36 mol\ Cl$

Find smallest whole # ratio

$\dfrac{4.08 mol\ C}{1.36} = 3 mol\ C \quad \dfrac{2.67 mol\ H}{1.36} = 2 mol\ H \quad \dfrac{1.36 mol\ Cl}{1.36} = 1 mol\ Cl$

$\boxed{\therefore \text{Empirical Formula: } C_3H_2Cl}$

II.) Find Molecular formula

Given mass of molecule = 150g

empircal formula mass = ?

$3C \times 12.01 = 36.03g$

$2H \times 1.01 = 2.02g$

$1 Cl \times 3545 = 35.45g$

$+ \overline{\quad 73.5g} = \text{empirical molar mass}$

$\dfrac{X = \text{molecular mass}}{\text{empirical mass}} = \dfrac{150g}{73.5g} \approx 2$

$\therefore C_6H_4Cl_2$ is the molecular formula

6

I) Find Empirical Formula

6. % → g ⟶ mol

$30.5\%\,N \rightarrow \dfrac{30.5\,g\,N}{} \Big| \dfrac{1\,mol\,N}{14.01\,g\,N} = 2.18\,mol\,N$

$69.5\%\,O \rightarrow \dfrac{69.5\,g\,O}{} \Big| \dfrac{1\,mol\,O}{16.00\,g\,O} = 4.34\,mol\,O$

mol ⟶ smallest whole # ratio of atoms

$\dfrac{2.18\,mol\,N}{2.18} = \underline{1\,mol\,N}$ $\dfrac{4.34\,mol\,O}{2.18} = \underline{2\,mol\,O}$

$\boxed{\therefore \text{ Empirical formula: } NO_2}$

II) Find Molecular Formula

given molar mass of molecule = 92g = 92amu

" " " emp. formula = ?

$1\,N \times 14.01 = 14.01\,amu$

$2\,O \times 16.00 = 32.00\,amu$

$+ \quad 46.01\,amu$

$x = \dfrac{\text{molecular mass}}{\text{empirical mass}} = \dfrac{92\,amu}{46.01\,amu} = 2$ so, $(NO_2)_2$

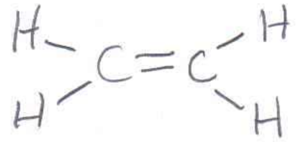
$\therefore N_2O_4$
Molecular Formula

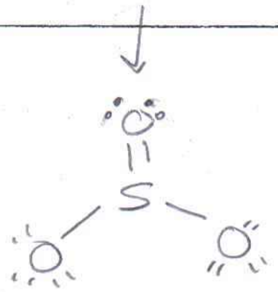
7

1/31/12 or 2/1/12

- helped after school

Lewis Diagram Worksheet 2

S_2 — :S=S: — 12 −2 = 10 — A_2 Linear — NP	CH_2CH_2 (two hydrogens attached to each carbon)  — NP
P_2 — 5 — :P≡P: — 10 −2 = 8 — A_2 Linear — NP	CHCH (one hydrogen attached to each carbon) — H−C≡C−H
SiO_2 — 4 — :O=S=O: — 4 + 12 = 16, −4 = 12 — AB_2 Linear — NP	PN — 5 — :P≡N: — 10 −2 = 8 — AB linear — Polar
SiO — 4 — :Si≡O: — 4 + 6 = 10, −2 = 8 — AB Linear — Polar	CS_2 — 6 — :S=C=S: — 4 + 12 = 16, −4 = 12 — AB_2 Linear — NP
SO_3 — AB_3 Triangular Planar — 18−O, +6−S = 24, −6 = 18 —  — NP	N_2O (nitrogen in the middle) — :O=N=N: — 10 + 6 = 16, −4 = 12 — AB_2 Linear — Polar



Answer Key

Homework Wks: Sect 7.1 2/9/12

1. Give the name and formula of the compound formed from the following elements:

Name Formula

a) sodium + nitrogen: Sodium nitride, Na_3N

b) oxygen & strontium: strontium oxide, SrO

c) Aluminum + chlorine: Aluminum chloride, $AlCl_3$

d) Magnesium + Nitrogen: Magnesium nitride, Mg_3N_2

e) Iodine + cadmium: cadmium iodide, CdI_2

f) sulfur + cesium: cesium sulfide, Cs_2S

g) Strontium + fluorine: strontium fluoride, SrF_2

2/15/12

Key

Naming binary molecular compounds
Worksheet#3.

Binary molecular compounds are made from a combination of 2 different atoms, or in the case of diatomic molecules one kind of atom, ie. Br I N Cl H O F.

When naming a binary molecular compound you need to use prefixes

1 = mono	6 = hexa
2 = di	7 = hepta
3 = tri	8 = octa
4 = tetra	9 = nona
5 = penta	10 = deca

The prefixes indicate how many atoms of each element are in the compound.

The only time you do not use the prefix mono is when the first element in the compound has only one atom. Example: CO = carbon monoxide, not monocarbon monoxide.

When naming the second element drop the elements ending and add "IDE". Example: Oxygen = Oxide

Name the following binary molecular compounds:

1. CO_2 carbon dioxide	2. NO_3 Nitrogen trioxide
3. SO sulfur monoxide	4. SO_2 sulfur dioxide
5. SO_4 sulfur tetroxide	6. SO_3 sulfur trioxide
7. CF_4 carbon tetrafluoride	8. H_2O_2 dihydrogen dioxide
9. H_2O dihydrogen monoxide	10. S_8Cl_4 octasulfur tetrachloride
11. NH_3 Nitrogen trihydride	12. N_6O_6 hexanitrogen hexaoxide

Write the formula for the following binary molecular compounds:

1. Heptachlorine dioxide Cl_7O_2	2. Trisulfur octaoxide S_3O_8
3. Pentaphosporus decaoxide P_5O_{10}	4. Nitrogen hexafluoride NF_6
5. Disulfur dibromide S_2Br_2	6. Nitrogen monoiodide NI
7. Phosphorus trichloride PCl_3	8. Dinitrogen monoxide N_2O
9. Sulfur hexafluoride SF_6	10. Dinitrogen tetrahydride N_2H_4
11. Dinitrogen pentaoxide N_2O_5	12. Boron trichloride BCl_3
13. Diphosphorus trioxide P_2O_3	14. Carbon tetrabromide CBr_4

Name Key 2/13/12

Assignment #3 - Complex Ions: TERNARY COMPOUNDS

Name	Formula
1. zinc sulfite	$ZnSO_3$
2. hydrogen nitrate	HNO_3
3. sodium phosphate	Na_3PO_4
4. potassium chlorate	$KClO_3$
5. calcium carbonate	$CaCO_3$
6. iron(II) nitrite	$Fe(NO_2)_2$
7. copper(I) carbonate	Cu_2CO_3
8. aluminum phosphate	$AlPO_4$
9. lithium sulfate	Li_2SO_4
10. magnesium chlorate	$Mg(ClO_3)_2$
11. silver nitrate	$AgNO_3$
12. tin(IV) sulfate	$Sn(SO_4)_2$
13. iron(III) nitrate	$Fe(NO_3)_3$
14. copper(II) carbonate	$CuCO_3$
15. lead(II) phosphate	$Pb_3(PO_4)_2$
16. mercury(I) nitrate	$Hg_2(NO_3)_2$
17. sodium chlorate	$NaClO_3$
18. cesium phosphate	Cs_3P
19. calcium acetate	$Ca(C_2H_3O_2)_2$
20. zinc nitrate	$Zn(NO_3)_2$
21. aluminum sulfate	$Al_2(SO_4)_3$
22. lithium chlorate	$LiClO_3$
23. copper(II) phosphate	$Cu_3(PO_4)_2$
24. mercury(I) chlorate	$Hg_2(ClO_3)_2$
25. sodium carbonate	Na_2CO_3

Assign group of 5 to board (ea. 2) pull names

ask class if correct and why

Formula	Name
26. KNO_3	Potassium Nitrate
27. $Al(NO_3)_3$	Aluminum Nitrate
28. $MnSO_4$	Manganese (II) sulfate
29. $Ca_3(PO_4)_2$	Calcium Phosphate
30. Na_2SO_4	sodium sulfate
31. $HClO_3$	hydrogen chlorate
32. $Fe_2(CO_3)_3$	Iron (III) carbonate
33. Li_3PO_4	Lithium phosphate
34. $Hg(ClO_3)_2$	Mercury (II) chlorate
35. $Pb(NO_3)_2$	Lead (II) nitrate
36. $CuSO_4$	Copper (II) sulfate
37. $Mg(NO_3)_2$	Magnesium nitrate
38. $CaSO_4$	Calcium Sulfate
39. $Zn(C_2H_3O_2)_2$	zinc Acetate
40. $AlPO_4$	Aluminum Phosphate
41. $RbNO_3$	Rubidium Nitrate
42. $HgCO_3$	Mercury (II) carbonate
43. K_2SO_4	Potassium Sulfate
44. $Sn_3(PO_4)_4$	Tin (IV) phosphate
45. $CaCO_3$	Calcium carbonate
46. Li_2SO_4	Lithium sulfate
47. $CuNO_3$	Copper (I) Nitrate
48. Ag_2SO_4	Silver Sulfate
49. $BaSO_4$	Barium sulfate
50. K_3PO_4	Potassium Phosphate

Name Key

Assignment #4 - More Complex Ions:

Name	Formula	Formula	Name
1. ammonium nitrate	$\{NH_4\}NO_3$	26. Na_2SO_4	Sodium sulfate
2. magnesium persulfate	$MgSO_5$	27. KOH	Potassium hydroxide
3. aluminum carbonate	$Al_2(CO_3)_3$	28. KNO_2	Potassium nitrite
4. zinc hydroxide	$Zn(OH)_2$	29. Hg_2CO_3	Mercury (I) carbonate
5. ammonium sufite	$(NH_4)_2SO_3$	30. NH_4ClO	Ammonium hypochlorite
6. iron(II) hypophosphite	$FePO_2$	31. $Ca(OH)_2$	Calcium hydroxide
7. copper(II) nitrate	$Cu(NO_3)_2$	32. $Al_2(CO_3)_3$	Aluminum carbonate
8. lead(II) carbonate	$PbCO_3$	33. $NaClO_4$	Sodium Perchlorate
9. silver hypobromite	$Ag(BrO)_3$	34. $(NH_4)_2SO_3$	Ammonium sulfite
10. potassium phosphite	K_3PO_3	35. $MnCO_3$	Manganese (II) carbonate
11. sodium acetate	$NaC_2H_3O_2$	36. $PbSO_4$	Lead (II) sulfate
12. aluminum hydroxide	$Al(OH)_3$	37. $Ca(NO_2)_2$	Calcium nitrite
13. manganese(IV) sulfite	$Mn_2(SO_3)_4$	38. Rb_3PO_4	Rubidium ~~per~~phosphate
14. chromium(II) periodate	$Cr(IO_4)_2$	39. $LiBrO_2$	Lithium bromite
15. potassium hypochlorite	$KClO$	40. $Mg(OH)_2$	magnesium hydroxide
16. iron(III) hydroxide	$Fe(OH)_3$	41. $(NH_4)_3PO_3$	Ammonium Phosphite
17. mercury(I) carbonate	Hg_2CO_3	42. KNO_2	Potassium nitrite
18. strontium bromite	$Sr(BrO_2)_2$	43. $CaSO_3$	Calcium sulfite
19. barium nitrite	$Ba(NO_2)_2$	44. $Cr(BrO_2)_2$	Chromium (II) bromate
20. zinc carbonate	$ZnCO_3$	45. $MgSO_5$	Magnesium persulfate
21. silver persulfate	Ag_2SO_5	46. $Zn(NO_2)_2$	Zinc Nitrite
22. copper(I) hydroxide	$CuOH$	47. $Ca_3(PO_3)_2$	Calcium Phosphite
23. magnesium carbonate	$MgCO_3$	48. $CsIO_4$	Cesium per iodate
24. barium perbromate	$Ba(BrO_4)_2$	49. $BaCO_3$	Barium carbonate
25. iron(II) nitrate	$Fe(NO_3)_3$	50. $Fe(OH)_3$	Iron (III) hydroxide

Chemical formula worksheet- Ionic compounds Name Key

In the 1st 2 columns write the correct chemical formula, in the 2nd the correct name.

	Name	***Formula***	***Formula***	***Name***
1	Magnesium Fluoride	MgF_2	CaF_2	Calcium Fluoride
2	Lithium Chloride	$LiCl$	KBr	Potassium Bromide
3	Calcium Chloride	$CaCl_2$	CuCl	Copper (I) Chloride
4	Copper (I) Iodide	CuI	$CuCl_2$	Copper (II) Chloride
5	Potassium Bromide	KBr	FeO	Iron(II) Oxide
6	Aluminum Oxide	Al_2O_3	$AlCl_3$	Aluminum Chloride
7	Iron(II) Oxide	FeO	AgCl	Silver Chloride
8	Aluminum Sulfide	Al_2S_3	MgI_2	Magnesium iodide
9	Sodium Chloride	NaCl	NaBr	Sodium bromide
10	Barium Chloride	$BaCl_2$	$ZnCl_2$	Zinc ~~(II)~~ Chloride
	Sodium Acetate	$NaC_2H_3O_2$	Fe_2S_3	Iron (III) Sulfide h.w.
	Iron (III) Sulfate	$Fe_2(SO_4)_3$	Hg_2F_2	Mercury (I) fluoride
	Iron (III) Sulfide	Fe S	PbO_2	Lead (II) oxide
	Sodium Hydroxide	NaOH	$AgNO_2$	silver nitrite
	Ammonium Bromide	NH_4Br	$NaHCO_3$	sodium bicarbonate
	Potassium Sulfate	K_2SO_4	$(NH_4)_2SO_4$	Ammonium sulfate
	Sulfuric Acid	H_2SO_4	KNO_3	Potassium Nitrate
	Barium Chlorate	$BaClO_3$	$NaC_2H_3O_2$	Sodium Acetate
	Potassium Nitrate	KNO_3	$MgCO_3$	Magnesium carbonate
	Ammonium Phosphate	$(NH_4)_3PO_4$	$Al(C_2H_3O_2)_3$	Aluminum Acetate
	Hydrogen Hydroxide	$HOH = H_2O$	$Fe(NO_3)_3$	Iron (III) nitrate
	Calcium Chlorate	$Ca(ClO_3)_2$	$HgCO_3$	Mercury (II) carbonate
	Copper (II) Nitrate	$Cu(NO_3)_2$	$PbSO_3$	Lead (II) sulfite
	Ammonium Chloride	NH_4Cl	$Sr(OH)_2$	Strontium hydroxide
	Mercury (II) oxide	HgO	Li_2BO_3	~~Lith~~ Lithium Bromate

Name: Key Date:

Chemistry Period:_____ Naming Chemical Compounds #2

Directions: Write the name of each of the following compounds.Use the Roman Numeral (Stock) name when it applies.

1.	Copper (I) nitrate	$CuNO_3$
2.	Copper (II) nitrate	$Cu(NO_3)_2$
3.	Mercury (II) oxide	HgO
4.	Mercury (I) oxide	Hg_2O
5.	Chromium (III) sulfate	$Cr_2(SO_4)_3$
6.	Chromium sulfate	$CrSO_4$
7.	Nickel (III) phosphate	$NiPO_4$
8.	Nickel (II) phosphate	$Ni_3(PO_4)_2$
9.	Copper (II) chloride	$CuCl_2$
10.	Copper (I) chloride	$CuCl$
11.	Gold (I) chloride	$AuCl$
12.	Gold (III) chloride	$AuCl_3$
13.	Strontium cyanide	$Sr(CN)_2$
14.	Potassium Chromate	K_2CrO_4
15.	Lithium Nitrite	$LiNO_2$
16.	Beryllium dichromate	$BeCr_2O_7$
17.	Sodium Thiosulfate	$Na_2S_2O_3$
18.	Lithium Oxide	Li_2O
19.	Beryllium sulfide	BeS
20.	Rubidium oxide	Rb_2O

Name Key

2/16/12

Convert the following names to chemical formulas.

iron(III) sulfate	$Fe_2(SO_4)_3$
potassium cyanide	KCN
dinitrogen monoxide	N_2O
copper(II) nitrate	$Cu(NO_3)_2$
sulfur tetrachloride	SCl_4
magnesium acetate	$Mg(C_2H_3O_2)_2$
antimony triiodide	SbI_3
silver (I) perchlorate	$AgClO_4$
oxygen difluoride	OF_2
mercury(I) iodide	Hg_2I_2
nickel(II) chloride	$NiCl_2$
dihydrogen monoxide	H_2O
boron trifluoride	BF_3
sodium hypochlorite	NaClO
calcium hydrogen carbonate	$Ca(HCO_3)_2$
zinc (II) arsenate	$Zn_3(AsO_4)_2$
cesium perchlorate	$CsClO_4$
ammonium phosphate	$(NH_4)_3PO_4$
aluminum hypochlorite	$Al(ClO)_3$
cobalt (II) nitrite	$Co(NO_2)_2$
lead (IV) sulfite	$Pb_2(SO_3)_4$
dinitrogen tetraoxide	N_2O_4
potassium carbonate	K_2CO_3

Mixed Formula Review

Convert the following formulas to names.

p.231 in book $Mg(HCO_3)_2$	Mercury (II) bicarbonate
S_2Cl_2	disulfur dichloride
$KMnO_4$	Potassium permanganate
$Mg_3(PO_4)_2$	Mercury (II) Phosphate
$LiNO_2$	Lithium Nitrite
SF_6	sulfur hexafluoride
XeF_5	Xenon ~~hepta~~ pentafluoride
$KHSO_4$	Potassium Hydrogen Sulfate
$Al(ClO_4)_3$	Aluminum perchlorate
CCl_4	Carbon tetrachloride
$FeCl_2$	Iron (II) chloride
Li_2O	Lithium Oxide
Hg_2Cl_2	Mercury (I) chloride
$(NH_4)_2Cr_2O_7$	Ammonium dichromate
SbF_5	Antimony pentafluoride
$Ba(CN)_2$	Barium cyanide
LiOH	Lithium Hydroxide
$NaClO_3$	Sodium chlorate
$NaC_2H_3O_2$	Sodium Acetate
PCl_5	~~Pot~~ Phosphorus pentachloride
$PbCrO_4$	Lead (II) chromate
KBr	Potassium Bromide
PbS	Lead (II) sulfide
~~AgN~~ Ag_3N	Silver Nitride
$Hg_3(PO_4)_2$	Mercury (II) phosphate
BBr_3	Boron Bromide
$Cr_2(SO_4)_3$	Chromium (III) sulfate

Chemistry Binary Ionic Compounds WS#2

Name Key Period ______ Date 2/9/10

Binary Ionic Compounds contain Group I, II, and III metals with non-metal ions. Show the correct name for the following compounds.

Give correct names for these binary compounds

HCl	Hydrogen Chloride (Hydrochloric Acid)
K_2O	Potassium Oxide
CaO	Calcium oxide
$MgCl_2$	Magnesium Chloride
NaH	Sodium Hydride
Li_2O	Lithium oxide
ZnS	Zinc sulfide
RbBr	Rubidium bromide
Al_2O_3	Aluminum oxide
Na_3N	Sodium nitride
Ca_2P_3	Calcium Phosphide
KI	Potassium Iodide
AlP	Aluminum Phosphide
Ba_3As_2	Barium Arsenide
Rb_2O	Rubidium oxide

Give correct formulas for these binary compounds

calcium iodide	CaI_2
calcium hydride	CaH_2
magnesium fluoride	MgF_2
strontium bromide	$SrBr_2$
sodium nitride	Na_3N
rubidium oxide	Rb_2O
barium nitride	Ba_3N_2
lithium chloride	LiCl
gallium sulfide	Ga_2S_3
aluminum nitride	AlN
cesium fluoride	CsF
lithium phosphide	Li_3P
aluminum iodide	AlI_3
cesium arsenide	Cs_3As
rubidium selinide	Rb_2Se
Barium phosphide	Ba_3P_2

Name Key Per. ______

Stock system Worksheet 1

Write the name of each of the following compounds using the **Stock System:**
Make sure you include the Roman numeral in the name.

1. Cu_2S Copper (I) Sulfide
7. Fe_2O_3 Iron (III) oxide
2. HgO Mercury (II) oxide
8. PbO_2 Lead (IV) oxide
3. CrN Chromium (III) nitride
9. SnCl Tin (I) chloride
4. NiF_2 Nickel (II) fluoride
10. CuO Copper (II) oxide
5. $FeCl_2$ Iron (II) chloride
11. PbF_2 Lead (II) fluoride
6. Hg_2Cl_2 Mercury (I) chloride
12. MnO Manganese (II) oxide

Write the formula of each of the following compounds. Remember, the Roman numeral indicates the charge of the cation.

13. copper (II) oxide CuO
14. nickel (II) sulfide NiS
15. cobalt (II) chloride $CoCl_2$
16. manganese (IV) fluoride MnF_4
17. chromium (III) bromide $CrBr_3$
18. iron (III) oxide Fe_2O_3
19. copper (I) nitride Cu_3N
20. iron (II) selenide FeSe
21. lead (II) phosphide Pb_3P_2
22. tin (IV) chloride $SnCl_4$

 Name ______________

Empirical Formulas

Part 1: % Composition

Calculate the percent composition of the following compounds. SHOW ALL WORK.

HCl

1 H : 1.01

1 Cl : 35.45

36.46

$\%H: \frac{1.01}{36.46} \times 100 = \boxed{2.77\%\ H}$

$\%Cl: \frac{35.45}{36.46} \times 100 = \boxed{97.23\%\ Cl}$

K_2CO_3

2 K × 39.10 = 78.2 amu

1 C × 12.01 = 12.01 amu

3 O × 16 = 48.00 amu

138.21 amu

$\%K: \frac{78.2}{138.21} \times 100 = \boxed{56.58\%\ K}$

$\%C: \frac{12.01}{138.21} \times 100 = \boxed{8.69\%\ C}$

$\%O: \frac{48}{138.21} \times 100 = \boxed{34.73\%\ O}$

Part 2: Empirical Formulas

Work each of the following problems. SHOW ALL WORK.

1. A compound is found to contain 63.52 % iron and 36.48 % sulfur. Find its empirical formula.

$63.52\,g\ Fe \times \frac{1\,mol}{56.0\,g\ Fe} = 1.13\,mol\ Fe \quad \frac{1.13}{1.13} = 1$

$36.48\,g\ S \times \frac{1\,mol\ S}{32.0\,g} = 1.14\,mol\ S \quad \frac{1.14}{1.13} = 1$

$\boxed{FeS}$

2. In the laboratory, a sample is found to contain 1.05 grams of nickel and 0.29 grams oxygen. Determine the empirical formula.

$1.05\,g\ Ni \times \frac{1\,mol\ Ni}{58.69\,g} = 0.0179\,mol \quad \frac{0.0179}{0.0179} = 1$

$0.29\,g\ O \times \frac{1\,mol\ O}{16.0\,g} = 0.0181\,mol \quad \frac{0.0181}{0.0179} = 1.01$

$= \boxed{NiO}$

Worksheet: More Practice with % Composition Name______________

Worksheet: % Composition and Empirical Formulas Name ______________

Part 1: % Composition

Part 1: % Composition

Calculate the percent composition of the following compounds.

Calculate the percent composition of the following compounds. SHOW ALL WORK.

~~HCl~~ $Ca(OH)_2$

$1\ Ca \times 40.08 = 40.08$

$2\ O \times 16 = 32.00$

$2\ H \times 1.01 = 1.01$

$\}$ 73.09 total compound mass

$\%Ca: \frac{40.08}{73.09} \times 100$ $\boxed{54.84\%\ Ca}$

$\%O: \frac{32}{73.09} \times 100 = \boxed{43.78\%\ O}$

$\%H: \frac{1.01}{73.09} \times 100 = \boxed{1.38\%\ H}$

Na_3PO_4

~~K_2CO_3~~

$3\ N \times 22.99 = 68.97$ amu

$1\ P \times 30.97 = 30.97$

$4\ O \times 16 = 64.00$

$\}$ 163.94

42.07 % Na

18.89 % P

39.04 % O

$\frac{28.25\,g\ O}{} \Big| \frac{1\ mol}{16.0\,g} = \frac{1.77\,g\ O}{0.588} = 3\ mol$

Part 2: Empirical Formulas

Part 2: Empirical Formulas

Work each of the following problems. SHOW ALL WORK.

Work each of the following problems. SHOW ALL WORK.

1. A compound is found to contain 63.50 % silver, 8.25 % nitrogen, and the remainder is oxygen.

1. A compound is found to contain 63.52 % iron and 36.48 % sulfur. Find its empirical formula.

$63.50\%\ Ag = \frac{63.50\,g\ Ag}{} \Big| \frac{1\ mol}{108.0\,g} = \frac{0.588\ mol\ Ag}{0.588} = 1$

$8.25\%\ N = \frac{8.25\,g\ N}{} \Big| \frac{1\ mol}{14.0\,g} = \frac{0.589\ mol\ N}{0.588} = 1$

$\boxed{AgNO_3}$

2. A compound is found to contain 63 % manganese, Mn, and 37 % oxygen. What is the compound's empirical formula?

~~2~~. In the laboratory, a sample is found to contain 1.05 grams of nickel and 0.29 grams oxygen. Determine the empirical formula.

$63\%\ Mn = \frac{63\,g\ Mn}{} \Big| \frac{1\ mol\ Mn}{55.0\,g} = \frac{1.15\ mol\ Mn}{1.15} = 1$

$37\%\ O = \frac{37\,g\ O}{} \Big| \frac{1\ mol\ O}{16.0\,g} = \frac{2.31\ mol\ O}{1.15} = 2$

$= \boxed{MnO_2}$

Ch.7.3 WS#1 Using Chemical Formulas

Name Key Period______ Date 2/27/12

I. Find the formula mass of the following:

a. $C_2H_3O_2^-$ amu

2C: 2 x 12.01 = 24.02 amu
3H: 3 x 1.01 = 3.03 amu
2O: 2 x 16 = + 32 amu

$\boxed{59.05 \text{ amu}}$

b. $C_8H_9NO_2$ (acetaminophen/Tylenol)

8C: 8 x 12.01 = 96.08 amu
9H: 9 x 1.01 = 9.09 "
1N: 1 x 14.01 = 14.01 "
2O: 2 x 16 = + 32.00 "

$\boxed{151.18 \text{ amu}}$

c. $C_{10}H_8O_4$ (Polyethylene terephthalate, found in food/beverage containers)

10C: 10 x 12.01 amu = 120.1 amu
8H: 8 x 1.01 " = 8.08 amu
4O: 4 x 16 " = + 64 amu

$\boxed{192.18 \text{ amu}}$

II. Determine the molar mass of the following:

d. H_2O_2

2H: 2 x 1.01 g/mol = 2.02 g/mol
2O: 2 x 16 " = 32 "
+

$\boxed{34.02 \text{ g/mol}}$

e. $Cu_3(PO_4)_2$

3Cu: 3 x 63.55 = 190.65 g/mol
2P: 2 x 30.97 = 61.94 g/mol
8O: 8 x 16.00 = 128.00 g/mol
+

$\boxed{380.59 \text{ g/mol}}$

f. $BiAsO_4$

1Bi: 1 x 208.98 g/mol = 208.98
1As: 1 x 74.92 " = 74.92
4O: 4 x 16 " = + 64 g/mol

f.) $\boxed{347.9 \text{ g/mol } BiAsO_4}$

III. Calculate the percentage composition of the following:

g. $FeCl_2$

1Fe x 55.85 = 55.85 amu
2Cl x 35.45 = 70.9 amu
+
126.75 amu

%Fe: $\frac{55.85}{126.75}$ x 100 $\boxed{44.06\% \text{ Fe}}$

$\frac{70.9}{126.75}$ x 100 = $\boxed{55.94\% \text{ Cl}}$

h. AgOH

1Ag x 107.87 amu = 107.87 amu
1Oxygen x 16 = 16 amu
1H x 1.01 = 1.01 amu
+
124.88 amu

h.) %Ag = $\frac{107.87}{124.88}$ x 100 = $\boxed{86.38\% \text{ Ag}}$

%O: $\frac{16}{124.88}$ x 100 = $\boxed{12.81\% \text{ O}}$

%H: $\frac{1.01}{124.88}$ x 100 = $\boxed{0.81\% \text{ H}}$

i. $CoCr_2O_7$

1Co x 58.93 = 58.93 amu
2Cr x 52 = 104 "
7O x 16 = + 112 "
274.93

(i)
%Co = 21.43% Co
%Cr = 37.83% Cr
%O = 40.74% O

Ch.7.4 WS#2 Determining Chemical Formulas

Name Key Period_____ Date 2/27/12

A. Find the percentage composition of the following compounds:

1. Sn_3N_2 Sn: 92.71% N: 7.29%

$3\,Sn \times 118.71\,amu = 356.13\,amu$
$2\,N \times 14.01\,'' = 28.02\,''$
add total 384.15

$\frac{356.13}{384.15} \times 100 = 92.71\%\,Sn$

$\frac{28.02}{384.15} \times 100 = 7.29\%\,N$

2. $NaIO_3$ Na: 11.62% I: 64.13% O: ~~24.40%~~ 24.25% O

$1\,Na \times 22.99\,amu = 22.99\,amu$
$1\,I \times 126.91\,'' = 126.91\,''$
$3\,O \times 16\,'' = 48\,''$
$+$
197.9 amu compound

Na: $\frac{22.99}{197.9} \times 100 = 11.62\%\,Na$

I: $\frac{126.91}{197.9} \times 100 = 64.13\%\,I$

O: $(48/197.9) \times 100 =$ ~~24.40~~ 24.25 % O

B. Given that the percentage composition of a compound is 10.2 % C, 2.1 % H, and 87.7 % O, (a) find the empirical formula of the compound. (b) Given that the molecular mass of the compound is 329.97 g/mol, determine the molecular formula of the compound. {Hint: need the empirical formula to calculate the molecular formula}

a) $10.2\%\,C = \frac{10.2\,g\,C}{} \left| \frac{1\,mol\,C}{12.01\,g\,C} \right. = 0.8493\,mol\,C \div 0.8493 = 1$

$2.1\%\,H = \frac{2.1\,g\,H}{} \left| \frac{1\,mol\,H}{1.01\,g\,H} \right. = 1.99\,mol\,H \div 0.8493 \approx 2$

$87.7\%\,O = \frac{87.7\,g\,O}{} \left| \frac{1\,mol\,O}{16\,g\,O} \right. = 5.481\,mol\,O \div 0.8493 \approx 6$

$\boxed{\text{Empirical Formula: } CH_2O_6}$

b) Given molecular molar mass = 329.97 g/mol

i $X = \frac{\text{molecular mass}}{\text{empirical mass}}$

iii $= \frac{329.97}{110.03} \approx 3$

ii empirical mass = ?

$1\,C \times 12.01 = 12.01\,g/mol$
$2\,H \times 1.01 = 2.02\,g/mol$
$6\,O \times 16 = 96\,g/mol$
Add 110.03 g/mol

iv. multiply subscripts of empirical formula by X (here X=3)

$\boxed{C_3H_6O_{18}}$: Molecular Formula

Name: Key Per: ____________ Date: ________ ID: A

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Ch. 7 Section 7.1 Test Chemical Formulas

Short Answer (40pt)

1. Write the chemical formula for the following main-group binary ionic compounds:

a. mercury^{2+} (II) phosphide^{3-}	Hg_3P_2	f. sodium nitride	Na_3N
b. aluminum oxide	Al_2O_3	g. iron (II) chloride	$FeCl_2$
c. copper (I) bromide	$CuBr$	h. potassium oxide	K_2O
d. calcium sulfide	CaS	i.strontium nitride	Sr_3N_2
e. tin (IV) iodide	SnI_4	j. lead (II) sulfide	PbS

2. Name the following binary ionic compounds.

a. $SnBr_2$ Tin (II) Bromide

b. Fe_2O_3 Iron (III) oxide

c. PbF_2 Lead ~~IV~~ II fluoride

d. $CuCl_2$ Copper(II) chloride

e. Hg_2S Mercury I sulfide

f. CsI cesium iodide

g. Ba_3N_2 Barium nitride

h. AlF_3 Aluminum fluoride

i. Li_3P Lithium phosphide

j. $MgBr_2$ Magnesium bromide

Key

3. Name the following ternary compounds:

a. $Sn(OH)_4$ Tin (IV) hydroxide

b. NH_4ClO_2 Ammonium chlorite

c. $Pb(CN)_2$ Lead (II) cyanide

d. $Al(NO_2)_3$ Aluminum nitrite

e. $CuClO_4$ Copper (I) perchlorate

f. $NaHCO_3$ Sodium hydrogencarbonate

g. $Cr(NO_2)_2$ (NO_3) Chromium (II) nitrate

e. $Ba(MnO_4)_2$ Barium permanganate

d. $Fe_2(CO_3)_3$ Iron (III) carbonate

e. $Al_2(SO_4)_3$ Aluminum sulfate

4. Name the following binary moleuclar compounds or give the formula.

a. CO_2 Carbon dioxide d. dinitrogen pentoxide N_2O_5

b. PCl_3 Phospherus trichloride e. sulfur monoxide SO

c. FBr_6 fluorine hexabromide f. tetraphosphorus dinitride P_4N_2

5. For each chemical formula below, list the number of atoms of each element that are in each compound.

a. Al_2O_3 2 Al / 3 O

b. $Ca_3\ (PO_4)_2$ 3 Ca / 2 P / 8 O

Extra Credit:

1. Titaniium is a transition metal. It can form a compound with oxygen called titanium oxide. Predict the chemical formula of this compound using the electron configuration to predict the most common ion of titanium.

$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$ Ti^{2+}

$Ti^{2+}\ O^{2-} = \boxed{TiO}$

Name: Key Per: ____________ Date: ________ ID: B

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Ch. 7 Section 7.1 Test Chemical Formulas

Short Answer (40pt)

1. For each chemical formula below, list the number of atoms of each element that are in each compound.

   a. Al_2O_3 2 Al 3 O

   b. $Ca_3(PO_4)_2$ 3 Ca 2 P 8 O

2. Write the formula for each ternary compound below:

   a. sodium sulfate Na_2SO_4

   b. iron (III) nitrite $Fe(NO_2)_3$

   c. ammonium phosphate $(NH_4)_3PO_4$

   d. chromium (III) hydroxide $Cr(OH)_3$

   e. calcium acetate $Ca(C_2H_3O_2)_2$

   f. aluminium cyanide $Al(CN)_3$

3. Name the following binary moleuclar compounds.

   a. CO_2 Carbon dioxide

   b. PCl_3 phosphorus trichloride

   c. FBr_6 Fluorine hexabromide

   Give the formula for each binary molecular compound below:

   a. dinitrogen pentoxide N_2O_5

   b. sulfur monoxide SO

   c. tetraphosphorus dinitride P_4N_2

4. Write the chemical formula for the following main-group binary ionic compounds:

   a. mercury (II) phosphide $Hg_3(PO_4)_2$

   b. aluminum oxide Al_2O_3

   c. copper (I) bromide $CuBr$

   d. calcium sulfide CaS

   e. sodium nitride Na_3N

   f. iron (II) chloride $FeCl_2$

   g. potassium oxide K_2O

5. Name the following ternary compounds:

a. $Sn(OH)_4$ Tin (IV) hydroxide

b. NH_4ClO_2 Ammonium chlorite

d. $Al(NO_3)_3$ Aluminum nitrate

e. $CuClO_4$ Copper (I) perchlorate

f. Na_2SO_3 sodium sulfite

g. $Ba(MnO_4)_2$ Barium permanganate

h. $Fe_2(CO_3)_3$ Iron (III) carbonate

6. Name the following binary ionic compounds.

a. Li_3P Lithium phosphide

b. Fe_2O_3 Iron (III) oxide

c. CsI cesium iodide

d. $MgBr_2$ magnesium bromide

e. Ba_3N_2 Barium nitride

f. PbF_2 Lead (II) fluoride

g. $SnBr_2$ Tin (II) bromide

Extra Credit:

1. Titanium is a transition metal. It can form a compound with oxygen called titanium oxide. Predict the chemical formula of this compound using the electron configuration to predict the most common ion of titanium.

$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$ Ti^{2+} O^{2-} =

2 valence

TiO

College: Chapters 7.3 and 7.4 Test **A**

Name________________________ Period______ Date 3/9/12 ~~40~~ 40

Use the following atomic masses for all calculations:

H: 1.0 **C**: 12.0 **O**: 16.0 **Cl**: 35.5 **Na**: 23.0 **Ca**: 40.0 **I**: 126.9 **Ga**: 69.7

A. Show all your work on the following problems in order to receive full credit. Round all final ANSWERS to ONE decimal place. **(15pts)**

Circle your final answers.

1. Find the molar mass of NaI. Use correct units:

(4)

Na = 23.0 u (2)
I = 126.9 u
149.9 u

(2) 149.9g or 149.9 g/mole

1 dec −1/2
unit −1

2. Find the formula mass of $Ca(OH)_2$. Use correct units:

(5)

1 Ca × 40.0 = 40.0
2 O × 16.0 = 32.0 (3)
2 H × 1.0 = 2.0
74.0

74.0 amu (2)

1 dec = −1/2
unit −1

(6) 3. Calculate the percent composition of C_6H_{12}.

6 C × 12.0 = 72.0
12 H × 1.0 = 12.0
84.0 amu (2)

$\% C = \frac{72.0g}{84.0g} \times 100 =$ 85.7% C

$\% H = \frac{12.0g}{84.0g} \times 100 =$ 14.3% H

(2) (2)

B. Show all your work on the following problems in order to receive full credit. Circle your final answer(s). **(25pts)**

(6) 1. Determine the empirical formula of a compound containing 80.0% carbon and 20.0% hydrogen.

$\frac{80.0g\ C \mid 1mol\ C}{\mid 12.0g}$ (1) $= \frac{6.67 mol\ C}{6.67}$ (1) $= 1$ (1)

$= CH_3$ (1)

$\frac{20.0g\ H \mid 1mol\ H}{\mid 1.0g}$ (1) $= \frac{20.0 mol\ H}{6.67}$ (1) $= 3$ (2.99)

College: Chapters 7.3 and 7.4 Test **A**

(13) 2. A compound has a percent composition by mass of 54.6% C, 9.0% H, and 36.4% O. The formula mass of the molecular is 176 amu. What is the compound's molecular formula?

(1) (1) (1) 2

$\frac{54.6\,g\ C \mid 1\,mol\ C}{\mid 12.0\,g}$ $\frac{4.55\,mol\ C}{2.28} \approx 1.99 = 2$ C_2H_4O = Emp. Form. = 44g

(1) (1) (1)

$\frac{9.0\,g\ H \mid 1\,mol}{\mid 1.0\,g} = \frac{9.0\,mol\ H}{2.28} \approx 3.9 = 4$ $\frac{176\,g}{44\,g} = 4$ (2)

(1) (1) (1)

$\frac{36.4\,g\ O \mid 1\,mol}{\mid 16.0\,g} = \frac{2.28\,mol\ O}{2.28} \approx 1$ $C_8H_{16}O_4$

(4) 3. The empirical formula of a substance is CH_2O. The molar mass is 180 g/mol. What is the molecular formula?

$CH_2O \approx 12 + 2 + 16 = 30\,g$

(3)

$\frac{180}{30} = 6$

$(CH_2O)_6 = C_6H_{12}O_6$

(1)

4. The molecular formula of a compound is $C_2H_4Cl_2$. Give one example of a possible empirical formula based on this molecular formula. (2)

$\frac{C_2H_4Cl_2}{2} = CH_2Cl$

Bonus: Determine the empirical formula of a compound that is 74.39% Ga and 25.61% O.

+3

$\frac{74.39\,g\ Ga \mid 1\,mol\ Ga}{\mid 69.7\,g} = \frac{1.07\,mol\ Ga}{1.07} = 1 \times 2 = 2$ Ga_2O_3

$\frac{25.61\,g\ O \mid 1\,mol\ O}{\mid 16.0\,g} = \frac{1.60\,mol\ O}{1.07} = 1.5 \times 2 = 3$

Honors: Chapters 7.3 and 7.4 Test **A**

Name Key Period____ Date 3/9/12 % of 64

Use the following atomic masses for all calculations:

H: 1.0 **C**: 12.0 **O**: 16.0 **Cl**: 35.5 **Na**: 23.0 **Ca**: 40.1 **I**: 126.9 **K**: 39.1 **P**: 31.0 **Ga**: 69.7

A. Show all your work on the following problems in order to receive full credit. Round all final ANSWERS to ONE decimal place. **(15pts)**

Circle your final answers.

(3) 1. Find the molar mass of NaI. Use correct units:

Na = 23.0
I = 126.9 (2)
149.9 u

(1) 149.9 g or 149.9 g/mole

unit −1/2
1 dec −1/2

(3) 2. Find the formula mass of $Ca(OH)_2$. Use correct units:

1 Ca × 40 = 40
2 O × 16 = 32 (2)
2 H × 1 = 2
74

74.0 amu (1)

unit −1/2
1 dec −1/2

(9) 3. Calculate the percent composition of K_3PO_4.

1 dec −1/2

3 K × 39.1 g = 117.3 g
1 P × 31.0 g = 31.0 g
4 O × 16.0 g = 64.0 g
212.3 (3)

(3) (3)

$\% K = \frac{117.3g}{212.3g} \times 100 = 55.3\% K$

$\% P = \frac{31.0g}{212.3} \times 100 = 14.6\% P$

$\% O = \frac{64.0g}{212.3} \times 100 = 30.1\% O$

B. Show all your work on the following problems in order to receive full credit. Circle your final answer(s). **(50pts)**

(10) 1. Find the empirical formula of a compound containing 64.27% C, 7.19% H, and 28.54% O.

$\frac{64.27g\ C}{} \Big| \frac{1 mol\ C}{12.0g} = \frac{5.36 mol\ C}{1.78} = 3$

$\frac{7.19g\ H}{} \Big| \frac{1 mol\ H}{1.0g} = \frac{7.19 mol\ H}{1.78} = 4$

$\frac{28.54g\ O}{} \Big| \frac{1 mol\ O}{16.0g} = \frac{1.78 mol\ O}{1.78} = 1$

(3) (3) (3)

C_3H_4O (1)

(15) 2. A compound has a percent composition by mass of 54.6% C, 9.0% H, and 36.4% O. The formula mass of the ~~molecular~~ compound is 176 amu. What is the compound's molecular formula?

$\frac{54.6g}{} \Big| \frac{1 mol}{12g} = \frac{4.55 mol\ C}{2.28} = 2$ $\quad C_2H_4O$ (1) $= 44g$ (1)

$\frac{9.0g\ H}{} \Big| \frac{1 mol}{1.0g} = \frac{9.0 mol\ H}{2.28} = 3.9 = 4$ $\quad$ (2) $\frac{176}{44} = 4$ (1)

$C_8H_{16}O_4$ (1)

$\frac{36.4g\ O}{} \Big| \frac{1 mol\ O}{16.0g} = \frac{2.28 mol\ O}{2.28} = 1$

(3) (3) (3)

(5) 3. The empirical formula of a substance is CH_2O. The molar mass is 180 g/mol. What is the molecular formula?

$CH_2O = 30g$ (1) $\quad \frac{180}{30} = 6\ (CH_2O)$ (3) $= C_6H_{12}O_6$ (1)

4. The molecular formula of a compound is $C_2H_4Cl_2$. Give one example of a possible empirical formula based on this molecular formula. (4)

Emp is simplest ratio of atoms in a molecule $= CH_2Cl$

(15) 5. Determine the molecular formula of a compound that is 74.39% Ga and 25.61% O. The molar mass of the compound is 735.2 g/mol.

$\frac{74.39g\ Ga}{} \Big| \frac{1 mol\ Ga}{69.7g} = \frac{1.07 mol\ Ga}{1.07} = 1 \times 2 = 2$ $\quad = Ga_2O_3$ (1)

$\frac{25.61g\ O}{} \Big| \frac{1 mol\ O}{16.0g} = \frac{1.60 mol\ O}{1.07} = 1.5 \times 2 = 3$

(2) (2) (2) (2)

$Ga_2O_3 = 139.4 + 48 = 187.4$ $\quad 4 = \frac{735.2}{187.4} = 4$ (1)

(1) (1) (1) (1) $\quad Ga_8O_{12}$ (1)

$(Ga_2O_3)_4$

Appendix I

Interviews/Quotes

"There's never down time, never a dull moment."

"You always have to be on task, on your toes."

"Every day is different."

"One of the jobs of being a teacher is convincing students to accept, to believe in it, buy into what they are learning. They need to learn that it's something that's important, to work hard, that they can do the work."

"Your chemistry class may be one of the first classes they may take where they realize they need to put in a lot of effort. But they've got to want it. You don't need to be a genius, you just need to put in a lot of effort."

"Students often ask, "Why do I need to know this?". At the age of 15, how do you know what you need to know? Schooling is about education. Education is about learning, which keeps away ignorance, to prepare you for the future."

"Teaching is data driven. Everything is based on results of standardized tests."

"Teacher quality, I've seen that improving over the years."

"The perception for most people is that teachers have a lot of time off. They don't see what goes on in the classroom, the hours teachers put into preparation for classes, what goes into the class. They think we teach for five hours a day. There are no coffee breaks. We get twenty minutes for lunch, one prep period for correcting and prep, and we have one duty. You have to get your master's, pay for it, and keep up your license."

"All it takes is one kid to come back the next year, telling you they're doing well in college, to know you made a difference."

"I'm not interested in how much I teach, but in how well I teach, and how well the students have learned the material."

"My objective is to make sure kids are learning. I work hard at my job, even after all these 28 years."

"Teachers aren't built over night. Teaching is like acting, you build on your skills."

"Have perseverance and don't take it to heart. All you can do is reflect on what you could have done differently, and try it."