

An Interactive Qualifying Project
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By
Whitney Thurrott

**Teaching Practicum for Whitney Thurrott 2007:
Massachusetts Criteria for Teaching Certification.**

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Worcester Polytechnic Institute, Biology, 2008

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*Project was previously submitted, with all supplemental materials, to the advisor in hard copy format

Chapter 1: Background Information

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Abstract

In order to meet the Massachusetts criteria for earning an entry level teaching certification, Whitney Thurrott completed coursework at WPI in conjunction with student teaching and observation hours at North High in Worcester, MA. From the end of January 2007 through the beginning of June 2007, Ms. Thurrott gradually assumed control over Mr. Richard Howarth's Biology II level 1 course and two Honors Anatomy courses. She used the techniques which she learned in courses through WPI and those learned via observations of Mr. Howarth to generate lessons and facilitate the instruction of material from the MA curriculum.

Chapter 1: Introduction

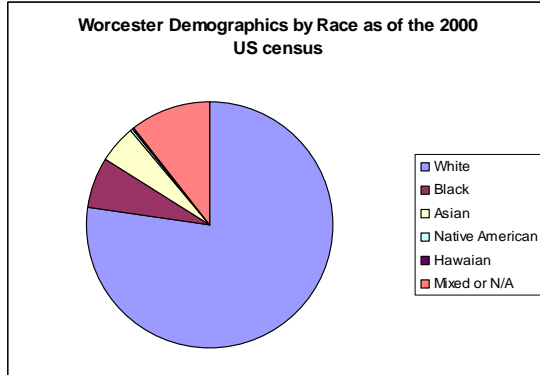
This is the teaching practicum based IQP for Whitney Thurrott, a biology major at Worcester Polytechnic Institute in Worcester, MA. Ms. Thurrott executed her student teaching hours at North High, a public High School in Worcester, MA. The practicum began on January 22, 2007 and concluded on June 1, 2007.

The first chapter of this paper contains background information on the school and area in which the practicum was performed. It is intended to establish a context for the practicum and illustrate the environment of the classes at North High School. This particular practicum will be broken down in the following way. First, a general overview of Worcester and the public school system therein will be discussed, followed by a broad look at the specific High School. Next, Ms. Thurrott's prior experiences at the school will be discussed followed by a brief description of Ms. Thurrott's personal background. This information will establish the basis for interactions described in the following chapters of the practicum paper.

Worcester and the Worcester Public School System

Although it was founded in 1722, Worcester came into its own in the mid 1800s with the building of the Blackstone canal and start of the industrial revolution. Interestingly, some even consider Worcester to be one of the birthplaces of the industrial revolution as it is renowned for industrial scientists such as Ichabod Washburn, and Robert H. Goddard. Over time, however, Worcester also developed its educational and biological prowess. Today, Worcester houses a number of well regarded universities and offers learners many research opportunities as well as various biotechnology industries. Worcester is notably the second largest city in Massachusetts having an area of 37.5 square miles and population of nearly 175,500 residents. The demographics of the city were broken down in a 2000 US Census as follows; 77.1 percent White, 6.9 percent Black or African American, 0.4 percent Native American, 4.9 percent Asian, 0.1 percent Hawaiian or Pacific Islander, and 10.6 percent mixed races or race not reported.

Fig. 1- 2000 US Census racial demographics of Worcester, MA



It is also noteworthy that 15.1 percent of the total population is of Hispanic or Latino decent. Additional information provided by the 2000 US census shows that 85.5 percent of the population is made up of native citizens while 14.5 percent are foreign born (both citizens and non-citizens).

While Worcester is a hot spot for higher education and home to many universities including Worcester Polytechnic Institute, Clark University, UMass Medical, and Holy Cross among others, 54.7 percent of the residents have less than or the equivalent of a High School Education. Additionally, 14.5 percent of the inhabitants have a household income of less than \$10,000 per year with a median household income of \$35,623 per year. From US census data it is evident that Worcester's written history is not necessarily a reflection of the day-to-day conditions experienced by the average resident. It is important to acknowledge that while Worcester may be prestigious as a city its people are common hard workers of mixed decent.

The public school system of Worcester consists of 34 elementary schools (including magnet schools and prep schools), 4 Middle Schools and 6 High Schools. There are over 25,000 students enrolled in the Worcester public school system which hopes to provide these students, "...with a quality education in a safe and healthy environment...(where they believe)...all students can achieve at high levels as they prepare to become productive citizens in our ever changing technological world..." Interestingly, Worcester has taken a unique approach to helping students achieve. Each of the High Schools in Worcester have taken on specific directions in order to help goal oriented students better pave the pathway to their desired future. These paths are described as "smaller learning communities" or "academies" within each High School. For example, if a student has interest in entering an Engineering field they could elect to attend Doherty High, if they are interested in arts they could attend Burncoat, if they are interested in Technology they could attend South High or the Technical High School. However, it should be noted that it is still typical for students to attend the school in their respective quadrant rather than based upon the direction of their studies.

Fig. 2- Quadrant Breakdown of Worcester High Schools



North High School

North High was the site for this IQP practicum. According to the Massachusetts Board of Education data from 2006-2007 the demographics for North High are as follows; 19 percent Black, 7.3 percent Asian, 35.6 percent Hispanic, 37.2 percent White, 0.2 percent Native American or Pacific Islander. Compared to the results for Worcester, it should be plainly obvious that this is a very racially diverse school. From the same data we can also see that the general economic level of the students enrolled at North fairly low with 68.2 percent of the students considered “low income”. Data from NCES 2004-2005 also reflects this finding in that more than half of the students at North are eligible for free or reduced-price lunch programs. North High is a city school and houses many students from all walks of life.

The school-building dates back to the World War era, which greatly affects the literal climate of the school and the environment of the individual classrooms. The school is not well ventilated and is often extremely hot in warm weather and extremely cold during the fall and winter months. Additionally, there are asbestos tiles throughout the building, many of which are cracked or broken. The classrooms are very closed-in and some have been converted from their original purpose in order to accommodate for the ever increasing student population. The library is a welcoming center for many of the students, however, the computers available in the library are slow and highly outdated. Further, the newer computers in the computer lab need to be highly monitored and are not always easily accessible for the students. Although the building is in need of updates, the faculty and staff make the most of what is available. Classrooms are brightened by posters and student work and the teachers often stand by their doors during passing times to interact with their students as they change classrooms.

North High is located at 150 Harrington Way in Worcester, MA. North's location next to the Ecotarium allows a partnership between the school and Ecotarium, which affords unique opportunities for students to develop their interest in biological sciences. Many of North's students have already shown interest in the biological sciences based upon their division into "smaller learning communities" within the Worcester community and North itself. North is divided (further) into learning communities; the Health Science Academy, the School of Technology and Business, and the School of Social Systems and Justice. These learning communities are intended to help students move toward a pathway that will allow them early experience and concentration in fields which they wish to pursue as careers.

In addition to the use of learning communities to aid the students in their studies, the courses at North High are broken down into levels in an attempt to provide classroom environments that are more catered to the abilities of the students. By offering the same topics at a few different levels such as level 1, 2, 3 and honors, a school can give all students information on a topic but present the material at a pace and in such a way that more of the students will understand the material. At North High, students who require more time to learn a topic can join a lower level class and will have a better chance at learning the material and meeting the requirements of the class.

Students from North High are all required to take the MCAS test, a standardized test which looks at the students' knowledge of the requisite curriculum. The test has multiple facets and places strong emphasis on reading, writing and math skills. The test results for North High sophomores are published each year and the table below contains the results of North High sophomores for the 2006-2007 academic year side by side with the state rankings. The results show that North High students produce MCAS test results that are generally lower for the advanced levels and higher for the insufficient levels of comprehension than the state averages. Additionally, on the Mass. DOE website the scores for the previous few years can be compared and when this is done for North High it becomes clear that the test scores have been fairly consistent for the past four years.

North High 2007 MCAS test scores from the Massachusetts DOE

<http://profiles.doe.mass.edu/home.asp?mode=so&so=1954-6&ot=5&o=1906&view=tst>

MCAS Tests of Spring 2007 Percent of Students at Each Performance Level										
Grade and Subject	Advanced/ Above Proficient		Proficient		Needs Improvement		Warning/ Failing		Students Included	CPI
	School	State	School	State	School	State	School	State		
GRADE 10 - ENGLISH LANGUAGE ARTS	8	22	35	49	43	24	14	6	258	75.6
GRADE 10 - MATHEMATICS	20	42	26	27	36	22	17	9	255	72.9

A Note:

Ms. Thurrott had experienced North High prior to becoming a student teacher there and to read her initial observations of the school please see the addendum following the concluding section of this practicum. The initial observations were originally added to this first section of the practicum because they contributed personal perspective to the discussion of the environment of the school. Ms. Thurrott encourages readers of this practicum to read through the addendum because she feels it greatly enhances the readers understanding of the drastically varied conditions present at North High.

Background for the IQP Student: Whitney Thurrott

Whitney Thurrott is majoring in biology and minoring in international studies with a German track at Worcester Polytechnic Institute. She attended high school at South Windsor High School in South Windsor, CT from 2000-2004. The demographics of South Windsor High School are far different from Worcester, they are as follows; 86.8 percent White, 4.6 percent Black, 3.1 percent Hispanic, 5.1 percent Asian, and 0.4 percent Native American. Compared to North High, it is obvious that South Windsor is a less diverse school and further, only 4.5 percent of the students come from non-English speaking homes. Additionally, South Windsor has a much lower percentage of “low income” students. From the strategic profile for South Windsor Schools 2001-2002 it can be seen that only 5.3 percent of the students are eligible for free or reduced price meal plans versus more than 50 percent of the students at North High. The following is a table of the test results of South Windsor students for the Connecticut Aptitude Performance Test (CAPT), a test comparable to the MCAS in Massachusetts to illustrate the standardize testing differences between the school of Ms. Thurrott’s background and North High.

Conn. Academic Performance Test, 2nd Gen.

	% Grade 10 Meeting State Goal			
	District 2000-01	District 2001-02	ERG 2001-02	State 2001-02
Reading Across the Disciplines	45	63	64	44.8
Writing Across the Disciplines	56	63	68	51.0
Mathematics	60	66	65	44.1
Science	56	62	60	43.2
All Four Tests	31.3	40.4	38.8	23.7
Participation Rate	96.1	96.4	95.3	92.4

The courses at South Windsor High School are divided into levels like the courses at North High, however at South Windsor they range from 1-4 and AP and the school is not broken down into learning communities. Additionally, not all of the classes at South Windsor were offered at all levels and only certain classes such as the standard sophomore year biology class were offered at varied levels. Elective biology classes at South Windsor were typically level 2 or 3 with the exception of the Honors Anatomy and Physiology course which was offered at levels 3 and 4. Also, the level of the courses taken played heavily into the student’s qualitative grade-point average and often students would refrain from taking lower level classes that might hurt their weighted GPA.

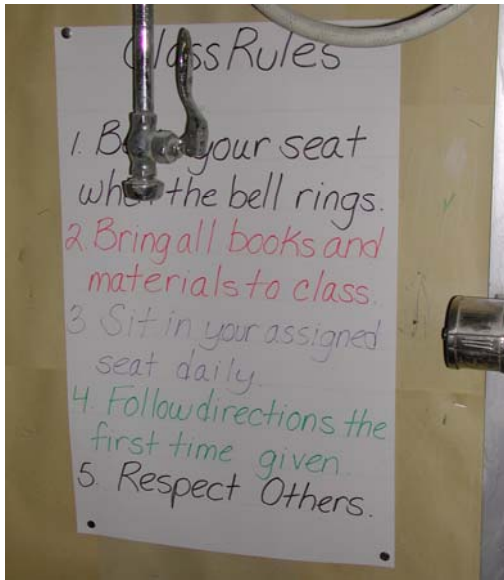
When comparing North High to Ms. Thurrott's high school it is evident that there are some significant differences. Although Ms. Thurrott's personal high school experience was not easily comparable to the experience of her students at North High she felt that it was not much different interacting with students from her high school and those at North High. By emulating teachers who treated their students with respect and courtesy, Ms. Thurrott was able to build a good rapport with her students. She believes that a teacher should not overtly exercise their authoritative position unless the students do not return the respect and courtesy which the teacher offers to them. This does not mean that a teacher should hide their authority status, but a teacher does not need to be constantly overbearing and outspoken in that respect. If a teacher is able to establish the ground rules of the classroom early on and is clear about the consequences for poor behavior then the students have no reason to act out of line and the only time that would warrant a display of authority from the teacher would be if the students violate the rules. When a teacher is able to communicate with their students with mutual respect both parties will be able to learn from each other. Also, students who respect their instructor are more likely to enjoy learning from that teacher. For example, many coaches at North High get more respect than the teachers because they build this type of rapport with their students.

The Classroom

Ms. Thurrott tried to create a welcoming, structured environment for the students. When she took over the classes from Mr. Howarth she made sure to keep current student work plastered on the walls of the classroom along with diagrams and study aids. In addition to those pieces of décor, the classroom also contained structural elements such as the daily lesson plan and classroom rules. The following photos are of the classroom and elements that helped to create a welcoming, structured teaching and learning environment.

Figure one is a list of the Class Rules. This poster is a remnant from Mr. Howarth, however, the poster retained value because Ms. Thurrott upheld the rules established by Mr. Howarth and because the poster served as a constant reminder to the students of what was expected of them.

Fig. 1: Classroom Rules



An additional expectations chart was added to a more visible location in the classroom part way through Ms. Thurrott's student teaching term. Figure 2 is a photo of the poster that was part of a dialog with the Biology II students to determine proper classroom behaviors. Ms. Thurrott felt the students needed to create this poster because their own classroom behaviors did not correlate with those which they had been told were expected of them by Mr. Howarth at the start of the semester. Whenever the students would misbehave after the creation of this poster it would be referred back to and the students would be reminded of their own expectations.

Fig. 2 Additional classroom behavior poster

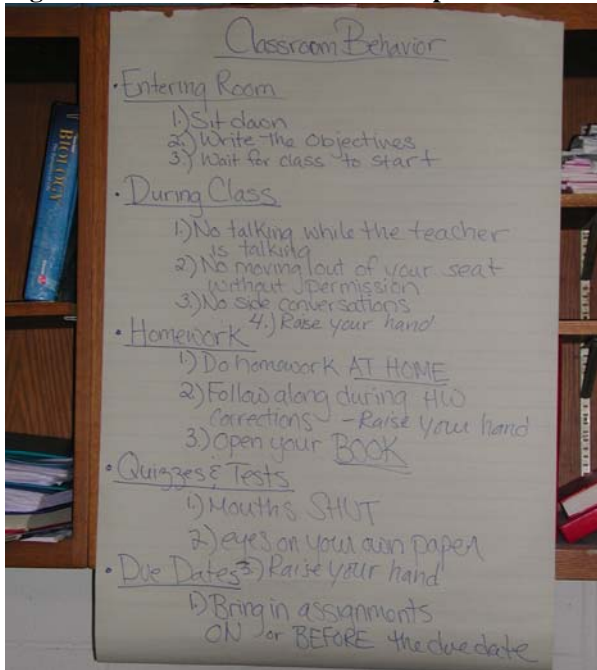


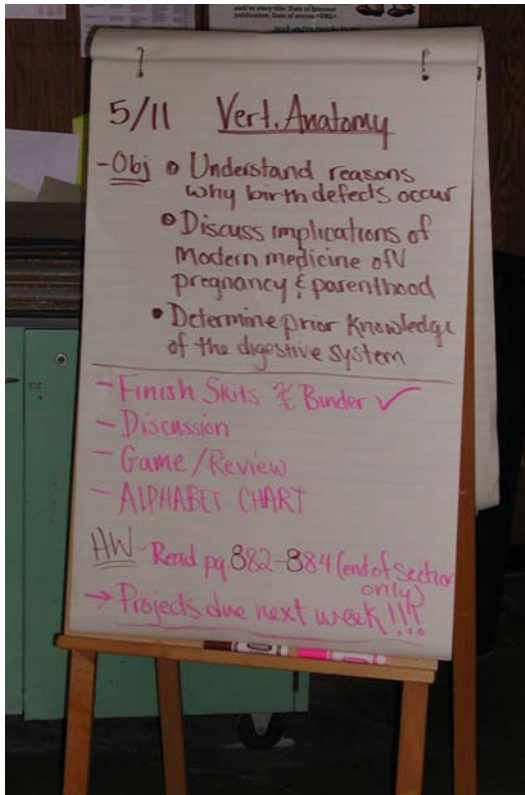
Figure 3 are photos of the supply cabinets near the blackboard. On this cabinet are a set of documents which acted as reminders and references for the students. Posted on the cabinet were safety guidelines, the classroom management plans, citation references, reading and writing strategies and the North High Mission Statement. Students would refer to these documents when working on writing assignments and projects. The documents also served as evidence for the expected behaviors and safety procedures which the students were expected to follow in a science classroom.

Fig. 3: Important classroom documents posted on the cabinets near the blackboard.



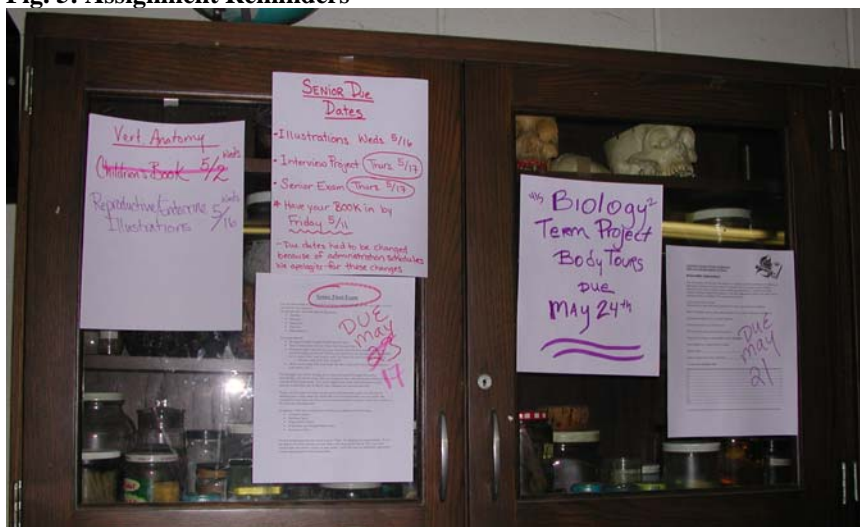
Figure 4 is a picture of the easel on which the daily lesson plans and homework assignments were written. Each day as students came into class they were expected to copy the lesson plan for the day into their notes along with any homework assignments and due dates which were also noted on the easel. The Biology II class also had lesson plans written on the easel, however, only a Honors Anatomy lesson plan is pictured.

Fig. 4: Easel with daily lesson plans



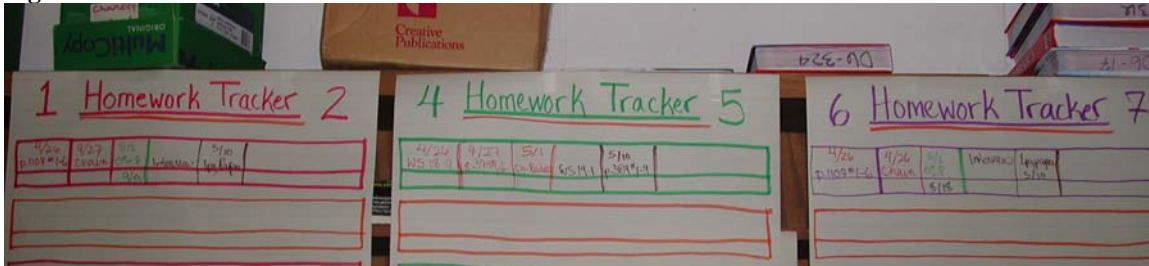
Additional due date reminders were posted on a glass cabinet in the room. Since the daily lesson plan changed each day it was important to maintain a list of important dates for the student. Figure 5 shows a pictures of the reminders posted on the cabinet. Reminders remained on the cabinet until their due dates had past and occasionally a little longer to remind students what assignments were needed from them.

Fig. 5: Assignment Reminders



One concept that Ms. Thurrott came up with to increase the amount of homework assignments turned in by the students was to begin charting homework assignments and make a competition between the classes concerning the number of days on which every member of the class brought their homework in. The idea fell a little short since most students continued to neglect their homework regardless of the possible reward for bringing it to class. The charting of the homework assignments, however, allowed students to keep track of the homework assignments throughout the semester. The posters shown in figure 6 were of particular use to students who had been absent and missed work because they could find the missing assignments listed on their class's chart quickly and easily before even talking to Ms. Thurrott about their missing work.

Fig. 6: Homework Tracker Charts



Ms. Thurrott tried to provide many different study aids on the walls of the classroom. Those study aids ranged from student work to vocabulary to models created to illustrate concepts from a unit. Figure 7 shows a few examples of the adornments on the walls of the classroom which served as study aids for the students and which made the classroom a more colorful, welcoming room for the students and teachers alike.

Fig. 7: Classroom décor

a. Vocabulary Wall



b. Student 3D Neuron Models



c. Large Labeled Neuron Model



Chapter 2: Curriculum Taught

Background of Courses Taught

Ms. Thurrott's background predetermined a biological sciences pathway for obtaining her teaching certification. Therefore, while student teaching at North High she was partnered with Mr. Richard Howarth, a biological sciences teacher for the Social Systems and Justice learning community at North High. She eventually took over Mr. Howarth's Honors Anatomy and Biology II classes. Although, Mr. Howarth is a teacher for the Social Systems and Justice learning community at North, this delineation applies mostly to the advisory activities that the teachers at North undertake. Students from all three of the learning communities present at North were students in the classes which Ms. Thurrott took over from Mr. Howarth. It should also be noted that the courses and course setup at North High differ slightly from those prescribed in the Frameworks; Biology I, Genetics, Cell Biology, Anatomy and Physiology, Evolution and Biodiversity, and Ecology, in that the topics required by the Frameworks are all covered, however, the courses are not in direct parallel with the prescription of the Frameworks. The following section of this document will highlight the courses which Ms. Thurrott taught and provide some background both on the topics covered and on how the topics fit into the school's curriculum.

General Course Curriculum at North High

The biological science courses at North High range from simple introductory courses to high level concentration related courses such as Pathophysiology and AP Biology. At the very low, introductory level there is a course titled “Bio-chem” which familiarizes students with both biology and chemistry. This course makes simple connections between the sciences and shows students the importance and interconnection between the two genres of science. However, Bio-chem is not a required course for all students. The typical freshman/sophomore year biology course is actually Biology I. This course can be taken at various placement levels but its intention is to cover a range of entry level topics. Students, depending on their background knowledge of life sciences in general, may begin with a section on units of measure and conversions between different units of measure. They may also review the scientific method in the early stages of the course. These non-specific sections allow the teacher to gauge the capabilities of their students who have come from different schools and different backgrounds. As far as biology specific topics, the Biology I course teaches about cells, their makeup and functions. From there students will have established an understanding of one of the lowest levels of organization for biological life forms. Additionally, students will learn about genetics in Biology I. Genetics is a topic which flows naturally from a study of cells because it explains how cells know to organize themselves within a living creature and how they are able to carry out biological functions. Students move from Biology I to Biology II, typically in their sophomore year, however, both Biology I and Biology II are semester long courses and could conceivably be completed in the same year or in different years.

In Biology II students take their knowledge of biology to the next level by observing the differences between organisms which make them unique. Students learn how organisms are classified and they observe how they are similar and different from one another. They also discuss the theory of evolution and use their knowledge of genetics to help them understand the critical ideas behind evolution. Then students learn about the interactions between organisms as they study ecology. Finally, the Biology II class briefly discusses Honors Anatomy which combines many of the topics from the previous sections of both Biology I and II. There will be a more in depth discussion on the Biology II course later in this section of the practicum.

The Bio-chem, Biology I and Biology II courses at North prepare students to make decisions about their upperclassman courses by giving them a broad overview of many of the themes and topics of biology. In their later years of study students may choose to take on higher level biology courses such as the Honors Anatomy course. This course, while it does not cover physiology, is intended for students who show interest in the medical fields. It gives them an in-depth look at each system of the body and makes connections to cells and their structure, genetics and evolution etc. A similar high level course offered at North High is the Pathophysiology course. In this course, students are exposed to elements of Honors Anatomy, however, there is a stronger physiology influence and students are asked to assess afflictions and disorders of the various anatomical parts from a biological and medicinal perspective. Advanced Placement (AP)

Biology is the highest level Biology related course available at North High. This course prepares students for the AP Biology test and may count towards college credit for some students. AP Biology takes themes from the previous biology courses and provides a much more detailed look at general biology topics. North High also offers Biotechnology, Honors Biology and Human Physiology. These course integrate more sections of the Curriculum Frameworks and provide students with additional course choices.

Biology II

(Level 1)

Text: Modern Biology- Holt, Rinehart and Winston 2006 Edition

The Biology II course touches on many of the topics required by the Massachusetts Curriculum Frameworks. Although some of the topics are not explored in great detail, the students are expected to become familiar with many of the ideas found in the requirements of the Frameworks. However, because the courses in Massachusetts are not standardized to the Frameworks, students are exposed to different requirements of the Frameworks at different times in their careers as students, especially if they have had to change schools. The Biology II course touches on goals set in the following Frameworks categories; 1.) The Chemistry of Life, 3.) Genetics, 4.) Anatomy and Physiology, 5.) Evolution and 6.) Ecology.

Students entering the Biology II course have, in theory, passed the Biology I course. They should therefore, have a basic understanding of cell biology, genetics and other fundamentals of biology that will be drawn upon in the Biology II course. Typically, the students will have a different teacher for Biology I and Biology II. This is mentioned because the Biology I and II courses are only semester long courses and may sometimes be taken consecutively with each teacher taking a slightly different approach to the material. If this happens it may make it difficult for some students to draw connections between linked topics, however, the same text book is used for both courses and provides students with consistent information between the courses. The textbook, “Modern Biology” by Holt Rinehart and Winston is a great text for early biology students. It divides themes into short manageable sections with clear explicit explanations and then concludes each section with a series of questions which reflect upon the 2-3 pages which makeup the section. Following along with this text gives the students a stable format to glean information from, although their teacher may vary from Biology I to Biology II.

The Biology II course at North High begins with a quick review of basic biology and what it means to study biology. The students have to determine what topics biologists study and prove that they understand what a biologist is and what a biologist does through the completion of a research project on a specific biologist. This activity connects biology to the students’ English classes and draws upon research skills that are required across all of the disciplines. As a class, the students then concentrate specifically on the biologist Charles Darwin. Studying Darwin and his life’s work provides a smooth transition into the unit on evolution, the unit which meets the requirements of section 5 of the Frameworks.

Throughout the evolution unit, students are expected to examine evidence for the theory of evolution, they begin by examining the fossil record and analyzing structural differences and similarities between organisms. Mr. Howarth, had the students do simulated archeology studies to examine the fossil record to make observations of the fossil record through time. They also had to describe how these changes over time could have occurred in terms of genetics and then consider why the different traits are selected for or against. (Frameworks 5.1) Since the students should have learned about genetics in Biology I it is assumed that they already have a reasonable grasp of how DNA works and how changes in a population can result from changes in the DNA of the individual organisms. (Frameworks section 3) Students also investigated how a species can diverge into two or more distinct groups and how those groups can become new species over time. Further, students should be able to describe these conditions from real life example which can occur through such instances as geographic isolation. (Frameworks 5.2) These are ideas that the students could relate back to the finches and other creatures that Charles Darwin observed in the Galapagos Islands. The contemplation of changes within a species, which allow the changed individuals to be better suited to their environment, raises questions such as; what makes an organism suited to an environment?, what roles do different organisms play in an environment and what happens when organisms interact with each other? Students in Biology II explored biodiversity and how it stems from principles described in the theory of evolution. (Frameworks 5.3) The ecology unit is where students investigated the interactions between organisms and their surroundings and hopefully discovered the answers to the questions previously listed and more.

During the ecology unit students learned about the breakdown of Earth from the biosphere to the individual organism. They also learned about how the various organisms' interactions change both the other organisms and the environment. A great deal of time was spent analyzing interactions and the students are asked to be able to explain the effects of various types of interactions; symbiotic interactions, cycles, ecological impact of the species of organisms in an area etc. The ecology unit provides a detailed glimpse at a branch of biology that students can easily observe in their everyday lives. For this reason, the ecology unit is particularly engaging for the students and a lot of the ideas presented in the unit can be easily understood through interpretation of the students' prior knowledge. The emphasis in the ecology unit, aside from the standard themes of ecology, is that all of the branches of biology are interrelated and that the world which we see everyday is an amalgam of all of the fine details and intricacies that biologists study. (Frameworks section 6)

In Biology II students are also expected to observe the impact of humanity on the environment. Having learned about the energy and nutrient cycles they should come to the realization that humanity is leaving a deep imprint on the world and affecting all kinds of ecosystems and environments that we don't consider during our daily consumption.(Frameworks sections 6.2 and 6.4) And, although humans have one of the most complex brains of Earth's organisms, the adverse effects of our way of live on the natural environment and other organisms is also effecting us since in the end we are an animal very similar to every other animal.

The final unit of Biology II is a brief look at Honors Anatomy and physiology. (Frameworks section 4) In this unit the students learn that humans are a product of natural processes and they learn to identify structures within the human body as well as the functions of those structures. Although the students in Biology II cover Honors Anatomy and physiology, it is a very basic overview of these topics and involves a major project in which the students cover anatomy and physiology in a more self-directed style of learning. The unit is covered in this manner due to time constraints and puts a lot of responsibility on the students to do research on the required material. Additionally, the topics from the students' research are not necessarily covered on a test and, therefore, the students are less likely to leave the Biology II class with a solid grasp of Honors Anatomy and physiology than if they take either the Honors Anatomy or the Physiology courses which are also offered at North High. It is hoped that the Biology II students will make connections back to their observations of the fossil record and to the class discussions of genes and evolution when they research Honors Anatomy and physiology so that they will see the similarities and differences between the various types of life on Earth.

Honors Anatomy (Honors Level)

Text: Honors Anatomy and Physiology, Sixth Edition - Elaine N. Marieb, 2003

The honors level Honors Anatomy course at North High is designed to give students an overview of the anatomical structures of the human body. Since North is a medical-track school, this course allows students who have completed high level biology classes an opportunity to explore the entry level of medical sciences. Additionally, the college level textbook used in this class illustrates the complexity of the human body, giving the students an idea of how much more there is to learn about Honors Anatomy and physiology than what is covered in the class. The advanced level of the textbook is also an indicator of the work and skill level required by the course. This course, although it does not delve into physiology, is a rigorous course and expects a high level of thought going into (written) responses and all forms of assignments from the students. The Honors Anatomy course correlates with the 4th section of the Curriculum Frameworks, however, since this course does not cover physiology it only covers the anatomy side of the Frameworks requirements in an in depth fashion. For this course, stress is put on the idea that the body is a highly interdependent, constantly communicating machine which is able rigorously maintain homeostasis through its constant communication and feedback. (Frameworks 4.7 and 4.8)

In their freshman and sophomore years at North High, it is expected that students will have completed both Biology I, which discusses unit conversion, the scientific theory, simple cells, genetics and provides a general introduction to the biological sciences, and Biology II, which covers the theory of evolution, ecology and provides a general overview of Honors Anatomy. These courses should have sufficiently introduced students to basic topics such as organization and the scientific method that they will be able to understand higher level versions of these concepts when they encounter them in

later courses. Additionally, the overviews of cell structure, and Honors Anatomy should have given the students an idea of what the Honors Anatomy course would entail.

The Honors Anatomy course begins with a brief review of the animal cell, its components and the functions of those components. This review sets the stage for understanding more complex organ systems such as the skeletal system which is the first major unit of the course. When learning about the skeletal system students learn not only the names but also the functions of the bones of the skeletal system. Students will learn about how the structure of bone cells, for example osteocytes, relates directly to their function, the storage and maintenance of calcium levels. The idea that structure and function are directly related remains a key theme throughout the Honors Anatomy course and students will be expected to make these types of connections especially at topic shifts such as the transition between the skeletal system and learning about muscles and joints. It is expected that, because students learn about which bones connect to which and that all bones are important to structure and movement, students will see that how the muscle attaches to the skeletal system directly related to the movements that it can generate. (Framework 4.5) Additionally, the interdependence of systems is stressed in much of the nomenclature of anatomical parts, therefore students will be asked to assess the functions of new parts based on their name and structures. As the class progresses from muscles and joints to the nervous system it is hoped that students will be able to relate brain structures to cranial bones which they have learned and that they will be able to connect the movements of muscles to the actions of neurons.

Students are then expected to take their understanding of communication throughout the body to a new level by studying the endocrine system. (Frameworks 4.4, 4.7 and 4.8) The endocrine system plays a huge role in connecting the brain to the rest of the body and is responsible for long term changes in body chemistry and functions. In the endocrine unit, students are asked to understand the connections between the various glands of the endocrine system, the brain and the chemicals responsible for the major changes that the endocrine system produces. This unit forces the students to observe the effects of chemicals on cells and how they function returning to the original concepts presented in the course and developing them by connecting to the specific systems of the body. Students are asked to know chemicals produced by each gland and some of the effects of those chemicals on the body as it develops. The hormones discussed in the study of the endocrine system lead into a discussion of development and the theme of the class shifts to a brief unit on developmental biology. (Framework 4.7) A large portion of this course shows students how the human body is in a constant transitional state and that over time, although we may feel like we look the same, our body will comprised of entirely new cells; new skin, hair, signals etc.

Students learn about the effects of hormones the sex organs and embryonic development. (Frameworks 4.6 and 4.7) These topics are of great interest to the students and stir many interesting classroom debates. The unit on embryonic development is especially important in this class for interlacing social themes and for providing a purpose for learning about Honors Anatomy. As the students explore the myriad of changes that occur between the communion of sperm and egg through birth many questions arise

involving themes such as gender, genetics, the beginning of life and all of these issues are the basis for many serious ethical debates. Everyday we are all subjected to various news stories involving Honors Anatomy and this class helps students to understand the science behind many of those stories.

In addition to the previously mentioned units, students will also learn about the digestive, circulatory, excretory and respiratory systems in the Honors Anatomy class at North High. (Frameworks, 4.1, 4.2, and 4.3) These units take a look at the other systems necessary for humans to exist and further illustrate the deep connections between each system of the body and their strong interdependence. (Framework 4.8) The students will observe the connection between the digestive system and the circulatory system and the circulatory system and the respiratory system for supplying the body with the chemicals and nutrients it needs to exist while also removing those that it does not need. These last overviews of critically important systems pave the way for students to take the physiology or even the pathophysiology courses at North High where the actions of these systems will be discussed in greater detail. It is hoped that by the end of this course the students will have a detailed understanding of the structures of the human body and the desire to pursue their understanding of what those structures do and how they're each an integral part of the human machine.

Chapter 3: Course Materials

The following discussion relates to a collection of documents which were created as assignments for the classes described in the previous section. The documents can be found accompanying this practicum in their respective sections. These assignments reflect the themes and concepts that the students were expected to master and will exemplify the appropriateness of the materials distributed by Ms. Thurrott. It is through these materials that a picture will develop of how the curriculum was presented and what types of activities were used to initiate different types of learners to pick up the ideas being taught. Through the following discussions it should become clear the Ms. Thurrott effectively creates materials that would engage the students and enhance their learning experience.

General

Ms. Thurrott used some general materials for all of the classes which she taught at North High. Typically, each class had some form of warm-up activity or activities that would either set the stage for a daily routine, as they did for the Biology II class, or which would review the previous day's lessons. Also, when beginning a new unit, Ms. Thurrott would assess the students' prior knowledge and misconceptions dealing with the new topic by using various activities. For example, a KWL (Know, Want to know, Learned) chart would signify the start of a new unit and the students would be asked to fill out the K and

W columns of the chart so that the students and Ms. Thurrott would be able to identify the starting point. Often this activity would initiate a dialog with the students about what they already knew about the topic. (G1) Additionally, Ms. Thurrott would use another activity called an alphabet round table to test the prior knowledge of the students. An alphabet round table is a grid where each box of the grid contains a letter of the alphabet. Students must attempt to fill in each box with something that has to do with the new unit and which begins with the letter identified in the box. (G2) Ms. Thurrott also created documents to assess the students' characteristics as learners. One such document tried to allow the students to analyze whether or not they were self-directed learners. This particular document was created during a point when the Biology II students had all failed to turn in an important assignment. Since there is only so much a teacher can do in order to allow students time and facilities to complete an assignment, Ms. Thurrott wished to have the students rate themselves and to observe their reactions to their ratings. Interestingly, the Honors Anatomy students rated themselves as less self-directed learners than the Biology II students had rated themselves. Even though it was explicitly stated that the assignment was not going to be collected and that no one was required to share their assessment the Biology II students still did not answer the questions (honestly-based upon their in-class behavior and the regularity with which they would neglect to turn in assignments). (G3) This insight indicated that either the Biology II students were trying to impress the teacher by providing the ranking which they felt was expected or that there may be a correlation between students who do not work hard and an inflated perception of their personal effort versus students who actually do work hard and a feeling that there can always be some room for improvement.

One unique aspect of Ms. Thurrott's approach to course material was her use of the internet as a source of reference and communication. A major tool that was used by members of all of the classes was a www.myspace.com web-page which was set up by Ms. Thurrott as a means of sharing interesting biology themed websites, news articles and to provide students with homework and other classroom reminders. Ms. Thurrott recognized that many of the students at North High use the internet on a regular basis outside of school for social communications. One of the most prevalent social networks on the internet is the website www.myspace.com, where subscribers can develop their own web-page using HTML in order to express themselves and share information or stay in contact with friends and family. Ms. Thurrott, created a web-page on www.myspace.com which could be accessed by any of the students at any time, providing that they had internet access. On the site Ms. Thurrott would post daily homework assignments along with project due dates and the dates of quizzes and tests. This site provided a simple, anonymous way for students to keep up-to-date on assignments and to acquire references for biology topics and even where they could find information on how to write bibliographical information properly. Ms. Thurrott, was able to develop the website in an impersonal way such that students could freely use it as if it were merely an educational tool and a standard part of the course material. The students used the *myspace* website well and it proved to be a very useful tool.

Another document that was common to all of the students, regardless of the course, was the "Flinn Scientific's Student Safety Contract". This document lists safe laboratory

procedures which were expected to be maintained by all of the students. The contract was read aloud in each class, signed by each student and their parent or guardian and kept in their class binder. This document makes the student accountable for their laboratory behaviors and although no labs were performed in either class which required dangerous substances the students were still expected to practice and learn proper lab practices. (G4)

One tool that has been mentioned previously is the students' classroom binders. These binders are required for each student and they must keep the binder organized and include in it all of the documents from the course as well as a copy of their safety contract and their classroom management policy. Periodically the binders are checked and graded by the teacher for content and organization. Students were given a binder check rubric which should have also been kept in their classroom binder. (G5a)(G5b)

Biology II Course Material

Throughout Ms. Thurrott's time teaching the Biology II class, she provided daily MCAS review questions. These review questions were actually pages from previous MCAS tests which consisted of either 3-4 multiple choice questions or 2 short answer questions. In order to help prepare the students for MCAS testing, 10 minutes in the first half of each class was dedicated to answering MCAS review questions and discussing the answers. During the review sessions many of the topics from the Curriculum Frameworks were discussed. During some of the sessions Ms. Thurrott had to (re)explain topics such as Punnett squares (Framework 3.6) and heredity patterns as described by the work of Mendel (Frameworks 3.5) to the students. These reviews gave the students a chance to brush up on topics that they should have covered in Biology I. The goal of these review sessions was to help the students become comfortable answering MCAS style questions. By answering MCAS questions each day the students should have been able to understand the significance of the material that they were covering in class as it pertained to an important test which they are required to pass in order to graduate from high school. Once in awhile a section of MCAS review questions would relate directly to the current topic of discussion. When this happened the MCAS question and its discussion made for a perfect segway into class-work and even into going over homework or starting new assignments.

Ms. Thurrott took over the Biology II class as they entered the ecology unit, Frameworks section 6 and therefore the evolution requirements of the Frameworks section 5 for Biology II were covered by Mr. Howarth. This class posed some difficulty, as far as undertaking more creative, less standard assignments, due to behavioral issues. Ms. Thurrott had noticed that the students, with the exception of a select few, consistently did not complete more than 1 homework assignment throughout the course of a week. Therefore, she decided to attempt a new technique where students would have one "major" homework assignment for the week which would cover the range of materials being covered in class that week. The major assignment would count as multiple

homework assignments and would allow the students a chance to exhibit their understanding of the material in a single assignment perhaps increasing the likelihood that the assignment would be turned in by more of the students. This novel idea for an assignment did not go over well due to behavior problems which will be discussed at greater length.

The beginning of the ecology unit describes the levels of organization of environments and organisms from the single individual to the entire biosphere. Therefore as the new week-long homework assignment, Ms. Thurrott developed an assignment where students would have to describe their “habitat”, a place where they felt most comfortable and they would have to use the lessons from the week to describe specific factors that contributed to their being suited to the environment. The objective of this homework assignment was to have the students demonstrate their understanding of the breakdown of levels of organization in ecology. The students were expected to draw their habitat and provide specific, detailed written responses to questions concerning their habitat. This assignment worked well for the students who handed it in on time. They provided well-thought-out, creative examples and were able to (mostly) accurately utilize the concepts from class to describe whatever location they choose as their “habitat”. However, the assignment was inevitably deemed a failure in that the students overall did not hand this assignment in on time. In fact, more students forgot about the assignment or handed it in late despite the repeated reminders than a typical homework assignment. This attempt at catering to the students’ work style did not work out well and the majority of the following assignments were kept as the standard worksheets which are generated by the textbook company to follow each section.

(B1)

The textbook, “modern Biology” by Holt, Rinehart and Winston, proved to be the best tool for developing and assessing the students’ grasp of the material. As was mentioned in chapter 2, the book was comprised of large units which were subdivided into small manageable sections, about 2-3 pages each. This length, although still too long for some students, proved to be an ideal amount of material for daily discussions, lessons and homework assignments for a majority of the students. Additionally, using the textbook created a stable predictable system for the students and many of them were able to understand that each day they were only required to do x-amount of work and that the work was all localized in one small section of their books. Although, the students and Ms. Thurrott agreed that it would be more engaging and more interesting to stray from the standard book-based lessons and homework, it was determined over time that the students required its basic structure in order to best understand the material. The reasoning for this decision will become clear as more of the coursework is discussed.

Instead of providing creative out-of-class homework assignments, Ms. Thurrott became determined to make the in-class study of ecology more meaningful and engaging for the students. She found a book in Mr. Howarth’s collection on using mini gardens grown in specially cut 2L soda bottles to illustrate principles of ecology; community, organisms, interspecies interactions, water cycle, carbon cycle, etc. (Frameworks 6.4) Ms. Thurrott then translated this idea to the Biology II class by writing a version of the long term

activity which would utilize the scientific method as well as the observation of ecological principles. She intended for the assignment to build the students' ability to think and write scientifically as well as to illustrate the concepts of the class.

For the Bio-Bottle assignment, students were required to keep journal entries on the progress of their randomly selected seeds. They were talked through the process of setting up the bottle and how to keep track of the progress of their plants. Ms. Thurrott drew out mock journal entries and repeatedly stated the information that was necessary to put in the journals. Because the Bio-bottle assignment was all done in-class, it was expected that the students would follow the requested protocols and fill in the necessary observations in the time allowed. It was also hoped that the dramatic changes of the plants through various phases of development would inspire the students to make clear, scientific observations and to draw conclusions about their little bottle environment. Since the growth and development of the plants in the bottles is easily observed, students should have been able to see things such as the water cycle and interspecies interactions making note of these types of observations in their journals.

Once again, however, there was resistance to maintaining a reasonable schedule for work. Students were provided with 10 minutes at the beginning of class three days a week to make detailed observations of their bottles. At the beginning this was extended to 15 minutes, or even 20 minutes as it was determined that students were not completing their work. Ms. Thurrott initially attempted to encourage the students to complete their work and thus more time was allotted for this encouragement and for some of the students to complete their observations. 20 minutes was a much greater span of time than should have been required for observations, especially considering that many of the students still were not completing their observations and were using the time to socialize and pretend to work. The students' behavior did not go unnoticed and it was quickly determined that the original 10 minute time limit was sufficient. Ms. Thurrott changed tactics, after discussing the problem with the class, and she began to strictly enforce the 10 minutes of observation time and reminded students that they were being graded on their observations as part of the Bio-Bottle project. The objective of this activity was not only to build the students understanding of the interactions between organisms and their environment in a real world application, but also to develop the students' scientific inquiry and observational skills. (Frameworks SIS1 and SIS3) Students should have made detailed observations of their seeds, the bio-bottle and their plants as they grew and developed. Initially, students were asked to examine their seeds and make predictions about the plants which would grow from their seeds, relying on prior knowledge of what some seeds from different types of plants look like to make their predictions. This did not happen.

In general the Bio-Bottle project was also a failure as far as student participation. Once again the hard-working students were the only students who seemed to benefit or even take the time to understand the assignment. It was very frustrating to attempt to create engaging assignments when the students themselves never seemed able to make the initial engagement and begin work. Despite the enthusiasm of the students for growing plants and for the growth of their plants, there was little enthusiasm for putting their

observations down in writing. Additionally, even with the aid and direction of both Ms. Thurrott and Mr. Howarth many students did not pick up on either scientific note taking techniques nor did they improve their inquiry skills.

(B2)

When the students began to discuss the interactions between organisms, food chains, food webs, trophic levels, symbiosis and so on, Ms. Thurrott attempted to use the students' prior knowledge of the interactions between organisms to develop the idea of food webs and food chains. (Frameworks 6.3) She provided the student with a list of organisms which students had to cut out and arrange on a paper in such a way that their diagram would show which organisms ate which other organisms. This activity served as an initiation to the idea of energy circulation through an environment and let students use their understanding of relationships to show the movement of energy through a system. Students also began thinking about how the number of various organisms in an environment affects the number of other organisms in the environment. As a final result of the activity the students had, by default, created their own food webs and chains. The students completed this particular assignment and were generally accurate with the organization of their diagrams, however, in the long run it did not seem to help clarify their understanding of the food web and food chain models as they are used in ecology to describe the relationships between organisms. Although the students could usually determine which organisms consumed which and what type of consumer or producer the organism was, they found it very difficult to arrange the organisms in true food chains and webs. This deficit, perhaps highlights a larger problem such as concentration or multitasking which should be looked into in earlier grade levels to determine the root of the deficit.

Ms. Thurrott would often provide the students with reading assignments containing topical references and she would attempt to generate in-class discussions about the readings with the students. One such example was an article on the ecological imprint of humanity. The intent of this article was to make the students think about how humanity has affected the Earth and what consequences our impact may have in the future. Using non-textbook reading assignments exposed the students to different styles of writing and forced them to read material the goal of understanding it. These assignments were intended to illustrate the importance of studying biology by highlighting the numerous connections to news and media from the students' daily lives. Additionally, since many of the students in the Biology II class seemed to require additional reading and writing practice, these assignments also helped to increase their exposure to analysis of written work and to force them to use writing to demonstrate their understanding of the text.

(B3a)

In class, when side conversations and random questions were no longer working, the students would attempt to deviate from the topic of the lesson by asking Ms. Thurrott biology related questions about phenomena or about something they had seen on television. Ms. Thurrott would attempt to briefly respond and return to the lesson at hand, however, the questions often provided an opening for an additional article reading and response assignment. Considering the low reading and writing proficiency of some

of the students, Ms. Thurrott felt that providing bonus assignment articles on topics that interested the students was yet another means of helping them to develop necessary communication skills. Ever averse to completing work, most of the students would not take on these extra credit assignments even though they had shown interest in the topic during class and could have likely earned credit for very little additional work.
(B3b) (B3c)

Due to the poor behavior of the class, Mr. Howarth suggested implementing a communication technique involving a discussion circle and a talking stick. The objective of the activity was to determine how the students were viewing their behavior and to get to the root cause of the behavior. Through this discussion it was determined that the students wanted to have the new creative assignments and also that they recognized their behavior. The students even suggested a few things that might help them to change their behaviors. However, when the creative, new assignments continued to fall short due to student timeliness and completeness, Ms. Thurrott began administering the standard worksheets, which followed along with each section of the text book, in a regimented manner. Each day the students were expected to take notes, read through sections of the book, and answer questions associated with the lesson. Their homework assignments consisted of either additional questions from the book or a worksheet that went along with the section of the book which was discussed in class. Students were provided with a predictable daily regimen until they showed enough adherence to the class structure that Ms. Thurrott felt that they were behaving well enough to attempt different activities.

In order to reintroduce more interesting, interactive activities, Ms. Thurrott created a group assignment for in-class work on population dynamics. The objective of this activity was to reinforce the concept of survivorship curves and the various dynamics of a population. Partners were given a set of cards which indicated either the age or the viability of an organism and they were asked to randomly pull and assess the “population” data that they collected through a number of rounds. This activity served as a very brief introduction to statistical concepts as a means of interpreting ecological information. The students were required to understand that populations form their adult populations through different initial death rates. The students should be able to identify populations that have large baby booms but end in a small adult population, those that retain a fairly consistent death rate over time and those that have low birth rates but a large percentage which survive to adulthood. (Frameworks 6.2) This activity also asked the students to be able to graph the death rate for each survivorship curve. The students were often asked to organize data into graphs and charts when describing ecological data. (Frameworks Biological Science part 3, Mathematical Skills)

(B4)

In addition to the group activity, Ms. Thurrott decided to use other in class activities to promote reviewing of the materials. Occasionally, as a warm-up or in-class activity, Ms. Thurrott would have the students play games which involved recalling information from the course. Jeopardy served as an excellent review tool especially before tests. Ms. Thurrott observed that if there were a candy prize offered, the students participated more actively often rallying to find the correct answers. The same was true for BINGO and

ball toss games. These games served as tools to present the students with the required materials and require the students' recall of those materials in a non-grade-determining setting. Ms. Thurrott felt that this type of review could be especially beneficial for the Biology II students because many of them clearly did not spend time with the class materials outside of class.

(B5a) (B5b)

It was previously mentioned that much of the coursework for the Biology II class was taken from a book of worksheets which followed along with the textbook. These worksheets were extremely clear in their requirements and followed along precisely with sections of the textbook, therefore, as a section was covered the worksheets could be used as either class-work or as homework assignments. When used as homework assignments, it was Ms. Thurrott's belief that they would be a decent review of the topic. Additionally, the worksheets typically contained problems that involved creating or interpreting data sets thereby exposing the students to various ways of presenting material. The use of graphs, tables and charts forced the students to learn how to read those types of informational displays which is an important skill for every person since much of the data we are presented with in our daily lives is formatted in graphs, tables and charts. If a student took the time to go through the worksheet and possibly reference the textbook the worksheets likely would have served their purpose. There is a scanned copy of one such worksheet included in the documents section of this practicum.

(B6)

Honors Anatomy Course Material

The Honors Anatomy courses were the first classes that Ms. Thurrott took over from Mr. Howarth. Since they were honors courses, the students' behavior was not nearly as much of an issue as with the Biology II students and therefore Ms. Thurrott was able to develop an assortment of varied material and activities to do with the students and to give them as homework or in-class assignments. Although some of the concepts for assignments were used for both types of classes the Honors Anatomy classes utilized a larger range of material. Like she did for the Biology II class, Ms. Thurrott used games and daily warm-up activities for the Honors Anatomy classes which functioned as stress-free reviews for the students. The students also were given some standard worksheets, however, the textbook did not offer the same type of predictable worksheets that the biology book did and so many of the homework assignments for the Honors Anatomy class were developed by Ms. Thurrott.

Ms. Thurrott took over the Honors Anatomy courses at the start of the muscle unit, much earlier in the term than she took over the Biology II class. (Framework 4.5) A lot of the course material for this unit involved location and name association activities for the various muscles that the students were required to learn. The homework assignments often involved coloring activities in which the students had to color muscles and their corresponding name in like colors so that they would have an illustrated study guide and so that they would begin to build associations between the names and locations of the

muscles. These coloring assignments were a staple throughout the course for all of the systems because it was extremely important for the students to be able to recognize and identify anatomical structures. Even if the component being studied could not be shown to scale within the body, the illustrations offered a way for visual learners to make color associations with the names and structures being studied. Additionally, the coloring activities proved to Ms. Thurrott, that the students knew how to isolate the structures from other connected or proximal body structures. Feedback from these assignments showed the students where they had misconceptions and provided them with a tool which they could use for studying.

(HA1)

A staple of many science classes is the use of labs to illustrate ideas in a hands-on way. Labs allow students to visualize aspects of science first-hand and labs bring the topic out of the textbooks and into the classroom. While studying the muscle system, the students were assigned a lab in which they had to view the three types of muscle under a microscope and write about the characteristics which they viewed. In this lab, the students also got to make their own slide preparations using chicken skeletal muscle which they could compare to prepared slide of skeletal muscle. Exploring the different type of muscle forced the students to draw conclusions about what differentiates the three types of muscle. Making such decisions and observations for themselves added more meaning to those distinctions than simply reading about them in a text or from the teacher's notes. Provided in the documents section is the portion of the lab which Ms. Thurrott created as an add-on to the prepared lab from a book of student laboratory activities. This add-on was intended to have the students directly participate in the creation of sample in the hopes of highlighting the fact that the prepared samples are not anything special and that the materials they contained could be procured and viewed by the everyday person. This activity really attempted to bring science into the accessible, everyday realm.

(HA2)

Students were expected to make connections not only between their everyday lives and the class but also to their other classes. Science is a very broad topic and areas of science such as biology and chemistry require math and English as well as aspects of the other themes in science. During another lab that the students were asked to do, they learned how themes from physics apply to biological systems. Students investigated how the connections between muscles and bones acted as different types of levers. In this lab, the students were asked to identify the fulcrum, weight and direction of force for each of the three types of levers. Then, using models set up in the classroom, they were asked to determine those same points on the models and determine what type of lever was illustrated by each model. Stations were set up around the room according to the diagrams depicted in the lab document and groups of students took about 5-10 minutes to investigate each station. This hands-on activity once again highlighted the presence and application of science in the daily lives of the students and allowed the students to apply concepts from class to objects that they are more familiar with. Additionally, students who had taken or who will later take physics courses will be able to connect concepts from Honors Anatomy to ideas in physics.

(HA3)

Students in the Honors Anatomy course were occasionally prescribed article reading and response assignments. These assignments tested their reading comprehension and exposed the students to both scientific articles and articles from the general media that applied to the topics from the class. One of the first article assignments that the students undertook explained what happens to a body post mortem, rigor mortis. This article came at the end of the muscle unit after the students had completed a CSI type investigation at the end of the skeletal system unit so it was able to tie into the previous work students had done in class. Additionally, the article was presented with an activity that aimed to get students interested in the article. Ms. Thurrott wrote words from the article on the board and asked students to predict what each word might have to do with an article on rigor mortis. As they read the article for homework the students had to write out what the words actually meant in relationship to the article. By being creative with the word choices, Ms. Thurrott was able to build a sense of curiosity in the students that translated to their reading and understanding key aspects of the article. In the days following the initial reading of the article, Ms. Thurrott offered a bonus reading assignment which also dealt with rigor mortis. This bonus assignment was a full primary scientific article which explored why rigor mortis progresses in a specific direction. This article exposed students to a high level journal paper and showed them a higher level of science dealing with Honors Anatomy. Using primary journal articles exposes students to the ultimate product of the scientific method and as part of the bonus assignment the students were asked to identify the scientific method in the primary article. In addition to the described articles, a few of the other articles that were distributed are provided in the documents section of this practicum.

(HA4a) (HA4b) (HA4c) (HA4d)

Other article reading assignments were given throughout the term because in any discipline both reading and writing are necessary skills and the more a student works on improving those skills the better they will become. In class, a different type of article assignment was used for group poster projects. For example, during the unit on the endocrine system, a different article was passed out to each of five groups on different types of endocrine disorders. Each group had to read through the article which they were assigned and analyze it before arranging the information on a poster which they would then present to the class. This activity exposed the students to an assortment of conditions which are related to the endocrine system and it put responsibility on the students to thoroughly read their assigned article. When students have to present material they need to be able to explain what they're presenting in such a way that the other students can understand the material. Ms. Thurrott would assign these type of tasks because she believes that if you can teach something, you will yourself understand it better. In the documents section are a few of the articles which were distributed to the groups.

(HA5a) (HA5b)

It may be obvious by this point that the textbook was not being heavily utilized by Ms. Thurrott for the Honors Anatomy course. In order for the students to become more

familiar with their book and how to use its features, Ms. Thurrott, developed an activity that would introduce the students to the nervous system and that would help them develop an understanding of how to use their textbooks. Since the text book for this course is designed as a college level book, it was important to explain most of the concepts to the students before assigning them bookwork, however, this assignment was used more to get the students thinking about the nervous system than to engrain the answers to the questions in their memories. The main goal of this activity was to analyze how the students were using their books and to give them suggestions for how to use it more effectively as a resource. Although the assignment itself is fairly plain and straight forward, Ms. Thurrott, circled the room observing how the students worked on the assignment and tried to help the students learn to use the features of the textbook to answer the questions. This assignment adjusted the way that students approached using their textbook.

(HA6)

Unlike the skeletal system and the muscle system, the nervous system posed a challenge because of all of the very distinct structures. The nervous system was introduced by a basic overview of the neuron, the cellular building block and basis of the nervous system. In order to better understand the function of the neuron, Ms. Thurrott had the students engage in a game of Simon Says. This class warm-up had the students playing a game that they all knew well and then discussing their actions during the game and hypothesizing why those things happened and how they were able to happen. Using a kinesthetic activity caused the students to think about the nervous system differently than by taking notes and regurgitating information. The Simon Says game also later served as an example to relate back to throughout the unit. For example, when students played with a large scale model of a neuron they could discuss that the signal traveling along the axon might be to tell the brain what direction was heard, “Simon says sit down” or it could be the translation of that message; muscles moving to cause a student to sit.

Using large models which the students could touch and explore further challenged their critical thinking prowess. In a group assignment, students used a model of a neural circuit to better understand the process; input processing/interpreting, output, which is a staple of the nervous system. Groups of three students held a string at three different points and maneuvered a ring along the string. This activity asked the students to explore how a message gets sent through the nervous system. From this starting-point students could learn about the importance of the form of the neuron for sending signals and apply the form to the processes which were taking place.

(HA7)

In order to make connections between the form and function of the neuron, the students needed to learn all of the components of the neuron and the particular function of each component. Once Ms. Thurrott had explained the neuron in a series of notes and discussions she asked the students to use their notes and their textbook to develop a 3D model of a neuron and to label each part on a poster with a brief description of the function of each part. The objective of this activity was to reinforce the material being covered by having the students make associations between the materials which they

chose to represent each part of the neuron and the name and function of that part. This was a combination of a kinesthetic and a visual activity to stimulate the interest and memorization of the material in a few different ways.

(HA8)

Students were often given an assortment of class-work activities that ranged from crossword puzzles, which require the recall of the names of structures based upon their functions in the form of a crossword to diagrams and custom worksheets. Students might be given blank diagrams of structures and asked to label the parts or they might be given a series of pictures of a structure or system and asked to identify (by coloring) the segment of the structure or system utilized in each of a set of written situations. These activities served to re-present the structures and their functions in various ways such that the students would form more connections to the material and be able to approach learning the material from multiple angles. Additional Material such as these activities will be presented without specific references to provide a general glimpse at the wide range of materials which were used in this course.

(HA9 additional assorted documents)

As a final document to represent the materials used to teach the Honors Anatomy course, a series of notes will be included as the 10th document set in the course materials section. The notes developed for this class were presented in a number of different ways. Initially, the notes were given to the students in a clear concise webbed format. Over time, the students became bored with this method of note taking and it was found that more of the students would interrupt the note taking with side conversations so Ms. Thurrott decided to try a new style of note taking. Prior to class, Ms. Thurrott would create a table with all of the structures listed and sometimes images of the system being studied next to each box containing a structure. She would fill in notes on the location, description and function for each structure, information which she felt was necessary for each student to have, however, she would pass out blank charts to the students. During class, the students were each asked to find information on the structures and then to fill in that information for one or two of the structures in a master list on the blackboard. Once the master list was filled-in, Ms. Thurrott would go through each structure discussing what had been filled in and determining if other students had more or different information, this eventually led to the chart being completed with all of the information which Ms. Thurrott had deemed necessary. Using this note taking method caused the students to be more involved in determining what information they had to learn. Instead of just regurgitating information for the students to write down, having the students create their own notes forced them to go through the material twice in once session and to write their notes in a way that they understood. When a person thinks about how to fit a lot of information into note form they learn to isolate the most important pieces of the material and they learn to word it in a way that will remind them of the greater details which they originally analyzed.

(HA10 Notes)

Chapter 4: The Students; Behavior, Background and Comparisons

This section of the practicum focuses on the makeup of the learners in the classroom. Here, the class dynamics will be clarified and the specific strengths and weaknesses for each group of students will be dissected and assessed. The point of this section is not to name names and concentrate on specific problem individuals but to provide evidence that the lessons were suited to the learners present and also that all efforts were made to provide a stable, stimulating learning environment for all students. Additionally, Ms. Thurrott would like to highlight the various strategies that were used to promote learning in the classroom.

Considering the mobility of the students in the Worcester public school system, it is typical for students to have attended multiple schools within the system. This creates additional teaching challenges because the courses are not standardized between the schools and therefore the students who have attended different schools sometimes have a difficult time translating their previous courses to those offered at their new school. This section of the practicum aims to highlight this among other challenges faced as a (student) teacher in the Worcester school system. Although, for the particular classes which Ms. Thurrott taught, it was not particularly difficult for a student to jump in and follow along with any individual unit of material, so long as the student was able to maintain the pace of the particular class. As a teacher, it is extremely important to know your students and be able to cater the classroom to the students and their specific needs.

General

Although it was important to treat each student as a unique learner it should be mentioned that Ms. Thurrott held some standard practices across all three of the classes which she taught at North High. These general practices did not take the individual student's background into deep consideration.

Firstly, many of the classroom policies were previously established by Mr. Howarth and therefore were upheld by Ms. Thurrott in order to maintain continuity through the transition between her teaching environment and Mr. Howarth's teaching environment. It is extremely important to have set guidelines for the students so that they know what is expected of them. Mr. Howarth developed a classroom management plan which he distributed to the students. This document dictated the expected behaviors of the students and his personal policies on attendance, tardiness, make-ups, extra help and grading. The classroom management plan states that all students are expected to follow certain procedures such as being on time to class, bringing all necessary materials to class, showing respect to the classroom and to all of the other students and the teacher and that cheating is not permitted. The classroom management plan was expected to remain in each student's class binder and was referred back to a few times when the protocols were not being followed properly.

Additionally, Ms. Thurrott had a very open after-school help policy and was frequently available to students for several hours after school let out to accommodate students who participated in sports and other after-school activities. Interestingly, many teachers at North High would leave immediately after most of the students had gone and it did not seem as though it were common practice to stay after just in case a student stopped by for extra help or study tips. Many teachers only stayed after to provide extra help if the students made specific appointments, however, Ms. Thurrott found that students would occasionally stop in before sports practices or other club meetings with a quick question or two and had she not been there they may not have been able to get those questions answered. Several students from each of Ms. Thurrott's classes also took advantage of extra help by scheduling times to meet.

Further, if a student were absent from class one day, it became their responsibility to ask for their missed work as is stated in the classroom management plan, however, when asked, Ms. Thurrott would try to provide not only the missed work but also a summary of the missed day or days' events in order to help the student catch up. Thankfully, biology and biological science classes don't always rely as heavily on the previous day's material as, for example, a math class would. The material made it somewhat easier for students to catch up on missed work in Ms. Thurrott's classes, especially since any material that was missed was typically reviewed in the following few days at the beginning of class. Review of the previous day's material was one method that Ms. Thurrott used not only to help students review and check their understanding but also to help previously absent students begin to grasp the material they missed.

Another aspect crucial to this section is to mention that in each of the classes, at least 1 enrolled student never showed up or was only present a few times. This may have been due to an enrollment conflict, a result of the student's action or perhaps a misrepresentation of the student's schedule. Therefore, for the first few days of class the teacher would assume that the student was simply absent, hold missed work for them and if they did not show within a few days the teacher would make a point of notifying the office and inquiring as to the whereabouts of the student. Additionally, some a significant number of students dropped out of the Honors Anatomy class after a few weeks because they were seniors who decided that they did not want to be taking a demanding course that could affect their GPA in the last half of the year.

Biology II Students

The Biology II class was initially made up of 21 students. The class contained hard working students, students who were clearly intelligent but did not complete assignments, students who were striving to obtain attention from their peers and students who had little concept of schoolwork other than that they are required to sit in a classroom for a certain number of hours each day. This class in particular had a hugely dynamic range of individuals making it extremely difficult to create an environment in which students of all abilities could have fun and learn. Part of the challenge of this class was that the leveling system at North High (or any other school), doesn't take into account the behavioral reasoning for the expressed abilities of a given student. As was previously mentioned, some of the students in this level one class were hard working while others simply sat in the room. Getting those students, who preferred to simply sit, to keep up with the hard workers was an ongoing struggle and one which was often lost. Additionally, at North High, the students have a strange sense of class attendance. Behavioral issues and sporadic attendance made for challenging obstacles when trying to maintain a stable, structured classroom environment.

Student JF is an example of a hard working female student. She was very quiet and didn't often speak up in class unless called upon but she generally had the correct answers and was consistently present for class. JF is a very artistic person who excelled at projects involving artistic creativity or prowess. Another hardworking student was GM, a male student who joined the class late in the term, managed to catch up on all of his missing work and who then became the student with the highest average in the class. He is also a very artistic person, however, his intelligence seemed to stem from literal interpretation of texts rather than an intuitive ability to interpret material like student JF. Additionally, GM had note worthy problems at home. The reason that he entered the class late was because he transferred from Framingham, MA when he was entered into the Massachusetts foster-care program.

GM had experienced a great deal of neglect and mistreatment in his home and was eventually kicked out for undisclosed reasons. His in-class behavior indicated that he was seeking positive attention and his constant, vocal drive to obtain straight A's was a sign of his need for reassurance. This student also had a history of drugs and self

self-mutilation which were openly expressed by the student to both Ms. Thurrott and Mr. Howarth. GM began his time at North High well with an optimistic new outlook, however, over time it became clear that he had not yet overcome his problems. He was eventually hospitalized for self-mutilation and began a series of “uncharacteristic” behavior including bad-mouthing his elders; instructors, foster parents and social workers, he would skip classes, not turn in assignments, and had fallen back to the using of illegal substances and self-mutilation. GM had bonded with similar students from the foster program and had problems receiving medication from his doctor which led to a downward spiral ending in his removal from the school, removal from his foster home and hospitalization.

SM, another hardworking student, did not have the level of material comprehension as GM and JF, however, his constant high level work allowed him to achieve a substantial understanding of the material. SM consistently participated in class and went above and beyond on all of his assignments. All of the examples of hard working students in the Biology II class, by the end of the semester, were found to have become bored with the in-class assignments as the speed of the less determined students pulled the pace of the class further down. As a result there was some slippage in the quality of work handed in by these students and a greater effort was made by both Ms. Thurrott and Mr. Howarth to redirect the class back to the original pace.

A different portion of the spectrum of students consisted of those who typically turned in assignments on time and provided thoughtful responses to answers in class. LF, although somewhat resistant to classroom rules would finish assignments despite constant chatting. She would easily take offense to behavioral corrections and would retort and not accept responsibility for tardiness or late assignments. However, LF would take care to complete all of the assignments in her own time and would tend to know what was happening in a lecture even if it appeared that her direct focus was not on the lesson. Additionally, when the pace of the course slowed, harder working students were obviously bored, and the teachers were trying to push the class forward LN took a different stance and was timelier with her assignments. It was as if she recognized her role in the classroom and was using her status to help the teachers redirect the class. Similarly, EM would talk throughout the class, however, his assignments were typically handed in eventually and contained mostly accurate responses. During group work EM would make certain that the work was completed and would often help other groups to also complete assignments when his group was finished. EM also converted to a more timely strategy when it was obvious that certain other members of the class were slowing progress dramatically. It was quite amazing to witness the transformation of these students as they converted to harder more conscientious workers.

Another group of students in the Biology II class consisted of students who were clearly intelligent and provided well thought out responses to verbal questions in class but who did not often complete assignments or who did not complete them in a timely matter. Although this category sounds quite similar to the previous, there was a much greater sense that they felt there was little necessity to complete written work when they knew the answers. They did not seem to feel that it was necessary to show in written form that

they understood the material. Student PM would always finish class work early and was a diligent worker during the class but he would rarely write out homework assignments often reciting memorized responses during class to prove that he had looked at the book and the questions. PM rarely brought in completed written assignments and although it was obvious that he had “done” the assignment and understood the materials his grade for the class was not necessarily reflective of his understanding of the material because he was missing so many assignments that needed to be physically turned in. PM would help to quiet disruptive students during class through his own attentiveness or a glance in the offender’s direction. However, if his sister would come to the door of the classroom all bets were off and PM might be inclined to leave the room and talk to / help his sister. Part of the problem with PM was that he was an obviously intelligent student and was typically very good natured so he often received reprieves from punishments for poor behavior from other teachers. When finished with assignments in class, for example, it was typical that he would be allowed to go to the gym where the gym instructor welcomed him into any gym class that was occurring. PM had found that if he was a model student in class, he could get away with behaviors that the other students would do and be punished for because they had not yet completed their work.

RM, another clearly intelligent student with an incredible grasp of historical facts would often not complete written assignments. He would complain that no one could read his handwriting anyway, which was in fact a fairly neat cursive writing. His responses in class to verbal questions were typically clear and well thought-out, however, his writing lacked the detail and care that were put into his spoken responses. RM was constantly rapping, both lyrics of his own creation and those from his favorite performers that he found inspiring. This behavior, though helpful to RM was distracting to both the teachers and to other students. Due to his lack of physically documented work, RM’s grade in the class suffered despite decent test scores. Because RM and some of the other students exhibited great interest in music, some effort was made to incorporate music into the lessons. During the evolution unit, Mr. Howarth, played a song about evolution and provided the lyrics to the class. Having observed a few other teachers providing similar assignments, Ms. Thurrott also offered extra credit for students who wrote songs that tied into the topic of the class. This tactic was originally well received by the students however, none of them followed through and produced a song or lyrics.

YM, another smart student with a love of music, had an additional vice which inhibited his in-class focus. YM would spend much of the class flirting with a few of the girls from the class; BF, CF, and KF in particular were targets of his approaches. The behavior of YM caused him to rarely complete work in class, although all completed work was of high quality, even with repeated reminders to stay on task and even when he was moved across the room. It was extremely difficult for YM to concentrate on school work when he had anything else on his mind. Although YM is a talented singer and a highly religious individual, no amount of various corrections seemed to help redirect his focus and the only time throughout the year that he seemed truly focused on his work was in the first few weeks of class before he established a rapport with the girls.

One of the girls who held the interests of YM, KF, had been moved through the different Worcester public school. KF did fairly well on assignments but would blaze through work not putting much thought into her efforts. She persistently turned in each homework assignment, even if it was quite late, but she did not strive for the same completeness in her class-work. KF would often be talking or trying to use her cell phone in class and when she was corrected she would continue speaking, but now in Spanish instead of English as though she had stopped the incorrect behavior. KF would often entangle MF, CF and BF in her conversations. This was highly detrimental to CF who was a hard worker but with serious concentration and comprehension problems. As soon as she became sidetracked it was extremely difficult for CF to right herself even though she had a strong desire to do well in class. CF often needed repeated explanations to comprehend a topic and would often fall short on quizzes and tests when trying to recall material unless she was able to talk out each problem with the teacher by explaining her take on each question.

In this class, a large number of the students had a problem similar to CF. It seemed as though reading and comprehending questions in any assignment was extremely difficult for them. Often students could talk through their answers to questions but required the question to be read to them in order for comprehension of what the question was asking. Although, through read-aloud activities, it was apparent that the students were able to read, some more fluently than others, many seemed to struggle with comprehension. Students BF, MF, HM, and TM frequently needed the questions read aloud and broken into parts so that they could answer each part individually. However, when helped to understand the question being asked, these students seemed to have a good grasp of the material and were often able to arrive at the correct response.

The student JM, on the other hand, had decent reading and comprehension understanding, however, he was diagnosed ADHD and had difficulty concentrating on anything other than being the class clown. He typically required the same reading allowed of each question by the teacher in order to be able to focus on a problem long enough to determine the answer. JM is a friendly, happy student with incredible outbursts. He would often speak too loudly and use profanity seemingly in an attempt to attract the attention of the other students. He was frequently removed from class for his uncontrollable disruptions and the inability to control himself in a group setting. During one test, Ms. Thurrott sent JM into another room and that test was one of the few tests which he actually completed since he had no friends to interact with. Additionally, it was reported that JM was not on medication for his ADHD and all attempts to contact his parents by Ms. Thurrott were unanswered so she could not provide them with missing work or discuss methods to help improve JM's behavior that did not require him to be sent off to a room by himself.

The final selection of students included those who seemed to lack either the drive to do work or the ability to begin working in the first place. One particular example of this behavior was student AM. AM had moved to Worcester from Africa, however, his spoken English skills were quite good and he clearly had been raised with a solid grasp of American pop culture. On the other hand, AM had a great deal of difficulty writing in

complete sentences and even more difficulty reading. Other teachers at the school all noticed similar problems with AM and his shortcomings concerning schoolwork were not helped by his other behavioral issues. AM would consistently challenge authoritative figures by carrying on side conversations and making gestures and comments behind the teacher's back. His actions were amplified if the teacher or authority figure was a female and it became clear that AM had little respect for women often talking about female classmates as objects. In class, AM would rarely begin work and only when he was enlightened to the fact that he was 19 years old and still a sophomore in high school, which meant he would not be allowed to repeat the year again, did he attempt to turn in any work at all. His work was rarely well thought out and was often a product of cheating from other students papers. He was even escorted out of the room on several occasions during tests for obvious cheating.

AM's behavior not only had a detrimental affect on his grade but his socializing and disturbances also caused other students to be frequently off task. DM, for example, a student with difficulty concentrating on and beginning work was often side tracked by conversations with AM. In class DM produced little work and would occasionally skip class to socialize in the cafeteria. However, in a one-on-one situation, DM could recall more information than one might expect and although his passion for producing quality work remained quite low his grasp of the material was heightened through one-on-one tutoring. Interestingly, unlike most of the other students, DM was willing to come after class for extra help and he was able to turn in one of the major projects because of his persistent after-school presence. KM, a member of the same social circle within the class, also produced little work. He, like AM, was originally from Africa, however, his grasp of reading and writing was quite good and it was only his own will which kept him from turning in assignments and staying on task in class. The work which KM did hand in was well thought out and showed a clear grasp of the concepts, however, his preference for socializing and poor classroom behavior hurt his grade and overall understanding of the material.

Although this section does not contain a description of every single student in the class, it provides a reasonable sample of the various personalities present in the Biology II class. From these descriptions it should have become obvious that many of the students in this class required one-on-one attention in order to show progress or even to be able to begin a task. For many of the students in this class it was detrimental to their learning to be in a classroom with other students, however, it would be impossible to have one teacher for each student who needs this type of learning environment. Ms. Thurrott tried to compensate for this by requesting the presence of certain students after school for extra help but the student would rarely make time to show up for extra help sessions. Those students who did show up for extra help, such as DM, found that for the next few assignments or projects related to the themes discussed in the extra help sessions were receiving better marks than their other work had received.

Ms. Thurrott also tried to use other techniques to improve the students' behavior. She and Mr. Howarth would move the arrangement of the desk or change the seating of the members of the class in an attempt to disrupt their social networks so that individuals

could concentrate on their class-work. Also, during tests and quizzes, Ms. Thurrott would ask each student if they needed help on any particular question. She would walk around the room seeing if students were stuck on problems and just generally making herself easily accessible for questions during the assessment. Students who needed to have questions answered often wouldn't bother asking, but if Ms. Thurrott noticed a problem she would help and eventually more students learned to use her as a tool to redirect their train of thought.

Period 1, 2 Honors Anatomy

*The use of initials to indicate the various students is reset between the classes. No student was in two of Ms. Thurrott's classes, however, different students may have the same initial markings from class to class.

The 1, 2 honors anatomy course had a different dynamic from either of the other classes because it was the students' first class of the day. Although the majority of the students were always on time a few select students were routinely tardy to the start of class and one in particular, AM, would only come to class occasionally, often sleeping in class and needing constant reminders to stay on task. Generally, however, this class did not have many challenges. It provided an ideal environment for trying various approaches to material and the students generally provided well thought-out responses to assignments. Even though initially, this class seemed to be slower to complete tasks and the individuals were consistently more forgetful concerning homework than the 6, 7 class, over time, the students proved to have greater focus and achieved higher average grades than the 6, 7 class.

One particular challenge presented in the 1, 2 class was a student, MF, who is from Africa and not a native English speaker. She had some difficulty with the high level of language and communication skills required by the course and often had difficulty describing on paper, the topics discussed in class. Often, Ms. Thurrott would offer extra help to MF and would go through homework assignments and quizzes/tests with MF to check her understanding of the material, occasionally adjusting a grade if MF demonstrated an understanding of the material in a way that was not clear in her written responses. MF would be asked to use diagrams to describe the material and often did much better with this type of activity than a text only short answer response. Also, although she was not very social in class and did not have friends among the other students, it was obvious that she would become more engaged in hands-on activities than written response activities.

Other students also shared an increased engagement in hands-on activities and for this reason Ms. Thurrott assigned more of those types of assignments. Through group work it became obvious that certain students would group together, one such group included students LF, AF, RF and SF, all four girls of Spanish speaking decent. Two of the girls, SF and AF were particularly hard workers who consistently turned in high quality work, however, all four girls were quite social talkers and this occasionally caused group assignments to be completed with lower quality results than was typical for those girls. LF did not work as hard at achieving good grades as SF and AF, but she tended to produce better work and was more able to recall information that was learned in a group setting. LF sat in the back of the classroom and occasionally would send text messages

on her cell phone, however, by the end of the term LF had moved to one side of the classroom as she became more friendly with a few of the other students, AnM, RF, and AlM and she was obtaining better grades. Within the class students were able to form learning collaborations which clearly aided in their absorption of topics.

Another girl, RF, from the first group was very interesting from a teaching perspective. She is a bright student who works hard most of the time and is typically happy and smiling, however, during this particular semester she was hit with a cascade of problems. First was the issue of money. In Worcester and particularly at North High, many of the students are from low income families and RF was no exception. Like many of the other upperclassmen at North, RF held a few different jobs and while this would have been enough to sustain most of the students, RF found herself still struggling. Part way through the term RF was absent for an extended number of days from school. Upon her return she was extremely sullen, occasionally crying and refrained from smiling, talking and interacting with the other students. She also all stopped producing any work both in and out of the classroom. When questioned about her absences and behavior, RF, replied that her boyfriend had been involved in a shooting that took place in Worcester, she had been some type of witness and was in and out of court both for that reason and to support her boyfriend. She added that she was struggling to work enough to help pay for her boyfriend's court fees and that she had just found out that she was pregnant and was going to have an abortion because she did not feel that she could support and care for a child. RF was 16 years old at the time. To support the student through this trying time, Ms. Thurrott offered extensions on assignments and make-up dates for quizzes and tests. As time passed RF was able to catch up on most of her work and her efforts toward the end of the term enabled her to end the course with a passing grade. Sometimes the students need the support and understanding of their teachers in order to keep from giving up during difficult times. It is important not to establish unyielding barriers when dealing with students who are at the brink of giving up. As an educator it is important to allow the students to achieve at their own pace (as much as possible) and to encourage those who are behind, to catch up.

Another student who encountered problems outside of school which affected his work in the classroom was AnM. AnM, like RF was a typically smiley, happy-go-lucky student who put forth a strong effort in all of his work. When he did poorly on an assignment, AnM would come in after school and consult with the teacher about the problem and offer to redo the assignment. In the end he was usually able to identify and correct any misconceptions such that the majority of his work was of excellent quality. Towards the end of the year however, AnM was a more frequent entity after school but not for reasons dealing with class-work. Eventually, AnM confided that his father, who had been jailed for attempted murder of his mother, was out of prison and had moved back home. The reconciliation had not lasted long as was obvious by AnM's lack of sleep from their fighting and from his overstressed aggressive behaviors. A frequent jokester with his friend AlM, AnM actually came close to being in a fist fight in class with his friend after he mistook a comment from AlM and began a retort. Ms. Thurrott had to step between the two and call down to the office to get a vice principal involved in the situation. AnM had been staying after school to delay his eventual trip back home and while at home he

was unable to complete work and unable to sleep well making his last few weeks of school very difficult. The teachers and staff at North High had to work with AnM in order to help rebound his grades and to help alleviate some of the stress of his home-life by offering support at school.

On the opposite side of the classroom sat DM, DnM and WM, the technology trio. All three of these young men were much more vocally social than most of the other male students in any of the classes. These three were also very interested in electronics and media. WM and DM would sometimes bring their laptops into school to attempt to access the internet or to work on group assignments together. All three boys were generally smart and tended to do well on all of their assignments, especially when they were allowed to use technology to enhance their understanding of the material. Although all of the students enjoy going to the library or computer lab in order to use the computers to do research, these gentlemen had a real passion for using technology and learning things through the internet. Their classroom etiquette, however, was somewhat lacking for standard tasks. Often they would break attention during lectures and note taking. If the information flow was not fast paced and flashy, they were not terribly interested in learning the material. These students required highly interactive and creative projects and the more technology could be used in the completion of said projects the better they would study and grasp the material. That being said, sometimes material must be presented in a standard, straight forward manner, but it was recognized that when possible students enjoy learning when it involved technology. Previously, it was mentioned that Ms. Thurrott started a www.myspace.com web-page in order for the students to continue learning outside the classroom. This website proved to be a great tool for students like WM, Dm and DnM. Additionally, all of the major projects assigned in classes included class-time spent in either the library or the computer lab which allowed the students to research using the internet.

Period 6, 7 Honors Anatomy

The 6, 7 anatomy class was a completely different class, in terms of personality, than the 1, 2 class. While the 1, 2 class was comprised of tired, but willing and hardworking students, the 6, 7 class contained a larger percentage of students who had already taken the (similar) pathophysiology course. Also, since the 6, 7 time slot is the last period of the day for these students they would often try to speed through lessons or end them early in order to end their school time. Ms. Thurrott understood that the last class of the day often feels like it is the longest class and would occasionally give these students 5 minutes of free time at the end of class if she felt that they had sufficiently completed the day's tasks. However, other times the class would state flat out that they did not wish to work anymore and their collective attitude could become somewhat frustrating. They were all very smart students, fully capable of finishing their work and doing well on it, however, because they all recognized this fact there seemed to be a collective feeling that they should be able to have free time or that they should be trusted to complete class-work as homework when they felt it was time for the class to be over. There were a few

times when it was truly a struggle to rein the students into a lesson for the full 99 minute class.

A few particular students stuck out as having the most outspoken personalities. JuM, a class comedian, who is ‘all bark and no bite’ so to speak, would frequently verbally refute tasks and requests from the teacher but end up completing the task without much delay. JuM rarely turned in homework assignments at the beginning of the semester and only began to take his school-work seriously at the middle to end of the term. Once he did, his grades improved drastically without little extra effort on his part. His initial lack of completed homework assignments was explained by the fact that JuM had chosen to live on his own and was shouldering a few jobs to help pay for his rent. Eventually, when he realized that graduating high school could help advance him in life he moved back in with his mother, was able to drop one of the jobs that he was working and then spent more time on school-work.

A friend of JuM, JM was another class clown, always making loud comments to get a laugh from the other students. JM was dating a girl, CF, from the same class for a time and they both maintained a high work ethic. Interestingly, the both were able to complete assignments more quickly than the other students and it was obvious before tests and quizzes that they had helped each other to learn the material for the test. After their breakup a few other members of the class seemed to join their study group. EF and JuM would join JM and CF for group work and their collective efforts were always of excellent quality. Although both JM and JuM would disrupt the class with their antics, they did not seem to be a hindrance to the class. Their comments and jokes would be in the form of quick bursts and were usually just as quickly gotten over by the class.

MM on the other hand, would continue what he considered to be jokes for far beyond their time of amusement. Additionally, MM has ADHD which rendered him inconsolable during certain situations. When in conflict with a teacher or another student for example, MM would continue the bout for the entire class or until the disturbance was so great that he needed to be sent out of the room. He would make ridiculous comments about the topic, teacher or another student, comments which might come across more as insults than as banter unless you knew MM, and then he would become angry if the target of his “humor” returned a comment in jest. MM’s comments and outbursts frequently ground the class to a halt until he was able to calm down. At times, his behavior would stir the other students to request his silence. MF would, for example, would tell MM that he was being ridiculous and to get back to his work so that the other students could do likewise. Other students would try to help keep MM in check because they understood that at times he could not control himself. JM and EF would have MM work with them during group work so that he would be able to turn in an assignment even if he was off task through much of the actual work. JM even helped MM with a project because MM had gotten into a disagreement about his contributions to the partner project (and opted to work on his own). In order to teach MM, it had to be understood that he required time and for the other students to ignore his comments. Once a student would laugh at his behavior MM was nearly unstoppable and would continue to deviate from his work through most of the remainder of the class. In an effort to curb this behavior, Ms.

Thurrott tried to incorporate multiple activities into each class period. This practice not only made the class more interesting for the other students but allowed for the environment within the classroom to be changed enough that MM could resettle.

Ms. Thurrott would also move the positions of the desks into different arrangements to keep the students from forming “comfortable” spots. It was observed early on that if the seating arrangement was inconsistent, the students would take time to re-acclimate to each new arrangement and during that time they would be less talkative and would focus more on their work. Although the same students would typically sit near each other it would often have a profound affect on the amount of non-topical conversation if the desk arrangement was altered. Students BF and SF would chat constantly in class and always sat next to each other, however, when the seats were changed they would converse a good deal less and they would more often be talking about the assignment at hand rather than socializing. Although BF and SF are both good students and their grades were good irrespective of their in class behavior it was interesting to observe their distinct behavioral change.

WF, another student who regularly turned in very high level work had attitude problems that would conflict with her perception of the class, the students and the teachers. When WF had set her mind to something there was no changing it, she is extremely opinionated and regardless of the outcome and regardless of a more rational counterpoint she would stick to her guns. Concerning assignments in class, if WF did not understand a portion of the assignment she would need the piece to be explained to her very explicitly or else she would argue that the part was wrong or “stupid” and that she wasn’t going to do it. With a student like WF it was best to approach the situation knowing that you cannot win an argument with her. When dealing with WF it was best to take things slowly and break things down into the tiniest of manageable pieces because, although she is very intelligent, she could close down at the slightest road block. Working with WF taught Ms. Thurrott that, even though a teacher is supposed to be an authority figure, there are times when it is better to concede the battle before it has even taken place and approach offering help passively as more of a suggestion or reminder than a probe.

One student in the 6, 7 class, RM left school for a few weeks to attend a mission with his church in Chile. Prior to his absence RM requested all of the materials that he would be missing and it was determined that he would make up missed quizzes and tests a specific amount of time after his return to school. It has been mentioned several times throughout this paper that students in each of the classes had extended period of absence from class, here is the one exception where the absence was known ahead of time and taken care of responsibly, with all work returned in a timely manner. Luckily for the other students who took extended time out of class, many of the topics that are covered in Honors Anatomy and biology II are not reliant on the previous day’s lesson for comprehension. Therefore, when a student was absent it was relatively easy to stay up-to-date with current topics while also catching up on missed work during their own time. In the case of RM, however, some of the material was changed or added to and there was additional work for him upon his return to class. All work done in class was saved in file folders in the classroom for this type of situation. Whenever a student needed a worksheet or

assignment it could be found in the file folder and the file folder also served as a good reminder to Ms. Thurrott about what assignments took place when since the file folder was maintained in chronological order. Provided that a student asked for missed work it was almost always guaranteed that they could acquire the work from the file folder.

Although there were many more students in each of the classes than were discussed in this document, Ms. Thurrott could explain appropriate learning conditions for each of those students as well. This section, however, should have provided a substantial picture of the students in each of the classes. Each class contained a huge range of personalities and characters which each brought unique dynamics to their respective class. Through this section of the practicum, the steps taken by Ms. Thurrott to improve the learning environment for each student should be apparent. Also, it should be obvious that the material used to teach the courses was appropriate for the students and enhanced their experiences in the class.

Chapter 5: Assessments

A major portion of teaching is providing and utilizing assessments. The use of assessment not only allows both teachers and students to judge their performance but also helps assure both that the students are prepared for standardized tests and have met the requirements of the curriculum. Ms. Thurrott used several methods of assessment with a focus on the assignments with numerical values such as quizzes tests and homework assignments, however, other forms of assessment allowed for a clearer picture of student comprehension to be drawn. Not every student learns material in the same way and similarly they will not be able to describe what they know in a uniform way, so a basic understanding of each student's strengths and weaknesses is prerequisite to achieving an unbiased assessment protocol. In the previous chapter, Ms. Thurrott demonstrated this necessary understanding of the individuals in her classes and although all of the students were subjected to the same type of assessment the assessments of their progress and grasp of the material varied from student to student. Some of the techniques used to assess the class and the individual students were already mentioned in previous sections of this practicum, in this chapter, the various forms of assessment which Ms. Thurrott used will be explained and discussed in greater detail.

For each form of written assessment, be it projects, quizzes, tests or homework, Ms. Thurrott tried to make the point values and objectives clearly defined. For the students, one of the most important aspects of grading and assessment is, knowing what they are being graded on and what information is most valuable to them as learners. On each

assignment (particularly quizzes and tests) the point value for each question or section was clearly labeled so that students struggling with time constraints would know where to concentrate their efforts and so that all of the students would know, for example, that Ms. Thurrott put more stock in written responses than true/false responses on quizzes and tests. Additionally, for projects where there could be significant format variations, rubrics were distributed with assessment breakdowns so that the categories being graded were clear and that the grading within the category was clearly defined. Essentially, providing a rubric allows students to choose their grade. If a student knows that they want to get a 4 out of 4 possible points in one category they know that they will need to give lots of accurate details whereas if a student doesn't care and does not take time to put in effort to meet the criteria they can be assured from the rubric that they did not meet the requirements for that particular category or assignment. Further, if a project was assigned which required a specific format, that format was shown to the students by either using examples of past work or by using a mock up of what was required. Providing students with a clearly defined assessment system not only puts responsibility on them to meet those requirements but it also provides the teacher with an unbiased foundation from which they can distribute and discuss grades.

Homework

The most frequent form of assessment that Ms. Thurrott used in her student teaching experience at North High was homework. Ms. Thurrott attempted to have daily homework assignments for the students that were each a review of the material discussed in class that day. Even if the assignment was very brief, Ms. Thurrott felt that it was important for the students to have some type of review of the material outside of class-time, therefore, homework assignments were assigned as frequently as possible, although they were not always a collected assignment- official assessment. Students were often asked to do an activity with their class notes such as create vocabulary flashcards or to write a story about a process that was discussed in their notes. In one assignment, Ms. Thurrott asked that the students in the Anatomy classes pretend that they are a hamburger and describe the process and pathway traveled as they were eaten and digested. Ms. Thurrott would also distribute coloring assignments where students were expected to make connections between structures in the diagram and the words which they would color in that same shade as the structure.

In the biology class, homework assignments were found to be an inaccurate means of assessment since so few of the students would turn in the homework assignments in a timely manner. For the biology class, the homework assignments were typically simple responses to perhaps 2-4 questions in their book that followed a short 2-3 page reading section. Although the material necessary to answer the questions was typically, blatantly obvious in the text and had been presented and discussed at length in class, the students would not take the time to write out their responses and thus refused a large amount of material review which would have greatly helped them on tests and quizzes. It became very obvious in the grade-book that students who frequently skipped homework assignments often did more poorly on quizzes and tests than students who completed their homework assignments. Further, by not taking the time to complete their

assignments the students further hurt their final grades by taking incomplete or late scores. Many of the formats used for homework assignments are illustrated throughout the Course Materials section, chapter 3, of this practicum.

Day-to-day Assessments

Following a homework assignment, at the start of the next class, Ms. Thurrott would give the students a warm up activity that usually drew upon the previous night's homework assignment and therefore also upon the previous day's class. Ms. Thurrott believes that it is exceedingly important for students to go over material multiple times from various approaches because it allows the students to connect more deeply to the material, these warm ups served both as a review session and often as an assessment of the students' understanding of the material. The warm up activities consisted of various activities from drawings, to word games, worksheets and group-work.

Ms. Thurrott also had the students reflect on their performance through in-class discussions and questionnaires. This type of assessment occurred more frequently in the Biology II class because those students required more self reflection upon their behavior and choices. On one occasion the students were asked to reiterate the class expectations from the classroom management plan. Ms. Thurrott determined from this activity that the students knew most of the expected behaviors and their responses lead to a discussion as to why those expected behaviors were not being acted out. The students also were asked to take a questionnaire entitled "Are you a self directed learner?" which Ms. Thurrott had developed to shed light on the students' work ethics.

Through the use of course materials Ms. Thurrott was able to assess the behaviors and understanding of the students in her classes. By interpreting the responses to different activities Ms. Thurrott was able to determine which areas of study the students needed to work on and what areas were more hindered by behaviors impediments than a lack of comprehension. Occasionally, while walking around the room during an activity, Ms. Thurrott would notice that the students were socializing more than working, other times she would notice that the students were getting stuck on a problem of theme. For either situation assessment of the students' working behaviors would lead to an adjustment of the classroom environment to remedy the condition. If students were socializing Ms. Thurrott would either redirect them to their work or take their socialization as a signal to move on to a new task. If the students were collectively stuck on a problem or task Ms. Thurrott would bring the class together to re-present the material in a new way or to go over the directions for the task or problem in order to clarify it for the students.

Quizzes

For each unit, Ms. Thurrott would typically have a quiz every 1 to 2 weeks and a test each month. The quizzes were used to assess the students' progress and understanding of the material throughout the unit. Quizzes were particularly important while teaching at

North High because, even in the high level classes, students would frequently not turn in homework assignments making daily progress and comprehension difficult to determine. Quizzes provided Ms. Thurrott with guaranteed work from the students, from which she was able to gauge what material was and was not well understood by the students. For example, in the Anatomy classes, during the nervous system unit, quizzes made it clear that the students had not completely memorized the parts (and functions of each part) of the neuron. Therefore Ms. Thurrott was able to re-present the material in new way in an effort to help solidify the terms for the students. Quizzes also provided the students with an idea of what the format of the tests. Ms. Thurrott generally would take a few questions from each quiz and use them in the exam to provide students who used their past assessments to study with a “freebie”. Examples of quizzes are provided in the section following the practicum.

Quizzes consisted of a series of multiple choice answers, true/false questions, short answer responses and diagrams much like the tests which will be discussed shortly. The quizzes contained material either from a first or second portion of the material in the unit and served as test preparation and a study tool for the students in addition to being a physical description of their understanding of the material to that point. Often quiz results could be predicted by the students’ in class work and responses because most of the material on quizzes came from material generate during class or questions asked of the students during class. Also, any information on quizzes was discussed at some length in class and was typically present in the notes.

Quizzes were formatted in a way that it was expected that students who had not prepared for the quizzes would get at least a few of the questions correct due to the repetition of that theme in the class. These types of questions were typically represented in the multiple choice or true/false components of the quiz. If students made a reasonable effort when studying they were expected to be able to get more of the higher level diagramming and short answer questions correct or at least obtain partial credit for their responses to these (more heavily point valued) questions. Students who were well prepared and who had clearly studied their notes as well as the materials from class were expected to be able the short answer and diagramming questions well enough that they would get most or full credit on these sections as well as few errors in the multiple choice and true/false sections.

In the Biology II class, quizzes typically held more stock than the quizzes in the Honors Anatomy class simply because the Biology II students would likely be taking the Biology section of the MCAS test and much of the material covered in class was likely to be present on the MCAS. As was previously mentioned, daily MCAS review questioned were a staple in the Biology II class, however, emphasis was also put on the writing portions of the quizzes and tests as a means of acclimating the students to answering MCAS type questions. As with the Honors Anatomy course, greater point values were assigned to the written response questions on quizzes and tests than to the other types of questions. The importance of written responses to questions on quizzes should have encouraged the students to be prepare to answer thematic questions in their own words.

Additionally, time in class was spent dialoging responses to questions, an activity which was intended to help the students prepare to answer questions in a detailed manner.

Examples of the quizzes given are available following the practicum paper in the materials section. Viewing those quizzes should illustrate the points discussed above.

Tests

Tests were the culmination to each unit of study in the classes which Ms. Thurrott taught. Tests typically consisted of a series of true/false, multiple choice, short answer, essay and diagramming questions from throughout about a month's worth of classes. These large assessments usually took the students about the entire 99 minute class period to complete. Students were expected to fair better on tests than on quizzes because some of the questions on each test would be directly pulled from quizzes and the students would have had quizzes on the material prior to the test which should have shown the students areas in which they needed to improve.

Tests, like quizzes focused more heavily on the written responses than on the multiple choice or true/false type questions. Additionally, diagrams were weighted heavily because both writing and being able to express ideas as a diagram are vitally important means of expressing one's understanding of a broad theme. If a student can put a concept into their own words or create a picture of the events they are describing it is a sign that they can effectively recall and organize the facts that they learned about that theme. While a student may be able to answer a multiple choice question correctly because they either are good at guessing or because seeing the answer jogged their memory, that same student might not be able to think of the answer if it were not provided. Written and diagramming responses force students to really illustrate how well they assimilated the material. Much like the written response questions on the MCAS test, written responses on Ms. Thurrott's tests were given partial credit depending upon how fully a student responded to the question. Students would have to recited X amount of details for full credit and progressive amounts of partial credit based upon how many of those details were explained in the student's response.

Ms. Thurrott would also offer make-up points to students on tests if they re-wrote their responses to the essay questions. Make-up points allowed students to review the material and attempt to provide a more accurate or complete response than they had delivered on the test itself. Although this practice may seem like a slight doctoring of the grades, Ms. Thurrott felt that good written responses showed the student's understanding of the material more than the other test questions and knowledge of the material is more important than punishing a student with a poor grade for not studying properly. Additionally, the extra time spent writing would hopefully help the students to develop a better awareness of their audience as they adjusted their initial responses so that they would be more clear and meaningful to the grader.

Chapter 6: Conclusions

Final Remarks

Student teaching is a challenging and rewarding experience. While she came into this project very concerned about meeting the curriculum outline and providing students with all of the information that they would need to successfully meet the learning requirements of the course, Ms. Thurrott found that the greater challenge than presenting all of the material was presenting the material in a meaningful way to the students. Through her own experiences as a student and this student teaching endeavor it became blindingly obvious that any lesson, if it is going to have an impression on students, needs to be approached with enthusiasm and a sense of purpose.

A major difficulty of teaching at North High was the duration of the classes at a full 99 minutes each. No person, of any age wants to sit at a desk for 99 minutes being lectured at. In order to hold the attention of students during such a long class, part of creating lesson plans involved breaking up the long period into smaller unique chunks. The division of the class into segments, however, was somewhat advantageous to lesson planning because it forced Ms. Thurrott to approach the material in different ways. Typically, each day began with a refresher from the previous lesson. It would be a quick review, possibly labeling a diagram or finishing a worksheet maybe reading a related article and discussing the theme as it applied to the current topic. Students might then be

asked to take notes or to break into groups for an assignment. Ms. Thurrott usually divided the class time into at least three distinctive parts so that the students would have different activities to hold their attention for the full 99 minutes.

Another pivotally important aspect of the lessons given each day was that the more enthusiastically Ms. Thurrott approached a lesson the more the students seemed to glean from that lesson. When Ms. Thurrott prepared a large model neuron for the Honors Anatomy students to use and examine she found that many of the students would mention the activity in their responses to test questions. Additionally, Ms. Thurrott had built up anticipation for the Bio-Bottle experiment in the Biology II class and when it actually came time to set up the bottles she was shocked at the speed and accuracy that the Biology students, who at typically been slow to complete any activity, completed the setup for the Bio-Bottle activity. Clearly, students respond to the enthusiasm of the teacher for the topic and if a teacher presents themselves as not wanting to teach a topic or not being excited about the material then the students are likely to have a similar attitude. It is difficult enough to inspire students to be excited about a topic that they don't understand, if the teacher is not excited about the subject matter it is highly unlikely that the students will see any merit in the subject either.

Many of the students at North High were found to be masters of delay and often the willingness of instructors to cater to procrastination served to reinforce the behavior. When executing a successful lesson plan, Ms. Thurrott found it important to enforce time requirements. During the class period it was especially important to control timing because the students would often move off task and need reminders to work on the task at hand. If students did not complete a task in a timely fashion it was necessary to move on to the next objective often requiring that the incomplete activity be finished for homework. Student timeliness also begs a discussion of discipline. Students who disturbed the class were first given 1-2 individual warnings. If the student's outbursts continued and were not culled by the verbal reprimand a one strike remaining order would be issued in front of the class. The student would be reminded that if their behavior continued that they would be sent to the principle's office to speak with their vice principle and receive an after school detention or in school suspension depending upon the outburst. Students who delayed the class were typically given after school detentions, however, the occasional case such as JM from the Biology II class, merited in school suspensions. For JM the in school suspensions were somewhat of a blessing because it put him into an environment where he was forced to be alone and to get work done.

As a final result of the student teaching experience, Ms. Thurrott realized that there is no one perfect method for teaching. She recognizes that anyone who wants to be a teacher must be in a constant state of change and adaptation. As a teacher you must constantly be morphing your attitude, presence and methods to suit the students of the moment. Additionally, no classroom of students maintains the same dynamic from day to day. Since a classroom is really a room full of individuals, a teacher must approach each day as if it is their first day of school and be ready for anything. In order to be a good teacher, you need to be a good actor. Because each class is different and requires the

teacher to approach them differently a teacher must be capable of convincing each class that they have what it takes to control and teach that class. The Biology II students, for example, required a militaristic teacher, and part of Ms. Thurrott's problem when teaching those students was that she did not come across as a full authority figure. On the other hand, the Anatomy students needed a teacher who was excited to be in class and who really knew what they were talking about. The higher level students required a different type of teacher not only because of the time of day in which their courses took place, but also because they were all a different style of learner (versus the Biology II students) as was evident from their high level of work and behavior.

A good teacher, however, is also a good student. This concept correlates with the notion that a teacher must be an actor, for an actor is also a good student. While an actor can change their persona to fill a role a teacher must learn what role needs to be filled before they are able to act the part. A good teacher uses their various types of assessment as well as their understanding of the students and the material to provide the students with the proper learning environment. The role of teacher is a constant variable within any classroom and as such the teacher must be prepared to change lesson plans and even their own attitude depending upon the students for any given day.

Addendum:

Ms. Thurrott's Pre-Student Teaching Observations of North High School

In this next segment Ms. Thurrott will describe the instances where she visited North High as an observation activity for the Teaching Methods class taken through Worcester Polytechnic Institute prior to her student teaching hours. This section of the practicum changes tense and is presented directly as the words and views of Ms. Thurrott.

Prior to student teaching at North High School I have had a few opportunities to observe the school and its students and teachers. My first look at North was as a student in the WPI Teaching Methods course for which we were able to undertake observation hours at North High School. My next experiences at North involved meeting the teacher who would be my mentor for student teaching and touring the area where I would eventually get to teach.

My first impression of North was that it was very stark and seemed somewhat unwelcoming. There is only one way to enter the building and the lobby area is very small compared to the one in the High School that I attended. The building seemed older and there is a plaque on the wall in the lobby commemorating the students from the school who served in WWII. I was later informed that there were plans underway for a

new building to be built in the near future. The students were dressed in urban fashion which was somewhat different from my suburban High School. The teachers were, for the most part, very nice and were very excited to have an observer present. The school appeared to be strictly regulated but there also appeared to be a certain disorderliness or rather pressing need to watch for deviation from the routine. A constant pressure hung in the air, or so I perceived, of the adults waiting and anticipating poor behavior from the students.

While undergoing observation hours for the Teaching Methods course I sat in on two different classes taught by different teachers. One class was an honors Pathophysiology class. The other was a low level anatomy course. While there were few differences in the set up of the classrooms there were huge differences between the teachers, their styles, organization of the class and the reactions of the students to the environment established by a given teacher.

In the pathophysiology class desks were set up in a grid with the teacher's desk and blackboard at the front of the room as well as an easel with the day's activities and assignments clearly written out. To one side of the blackboard was a list in bold letters of the classroom rules; timeliness, mutual respect, no gum chewing etc. On the rest of the walls there were various "attitude" posters which delineated target attributes for the students to aspire to as well as various projects and information that the students had created or compiled.

During the class, students interactively participated in in-depth discussions about diabetes, the current topic of the class. They reviewed detailed information about the disease and its treatment. All of the students participated at least once and most were intent on the teacher. The teacher spoke very clearly and the students seemed to absorb everything that was said. Occasionally, there were side discussions (non-topical) but all were quickly addressed by the teacher and overall attention remained on the topic at hand.

In the low level anatomy course, while the demographics (male/female, race, age etc.) appeared to be similar to the pathophysiology class, it was a completely different environment. While desks were arranged similarly and there was another easel with the day's objectives it was clear that the "rules" of the classroom were fairly non-existent. The room itself was technically not the permanent residence of the teacher and it was very starkly decorated.

The students initially came into the classroom and sat down but as soon as the bell rang the teacher bellowed for silence and quickly reviewed the previous day's homework before immediately assigning new work and leaving the kids to fend for themselves for the rest of the lengthy class. Students roamed the room for a good majority of the period with only a few staying on task and completing their work during the class period. Most of the students took the time to groom themselves and chat with the other students. This was in great contrast to the previous class and it was later made clear to me by the second teacher why. He indicated to me that this was a "segway" job for him and he did not

intend to continue teaching. He declared that the students would get through the work and he didn't have to do much.

It was made clear from these observation periods that there is a huge range of education going on at North. While most of the teachers that I have met at North are driven to teach and seem well versed in their subjects there are a few who consider teaching a "transitional" or "place-holder" job while they look for something better. Further, it was made obvious to me that when teaching at North there is an expectation that every goal and requirement of the class will be delineated ahead of time and then repeated throughout the day/course. It seemed that teachers expect students to need reinforcement and the students expect to make the teachers remind them of everything constantly.

Having a longer time to observe would have most likely shown that a lot of this reinforcement is a testing of boundaries (by the students) and a need for materials to be presented in multiple ways. For example, the pathophysiology teacher was reviewing characteristics of diabetes and would direct questions to specific students. If the student didn't get the answer right away the teacher would reform the question a few different ways until the student was able to recall the information. Further, when a non-topical discussion would begin the teacher would use a few different strategies for overcoming it; walking to where the conversation was taking place, speaking louder, or stopping discussion to specifically address the situation. By utilizing so many methods the teacher provided multiple cues for the students to associate with the teacher's desire for them to return to focusing on the class.

In meeting with my mentor, Mr. Howarth, I was introduced to some of his methods of reinforcement. Similar to the other classrooms mentioned, Mr. Howarth's room has the desks set up in a grid with his desk as one end and the blackboard behind it. There is yet another easel present with the agenda for the day and assignments. There is also a poster of classroom rules. Additionally, Mr. Howarth showed me some of the tools he utilizes for reading/assignment comprehension. They consisted of graphic organizers and documents suggesting how to break down reading assignments as well as various game-like organizers for determining prior knowledge of subjects and assessing projects. Even the daily lesson plans are very specific and clear cut leaving little room for misunderstanding. Based upon the student reactions to both Mr. Howarth and the pathophysiology teacher, it became very clear to me that the teachers who provided constant, consistent structure were the teachers who were respected by the students.

I mentioned earlier that North High gave the air of having a constant pressure with the adults waiting for the students to misbehave, however, I should mention that in the ordered classrooms, class did not have that same feeling. When the teachers' expectations were made clear, the students seemed to respond accordingly, at least in my first observations. Later I would find that even with constant reminders and behavioral correction, students will still not stay on task, though it is clear that the higher the behavioral expectations, the more likely the students will be to achieve closer to higher behavioral standards.