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Teaching Practicum at Doherty Memorial High School

Student Teaching Practicum Portfolio

Interactive Qualifying Project

Submitted to the Faculty

Of

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Degree of Bachelor of Science

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Abstract:

In partial fulfillment of the requirements for Massachusetts Educator Licensure, a total of 105 hours of observation and 152 hours of practice teaching were performed over the course of 1 semester at Doherty Memorial High School, located in Worcester, MA. Information and statistics regarding Doherty Memorial High School, the Worcester Public School System, and the surrounding community demographics were compiled. A set of lesson plans and assessments were developed with the aim of fulfilling the requirements set by the Massachusetts Curriculum Frameworks as well as the Worcester Public School System Curriculum.

Chapter 1: Doherty Memorial High School

Doherty Memorial High School, located at 299 Highland Street in Worcester, MA, has been educating Worcester Citizens since it first opened its doors in 1966. Due to its location, Doherty High is part of the Worcester Public School System and primarily serves children residing in the North Western region of Worcester. It is however, not uncommon for students from different areas of Worcester to attend this school as well. Doherty is rich with diversity, both ethnical and in economic status. It is this trait which makes the school strong and what inspires students on a daily basis. The hallways of this school are, and have been since the day the school opened, decorated by both student artwork and awards. Some of this artwork, directed by the art department, has even been permanently painted onto the walls by students who excel in the arts. Doherty is about average in terms of its MCAS performance. This school, however, starts working with students in standardized testing through the entirety of their freshmen year with their MAPS Test. This high school is known through Worcester as having high college placement with its students, and its faculty and staff work hard to make sure that the students go on to live productive lives.

Students from the North Western region of Worcester primarily attend DMHS. This being said, through one's time attending DMHS, they will undoubtedly meet an individual from a different part of the city. Students in the Worcester Public School System are allowed to switch the school that they are attending with permission from the school system. Furthermore, children from St. John's and St. Peter Marian Private High Schools who are no longer able to attend classes there are routinely transferred to one of the Worcester Public Schools to finish their high school education. On any given day, there are around 1200 students attending school at Doherty Memorial High School (MCAS Report- School Improvement Plan: Doherty Memorial High School, 2009).

With a mission statement reading "Doherty Memorial High School empowers students to become critical and independent thinks as well as life-long learners. We encourage diversity and creativity as we partner with our students and their families, our teachers, and our community to provide an education in a safe and caring environment" (Doherty Memorial High School Faculty Handbook, 2009), it is easy to see that this particular school places high priority on interactions between family, students, and faculty. This mission statement also shows an added priority on diversity. Doherty Memorial High School is known for its diversity, both ethnical and economic. In the 2009-2010 academic year, Doherty Memorial High School student body was 15.5% African American, 10.9% Asian, 25.7% Hispanic, 0.6% Native American, and 47.2% White. Compared to neighboring high schools, DMHS has a very diverse student body and this is something that they are proud of. With this diverse student

population, however, comes a difficult challenge for educators. Of the 1200+ students in attendance every day, 12.9% student body has limited English proficiency (MCAS Report- School Improvement Plan: Doherty Memorial High School, 2009). Because of this statistic, educators must be aware of teaching and assessment styles in the classroom.

Along with ethnical diversity, Doherty Memorial High School is full of students from varying economic statuses. Doherty offers cheap breakfasts for those students who may not have the opportunity to eat breakfast at home. Many students arrive at school early in the mornings to take advantage of this program that is offered to them. Along with having breakfast available to students, Doherty Memorial High School offers free/reduced lunches to those students who qualify for them. In the 2009-2010 academic year 48.1% of the students attending DMHS were a part of the Free/Reduced Lunch Plan (MCAS Report- School Improvement Plan: Doherty Memorial High School, 2009). This economic diversity, much like the ethnical diversity, has many impacts on the educators as well. Among many other things, teachers must be away of these differences when assigning large projects or homework assignments that may include a computer and/or the internet.

Providing a safe and caring environment is something which Doherty Memorial High School strives to accomplish every day. Through these strong ideals, DMHS provides a program to help students with learning disabilities. Through this program, students can take exams and quizzes in a stress free environment and at their own pace. This program also helps students with homework as well as teaching good study habits to those students who desire a further education on the topic. In some cases, one of the faculty members in the program will sit in on a student's classes so they can have a greater understanding of the material in which the student will be tested.

In attempts to better assess a student's readiness to advance out of freshmen year and onto sophomore year, DMHS requires that all students pass the school's MAPS test. This standardized test is administered in the spring of freshmen year and tests students on Math, English, and Science knowledge that they should have gained through the year. The MAPS test is taken over the course of a week and if students fail it they are not permitted to go onto sophomore year in its entirety. These individuals will be required to take certain freshmen level classes an additional time during their sophomore year. This test does well to make sure students are keeping up with their studies as well as prepare them with vital test taking skills that they will need for the MCAS state standardized test.

The MCAS, Massachusetts Comprehensive Assessment System, is a statewide standardized test given to students in the spring of their sophomore year of high school. This exam tests students in the areas of English, Mathematics, and Science and Technology. Students are not permitted to graduate

from high school until they have successfully passed this exam. Doherty Memorial High School is, overall, about average in their test scores on the MCAS test. The table below shows the test scores for Doherty Memorial High School for the spring of 2009.

Grade and Subject	Advanced/ Above Proficient		Proficient		Needs Improvement		Warning/ Failing		Students Included	CPI	SGP	Included in SGP
	SCHOOL	STATE	SCHOOL	STATE	SCHOOL	STATE	SCHOOL	STATE				
GRADE 10 - ENGLISH LANGUAGE ARTS	20	29	55	52	20	15	5	4	321	89.8	58.0	257
GRADE 10 - MATHEMATICS	43	47	23	28	20	18	14	8	320	82.4	55.0	258
GRADE 10 - SCIENCE AND TECHNOLOGY	8	16	37	45	45	29	10	9	283	74.6	N/A	N/A
ALL GRADES - ENGLISH LANGUAGE ARTS	20	16	55	51	20	25	5	8	321	89.8	58.0	257
ALL GRADES - MATHEMATICS	43	23	23	32	20	28	14	16	320	82.4	55.0	258

(Massachusetts Department of Elementary and Secondary Education)

Doherty Memorial High School has a vested interest in the well being of its students. This mentality transcends to its interest in the college placement of its seniors. Of the graduating seniors, a large percent of them end up attending college upon graduation. The graduating class of 2009 had 90% of its class population attending college. Of the 90% attending college after graduation, 52% went on to a four year college and 38% went on to a two year college. The last 10% of the students who graduated in 2009 either went onto employment, the military, or some other option. (Doherty Memorial High School Profile 2008-2009, 2009)

Overall, Doherty Memorial High School is full of personally invested faculty and staff as well as a richly diverse student body. The school does much to strengthen their students' academics through various testing options for those who may have learning disabilities. MAPS testing in freshmen year help students to test their knowledge before the ever so looming MCAS tests that come in the spring of sophomore year. Being in the city of Worcester Massachusetts provides a great opportunity for diversity in the classroom, both ethnical and economic. This diversity, however great for personal growth, provides added challenges for any given teacher in terms of teaching and assessments. Doherty Memorial High School is full of history and it is evident that the majority of the student body is proud to be a part of the Doherty Memorial High School Community.

Chapter 2: Daily Schedule and Curriculum

Daily Schedule:

Doherty Memorial High School uses a standard block schedule to organize its daily class schedule. This block scheduling (shown in the figure below) works such that every class meets every day as well as at the same time every day. Each day has seven fifty-minute blocks, with block five being extended to ninety minutes, allotting twenty minutes to lunch. Along with this extended fifth period, there is also a rotating "long block" class. Long block starts at first period, on an A-Day, rotates to the next period with each day, and finally ends on seventh period, on an F-Day. This period is extended to seventy minutes, thus giving teachers, especially in the science department, a chance to have extra time to complete extended lessons, test, perform laboratory procedures, etc. All courses follow this scheduling, with some higher level courses taking two sequential periods in the day. This schedule works for the Doherty High Community and the students enjoy knowing exactly when each class with meet. An exact copy of this block scheduling can be seen in Appendix III.

A	B	C	D	E	F
1 **Long Block**	1	1	1	1	1
2	**2** **Long Block**	2	2	2	2
3	3	**3** **Long Block**	3	3	3
4	4	4	**4** **Long Block**	4	4
5A 1st Lunch	5A 1st Lunch	5A 1st Lunch	5A 1st Lunch	5A 1st Lunch	5A 1st Lunch
5B 2nd Lunch	5B 2nd Lunch	5B 2nd Lunch	5B 2nd Lunch	5B 2nd Lunch	5B 2nd Lunch
5C 3rd Lunch	5C 3rd Lunch	5C 3rd Lunch	5C 3rd Lunch	5C 3rd Lunch	5C 3rd Lunch
6	6	6	6	**6** **Long Block**	6
7	7	7	7	7	**7** **Long Block**

Curriculum:

Through their time attending Doherty Memorial High School, students are required to meet a set of standards. These goals must be met before their graduation at the conclusion of senior year. Graduation requirements include four years of English, three years of Mathematics, two years of Science, three years of History, half year of Health, and two years of Physical Education. In addition, students must take and pass the English Language Arts, Mathematics, and Science MCAS Tests. As one can clearly see, students must do well and stay on task in their years at Doherty High.

From these graduation requirements, it is noticed that students are only required to pass two years of Science. The course that was taught by this WPI undergraduate, Vertebrate Anatomy, is one which mostly consists of juniors and seniors. Of these juniors and seniors, the majority of the class needed pass this class in order to graduate from high school. In addition, the majority of the students taking this class have only taken one or two years of high school science in the past.

Students attending Doherty Memorial High School are required to take a basic science course in their freshmen year, in efforts to prepare them for the Science MCAS Test. After this initial requirement, students are left to decide when they would like to continue their science education as well as for how long they would care to do so. Freshmen choosing to pursue an education in Biology can start in Biology I. This course, in accordance to the Massachusetts Curriculum Frameworks (Appendix I), covers topics such as the chemistry of life, cellular biology, genetics, anatomy and physiology, evolution, and ecology. If students fail to pass this course, they are required to take it again.

From this course, students can progress to Chemistry I and/or Physics I. Vertebrate Anatomy comes downstream of these courses. This course is considered and elective and students may or may not need to pass the course in order to fulfill graduation requirements. Through the Massachusetts Curriculum Frameworks, Vertebrate Anatomy has been designed to include an in depth explanation of the body systems, including the skeletal system, muscular system, respiratory system, circulatory system, digestive system, nervous system, endocrine system, lymphatic system and reproductive system. Through the teaching of these systems, the topic of homeostasis is always referred to and commented on.

The Science Curriculum of the Worcester Public School System, and Doherty High School as a member of this district, has been carefully compiled and edited in efforts to reach and surpass the standards presented in the Massachusetts Curriculum Frameworks and has been used since 2007. Doherty High School takes pride in the academic achievements of its students and works hard to prepare them for higher education and a life of continual learning.

Chapter 3: Course Materials

Lesson Plans:

At all times keeping in mind the MA Curriculum Frameworks, as well as the Doherty Memorial High School Curriculum, lesson plans were developed with the goal of educating students in the field of Vertebrate Anatomy and Physiology. The lesson plans developed for this course were organized by bodily system and were followed over the course of a 2-3 week period. Class discussion being the primary rational behind the lesson plans developed, all lesson plans were created in the same basic fashion. The first aspect of each lesson plan is that of the MA Curriculum Frameworks point pertaining to said lesson was added to the very beginning. Having the Frameworks point present at all times on each lesson plan assures that the educator sees it constantly and is continually reminded of the main points that need to be mentioned and instilled in the minds of the students.

In addition to every lesson plan containing the MA Curriculum Frameworks, each prepared lesson plan follows the same basic procedure. Each lesson plan begins by first introducing the bodily system that is going to be covered. This introduction includes the "big picture" of the bodily system; such as "What is this system responsible for doing in the body?" "What are some cool things about this system?" and "What do you already know/think you know about this system?" The lesson plan then moves to talk about the gross anatomy of the system in question. Once the anatomy of the system has been covered, a short quiz on the material is given in efforts to make sure that the students have been paying attention and learning the material. As the lesson progresses, students learn how the system does what it does. Students are then exposed to the "big picture" once more and the topic of homeostasis, the body's desire to maintain a semi consistent internal environment, is discussed in relation to the system in question.

Each lesson begins with the "big picture" of the bodily system that is going to be discussed. This aspect of the lesson is aimed at gaining the interest of the students and engaging those who may not see the need in learning about said bodily system. At this point in the class discussion, students are able to express what they may already know about the system, what they think they know about the system, and what they would like to know about the system. Often "hooks" are used to further gather the interest of the students. "Hooks" can be anything from open ended questions, "what if" questions, or even simple experiments. The point of the "hook" to is to get everyone's attention and then direct that attention towards what the topic at hand may be. This aspect of the lesson plans is crucial. Once students have the big picture of what is going to be discussed in the upcoming weeks, they can start to piece everything together themselves as the lesson progresses.

Once students have an idea of what the lesson is going to entail, the discussion moves onto the gross anatomy of the system. It is of the utmost importance that the anatomy of the system is discussed prior to discussing the physiology, due to the fact that the students will tend to get caught up on the terminology if it is not mentioned first. The anatomy portion of the lesson entails a description of structure and function. This discussion works to relate these two concepts with each anatomical feature such that the students have a better understanding of them in their long term memory. In addition, these concepts are discussed in a manner that shows how the function of the feature actually benefits from its structure. At the end of this portion of the lesson, students have an understanding of the anatomical features that are involved in the system and are better prepared to gain a deeper knowledge in its physiology.

At the conclusion of the gross anatomy portion of the lesson, an assessment is given to confirm retention of the presented material before moving on to newer, and more in depth, material. After being assessed, the discussion of the lesson continues to the physiology of the bodily system. This discussion, in essence, takes all of the prior knowledge on anatomy and shows how the different anatomical features work to do what they do as well as how the work with each other to attain the ultimate goal of the system. Physiology is topic that most students have difficulty with, as they are to think more in depth about structure and function as well as ponder how those qualities make it possible for the physiology to make sense, and is carefully presented in ways in which students can better understand the material. Many different methods are noticed through the lessons prepared on the various bodily systems. These methods entail laboratories, such as in the digestive system, figures, as well as real life applications. One method that is noticed to transcend the entire group of lesson plans is the use of analogies to give the students a different way to think about certain topics. Analogies, be them very literal and serious or comical, are a powerful tool in teaching, especially in the teaching of Biology, a subject in which most topics are microscopic and can only be imagined or pictured in figures. The lack of literal “hold it in your hands” experiments with physiology makes it necessary to think of certain concepts in a different way. Through the lessons, many analogies are noticed, and further ones are found in the handwritten notes which were used during the class period. All of this was done in efforts to show the students how the physiology of each system worked to achieve its ultimate goal. Along the analogies from the educator, students are also encouraged to come up with ways to remember certain concepts in a manner that makes sense to them and is still scientifically accurate.

At the conclusion of the discussion on physiology, the lesson works to, once again, tie all of the material together and show how the system works, what anatomical features are doing what, and how

those anatomical features are doing what they are. This review is given two manners. The first manner in which students review the material is through class discussion. In this instance, students have the chance to show what they have learned, by describing certain topics of the system that are asked. Review questions are placed on the board and are first answered, in writing, individually. Once students complete this, they are asked to explain themselves. At this point, other students are asked to build on, correct, or agree on what is said. This act gives students a chance to show that they understand the material as well as further instilling the information in their mind by physically writing the answer and bring all of their knowledge together words, explanation, and discussion mediated by the educator.

In addition to this review, students are also placed into teams and able to compete in a review game. The questions of this review game are completely made up by the students. The questions are then pulled out of a jar and the student selected to answer at that point has to answer correctly. This being said, if the student fails to answer the question correctly and the creator of the question fails to do so as well, the creator, in turn, looses points for their team. The team with the highest amount of points at the end of the game earns a total of 5 bonus points to be added to their exam on the material.

At the start of every class, a set of review questions from the previous day's material is written on the board for the students to individually attempt to answer. With a topic such as Biology, many concepts work off of each other. With this in mind, if a student fails to understand a basic concept, the more in depth concepts, that are later presented, will be that much harder to comprehend. Providing students with a set of review questions at the start of every class period allows for the further retention of material. This process also shows students the topics that the educator feels are important as well as gives them an insight as to what is going to be built off of in the following class period. Students were asked to answer these questions either individually or with the help of friends. After a short period of time, the class is asked to explain what they came up with.

Each lesson plan developed through this Teaching Practicum was done in such a manner that each student is provided with a way to understand the material. The lessons are set up in such a way that brings together concepts through pictures, lecturing, and discussion. The emphasis of the last statement is on the discussion aspect of the lessons. Through discussion, students are able to postulate their own ideas and figure out concepts in such a way that makes sense to them. This classroom discussion is, and should be, mediated by the educator and the concepts in which students have difficulty with are first explained by the educator. This open method of education shows to be beneficial to those students who care to participate, as well as the students who care more to listen to what others had to say and look at the figures shown in class.

An example of a lesson plan developed for Vertebrate Anatomy at Doherty Memorial High School can be seen in the following pages. A full compilation of the lesson plans created over the entirety of this Teaching Practicum can be found in Appendix IV. Furthermore, a full record of the handwritten notes, used in the classroom, can be found in Appendix V.

EXAMPLE LESSON PLAN

Mark Kuhlwein Respiratory System Lesson Plan

Last edit: 1/11/10

Run Time: 2 weeks (8 lesson days + 2 assessment days)

MA Curriculum Frameworks 4.3:

Explain how the respiratory system (nose, pharynx, larynx, trachea, lungs, and alveoli) provides exchange of oxygen and carbon dioxide.

Overview:

This lesson will focus on the Respiratory System and its purpose in the body. It is formatted in such a way that the students will first learn the anatomical features of the Respiratory System. Ample time will be given for this purpose so that when the physiology of Respiratory System is discussed, the students will have a much easier time understanding the process in relation to the features. Two assessments will be given for this lesson, with the first acting as a halfway marker and checking progress and the second tying everything together at the conclusion of the lesson.

The lesson will start with the learning of the anatomical features of this system. It will start with the features located in the skull and neck. Students will be responsible for knowing the location of the Superior/Middle/Inferior Nasal Conchae, Uvula, Hyoid Bone, Epiglottis, Vocal Fold, Larynx, Pharynx, and Trachea. Also, a brief explanation of function will be given for reference and to aid in the learning process. A review of this information will be given in the form of worksheets for those students who work better by reading and in a hands-on fashion.

The lesson then works to further the knowledge of the anatomical features of the Respiratory System along with their function by focusing from the neck into the lungs and thoracic cavity. Features being taught will include Primary/Secondary Bronchi, Bronchioles, Alveoli, Diaphragm, lobes of the Lungs, and Intercostal Muscles. Just like the first set of anatomical features, they will be located and their function will be discussed. An exercise / review will be given to be finished in class.

Before continuing onto the physiology of the Respiratory System, a class period will be set aside to assess the students' progress at this point.

After the small assessment, Respiratory Physiology will be started. The lesson will move to focus on inspiration, expiration, and non respiratory air movements. In relation to respiration, the passages that air passes through will be mentioned and the muscle movements (diaphragm and intercostals) will

be explored. Moving to expiration, the same basic concepts will be referenced, in terms of the passages that the air passes through once more and the movements of the diaphragm and intercostals. Next, the change in pressure in the thoracic cavity during respiration will be discussed. The role of surfactant, as a lubricant, will be referenced in terms of its role in the maintenance of alveolar sacs. Lastly, non respiratory air movements will be explored. Coughing, sneezing, crying, laughing, hiccupping, and yawning are to be covered. These movements will be examined in terms of what is happening during the movement and how that movement effects respiration.

The lesson will move to the topic of gas exchange. Focusing on external respiration and its gas exchange, the lesson will work to teach what is happening in the lungs and the alveolar sacs when air enters. There is a path that the oxygen takes as it enters the blood stream and makes its way to the body cells. The lesson will work with talking about this path and the role of hemoglobin in the red blood cells.

Continuing with the gas exchange portion of respiration, the lesson will next work with following the oxygen through the body and show how it interacts with the cells of the body. The examining of internal respiration will then proceed to follow the CO_2 as it travels back through the bloodstream and to the lungs where it is exhaled.

A day of review will be given before the exam. A review game will be played so students can practice their knowledge and check to see what they need to brush up on before the exam. This review game will also act a possible point gainer, with points going to the winning team.

All-in-all, this lesson sets out to teach the structure and function of the body's Respiratory System. It does so by first teaching the students the structures of the system, and then exploring what said structures do and how they work together to supply the body with oxygen.

Purpose:

- To spark interest in the Respiratory System
- Provide an overview of the system so students can relate and connect future lessons
- Initiate the learning of basic anatomical features related to the Respiratory System
- Review these anatomical features until they are instilled in the memory of the students before moving on to the next set of anatomical features
- To gradually instill a deeper knowledge of the Respiratory System and its function
- To explore the superficial act of inspiration and expiration and teach the students what is happening in terms of air movement and muscle contractions.
- To discuss the importance of change in pressure in terms of its role in the respiration
- Talk about surfactant and what can happen if the lung cells fail to produce it

- Explore other ways that air can either enter or leave the body in non respiratory air movements and their relation to respiration as a whole
- To further show the importance of the respiratory system as a way to bring oxygen into the body
- To show the primary defenses that the body has, in terms of mucus and cilia, against foreign material that may be harmful
- To explore the act of gas transport and how the structures of the lung and the qualities of red blood cells aid in the movement of oxygen through the body
- To show the different processes that are taking place during the act of respiration
- To further show the importance of the respiratory system in its role to bring oxygen into the body and expel carbon dioxide and other foreign agents from it
- To show the importance of the cardiovascular system and blood in the body

Objectives:

At the conclusion of this lesson, the students…

- Will be able to give a brief description of the respiratory system, how it works, and what it is responsible for doing in the body.

- Will be able to locate key anatomical features of the Respiratory System located in the head and neck as well as give a brief description of their role in respiration.

- Will have the knowledge on exactly what is happening in the body during respiration.

- Will be able to understand later concepts easier due to this primary knowledge being in place.

- Will understand Inspiration, Expiration, and Non-Respiratory Air Movements

Materials:

- White board
- Overheads that clearly show the anatomical features that will be discussed
- Worksheets for students to complete as an exercise and review of material

Day 1/Day 2:

Procedure:

1) Start with the "hook", which will be asking the students to come to the board and write down whatever they know, think they know, and want to know about the Respiratory System.
2) We will then go over this information and relate all of it to the Respiratory System by a brief description of how it works and what it is responsible for doing. Make sure to touch on…

- The passages that air passes through in the body on its way to the lungs
- How the diaphragm and intercostal muscles create a change in pressure that pulls air into the body
- Gas transport in the lungs and how it effects the body

3) Anatomical features of the skull and neck that aid in the respiratory system will then be located and discussed. Make sure to touch on……

- Superior/Middle/Inferior Nasal Conchae (work to warm the air as well as clean it as it enters)
- Uvula (prevents food from entering upper Respiratory Passages) (little punching bag)
- Hyoid Bone (acts as an anchor for many muscles related to the neck)
- Epiglottis (prevents food from entering the Trachea)
- Vocal Fold (produces noise) (try blowing between two pieces of paper and hear the noise)
- Larynx (known as the voice box and contains the vocal fold)
- Pharynx (respiratory area that is superior to the Larynx)
- Trachea (between the larynx and bronchi)

4) Provide an exercise / review for the students in the form of a worksheet that will aid in the studying process and develop understanding of the material that students will complete in class
5) Give homework assignment due the last day of the lesson (Friday, February 5th). **Review Questions at the end of Chapter 13 (pg 466-467).**
6) Announce the quiz that will be happening at the end of the anatomy lesson (planned to fall on a Friday)

Day 3 / Day 4

Procedure:

1) Recap of what we have learned already in relation to the anatomical features.
2) The “hook” for this lesson will be first having the students take a deep breath and watching / feeling their chest rise. I will pose the question of “who knows what is happening that is making your chest do this?” These answers will be put on the board and referred back to as we are going through the day’s lesson
3) Anatomical features of the neck / chest that relate to the Respiratory System will be located and their function, in relation to this system, will be discussed. Make sure to touch on….

- Primary Bronchi (as the Bronchi split, they are given the names Primary / Secondary / etc)
- Bronchioles (after the last split of the Bronchi)
- Alveoli (little sacs that cover the Bronchioles
- Diaphragm (muscle that controls the pressure inside the Thoracic Cavity)
- Intercostal Muscles (muscles located between the Costal Bones (ribs))
- Lobes of the Lungs (the Lungs are actually separated into different parts)

4) Provide an exercise / review for the students in the form of a worksheet that will aid in the studying process and develop understanding of the material that students will complete in class.
5) Check up on students as to the progress of their homework assignment.
6) Remind class that there will be a quiz on all of the week’s material the following day (Friday).

Day 5:

Assessment:

This quiz has been developed in light of what was covered in class over the past 4 days of the lesson. The quiz acts as a checkpoint for the class before more in depth topics are brought up later.

Day 6:

Procedure:

1) Recap the anatomical features that they were just quizzed on the following Friday as a post weekend refresher.
2) Use the same "hook" as before. Have students take a deep breath and feel / watch their chest rise. Have them also notice that their chest falls when they release that breath. Pose the question "who thinks that they know what is happening?" Put responses on the board and refer back to them as we are going through the lesson.
3) Start discussion on inspiration. Touch upon…

- The anatomical features that the air passes as is it brought into the body, through the nose/mouth and into the lungs
- Ask "What is drawing the air into the lungs?"
- Talk about the contraction on the diaphragm and external intercostals and how that changes the pressure in the chest, which pulls the air in. (two arm method for showing how external intercostals vs internal intercostals work to pull on the ribs)

4) Continue with discussing expiration. Touch on…

- Start in the lungs and move to the mouth/nose and then out of the body
- Refer back to muscles and say "muscles only contract. With that in mind, what has to be happening now?"
- Discuss the relaxation of the diaphragm and the external intercostals (expiration is passive)
- Forced expiration = contraction of the internal intercostals
- Relate back to the discussion on the pressure in the thoracic cavity and pose the question "knowing what we do about what happens with the pressure when we breathe in, what do you think is happening in the chest now?"
- Continue to relate to basically the opposite of inspiration in the fact that air is going backwards through the air passages and out of the body.

5) Discuss the presence and role of surfactant in the lungs. "What do you think would happen if you did not have this secretion?"
6) Explore with the class other possible ways that air can either move in or out of the body. Discuss how these movements effect respiration. Make sure to touch on….

- Coughing (the clearing of the lower Respiratory Tract)(comes from the chest)

- Sneezing (the clearing of the upper Respiratory Tract)(comes from the nose)
- Crying (an emotional response to pain)
- Laughing (an emotional response to humor)
- Hiccupping (the spasm of the Diaphragm)
- Yawning (the opening of all the Alveolar Sacs)(more oxygen to try to keep the brain "awake")

Day 7:

Procedure:

1) Recap from last lesson the act of respiration in terms of muscle movement and the movement of air in and out of your lungs.
2) The "hook" for this lesson will be "What do you think is different about the air that you breathe in and the air that you breathe out?" Write these responses on the board to refer back to as we progress through the lesson.
3) Start class discussion on what is happening when air comes into the lungs. Be sure to touch on….

- How it travels into the lungs and further into the alveolar sacks
- Discuss how the alveolar sacks are very thin (one cell thick) and how they are embedded in a mesh of capillaries (a capillary bed)
- Try to have them figure out what this means for the oxygen that is entering the lungs
- Explain the importance on the red blood cells and their ability to transport oxygen through the body via the blood vessels
- Make sure that they know the reasoning behind why they are able to do this due to the presence of hemoglobin and how this chemical is what gives the RBC their color.

4) Propose the question "Now what do you think would happen if something harmful (like a virus, etc) were to get into the lungs and subsequently the body?" Take these answers down and then start to discuss how the body have a way to protect itself from these harmful agents before they can even get into the lungs
5) In the process of describing the body's 2nd line of defense, make sure to touch on……

- How mucus traps some of the foreign material
- The location and purpose of cilia to move the material up the trachea and out of the body (via constant swallowing, sneezing, snot, etc.)

Day 8:

Procedure:

1) Recap what we went over in the last lesson. Bring up the importance of the capillary bed that surrounds the alveoli and how the hemoglobin in the Red Blood Cells is what carries the oxygen.
2) The "hook" for this lesson is to propose the question "What do you think happens to the oxygen that is in the blood now?" Write the responses on the board to refer back to as we progress through the lesson.
3) Pick up where we left off at the last class by starting to talk about the gas exchange that takes place during internal respiration. Be sure to touch on….

- How gas exchange happens again in capillary beds in the body
- Body cells that are in need of oxygen take it from the RBC. "Why do they need it?"
- The by-product of cellular respiration in CO_2 which is deposited into the bloodstream (but not on the RBC)
- Discuss the progression of chemical reactions ($CO_2 + H_2O \rightarrow H_2CO_3 \rightarrow H^+ + HCO_3^-$) (carbon dioxide + water goes to carbonic acid which looses a hydrogen and becomes a bicarbonate ion)
- Now we will follow this as the blood makes its way back to the lungs where the reaction goes backwards and the CO_2 moves through into the lungs and out of the body
- Final recap on the respiration process from start to finish
- Any questions?

Day 9:

Procedure:

1) Start the review game and play until the conclusion of the class period. The winning team will be awarded points to be added to their score on the Exam.

Day 10:

Assessment:

This will be a written exam with categories of questions including matching, multiple choice, short answer, and an essay. I have noticed that these particular students do not do well with essay questions and for that reason I will try to make it so they can still do well on the exam as a whole if they are able to answer the other questions correctly.

Homework:

With every lesson also comes a set of homework questions from the review section at the back of the related chapter in the book. The book used in this class is *Essentials of Human Anatomy and Physiology 9th Edition* by Elaine N. Marieb. The questions from this part of the chapter are chosen in such a way that students are able to answer some with ease, have to look some up, and have to think about the bigger picture of the system and what it does. All of the questions selected have relevance to what is being taught in class at the time, and are all very straight forward if the individual is listening and participating in class. The idea of homework leads to one more aspect of teaching. This aspect, being the student's interest in school outside the classroom, makes it so the students are forced to focus on their studies and recap the day's lesson. The homework assignments required for this course focus on further developing concepts as well as require the students to dive deeper into the system at hand. If the assignments fail to do either of these, at least they get the students to be thinking about the material and formulating mental questions on topics to bring up in future lessons.

Worksheets:

Often, as an additional part of a lesson, worksheets would be administered to the students for completion in class. Worksheets provide a means for students to test their knowledge prior to assessments as well as an idea of the types of questions that can be asked of the material. The worksheets used through this course were provided by the publishers of the course text and showed to be somewhat effective at helping students with the material. Worksheets used in this course can be seen in Appendix VI.

Chapter 4: The Students

Through this practicum, the challenge of getting through to all of the students was presented. This is a challenge that is quite clear to all professional educators and many different strategies need to be learned, and implemented in the classroom, in order to solve it. Doherty Memorial High School is full of culture and wide variety of students from different backgrounds and, subsequently, learning styles. In efforts to educate all students equally, different teaching methods needed to be taken in the classroom. These methods were unique to the different classes, due to no two situations being the same, and, once implemented, provided a more equal education to those students with different learning styles.

Period 1:

With Doherty Memorial High School having block scheduling to organize their classes, every class met at the same period of every day. This being said, Period 1 has some challenges unique from all the other periods. Some period 1 students, through misfortunes or neglect, were often late to class. In the field of Biology many topics require extensive periods of time in order to master. Students arriving late to class hurt themselves in this process, as well as other students who became distracted with the entering of a new student into the classroom. In efforts to not distract from the lesson, the late students were encouraged to simply take their seat and the class discussion was not stopped for them. At the conclusion of the class discussion, those students who arrived late would be told the basics of what they missed due to their tardiness and were told to review on their own time. These students were also encouraged to work with other students to attain missed notes as well as ask for clarification of topics that may need additional help from the educator.

Period 1 students, for the most part, were very well behaved in class and worked well with structured and directed classroom discussion. It was noticed that, as soon as a discussion started to become unstructured, side conversations would start and a snowball effect would be noticed in the attentiveness of the entirety of the class. To make sure that this did not happen, class discussions were structured and directed and side chatter was stopped immediately and before it became an issue.

This period also contained two students with which different teaching approaches needed to be met. One of these students has English as a second language. It is easy to see how such a student can make the teaching process rather difficult. The other student is what Doherty High calls an Individual Education Plan (IEP) student. Students in this program often have a hard time grasping concepts and require additional, one-on-one teaching and help outside the normal classroom setting. For these two students, similar education approaches were taken. Through the class discussion, questions were often

posed to the class, and students were called on the answer. These students were often called on in efforts to gauge their retention at that point. If it was noticed that they were unclear as to the answer to the question, the topic would be covered once more in a slower and more step-by-step fashion. With these students in mind, diagrams were often used in class. The diagrams used were overhead slides that were provided by the book. Using these as visual aids allowed for these students to also have a copy of the image in front of them. Visuals are universal through different languages and learning proficiencies, and proved to be a great tool in presenting material in a different manner.

Period 5:

Through Doherty Memorial High School's block scheduling, Period 5 is always an extended period due to lunch happening at the same time. Period 5 being extended would lead one to believe that more material would be able to be covered through the course of the year. The individual educational needs of students in the class, along with the some behavioral challenges, made this assumption not the case at all. This class was taught in a similar fashion with a lot of time spent on classroom discussion. This being said, discussion in Period 5 was tightly structured and closely directed. Students in this period were often talkative on subjects outside of the lesson and needed to be closely monitored to assure that learning was taking place. In efforts to end side chatter in this period, all talk outside that of Anatomy and Physiology was extinguished and some students had to be moved to different seats. These methods worked to keep students on task and attentive, though careful attention needed to be given to some key students who were noticed to start all of the side conversations.

Period 5 had some students who were able to understand the concepts presented with ease. These students literally just had to hear the material and would understand it and remember it. These students would often become bored, when other students, who had not yet fully grasped the material, needed additional time and education. To ensure that these students would continue being engaged and attentive, when concepts need to be discussed multiple times they were asked to teach the class. This method helped the class in multiple ways. Having these students present the material further helped them learn and it worked to present the same material in a different way that might be easier to understand by the rest of the class. For the students who had difficulty understanding the material, methods similar to Period 1 were used. Visual aids, in the form of overhead projection, were used to illustrate concepts. Often, personal drawings/representations were presented on the board, if those from the book were unclear.

Some students from this period were jokesters and would often try to present some comic relief during the class period. These students were commended on their creativity and presented with the challenge of only using their skills if it pertained to the class material. Often class discussion would lead to analogies, from the educator, that related what was being taught to the real world and things that happen in it. These students were encouraged to come up with similar analogies that could lead to a better understanding of the material by the entirety of the class. Needless to say, some rose to the occasion, whereas others preferred to simply keep their comments to themselves until the end of the day's lesson.

At the end of each class it seemed as though the students understood the material that was presented to them and what was discussed. Questions would be posed to the class as a whole to gauge retention of material and students all seemed to comprehend what was being asked of them and were able to answer correctly. Some students were, of course, quicker to answer than others. Those advanced students were encouraged to let others have a chance to answer. The students who did not answer would be called on to answer in efforts to get the entire class to participate and make sure that everyone was on the same page.

Chapter 5: Assessment

Examinations and Quizzes:

Over the course of a lesson, students were assessed as to how much of the material they retained. These assessments came in the form of tests and quizzes and were primarily based on in class discussion. Over the course of a lesson, review questions were posed to the students. These review questions expressed the points that were thought to be the most important out of the lesson. Examination and quiz questions originated from these review questions as well as questions that the students posed during both their review game and through the lesson.

Exam and quiz formats varied through the duration of this teaching practicum. Exams typically consisted of multiple choice, short answer, identification, and essay questions. Keeping in mind that some students do not test well, this format made it possible for students to all have an area to excel in. At times, however, when a lesson was either short or not many different questions could be posed to fill an entire exam of the previous format, the format of the exam was altered to only contain short answer questions. Students showed the ability to excel in this format as well as the previous. Short answer questions provides an opportunity for students to explain their rational and show that they know more than just what the question is asking.

Quizzes from this course mostly took the form of a set of short answers that were either word-for-word or very close to the review questions that had been previously been asked of the class. Quizzes were designed to be a pseudo check point through the lesson to make sure that students were paying attention and were keeping up with their studies. Some quizzes took a different form and were in the format of an oral assessment. These oral assessments required students to individually come to the front, pull the names of anatomical features out of a bucket, and identify them on an image that was in front of them. This format made it impossible for checking to occur, it tested students in a verbal manner, and students tended to do very well with them.

Examples of the examinations and quizzes administered in this course can be seen on the following pages. Further, and complete compilation, examples can be seen in Appendix VII.

Example Quiz

Nervous System Quiz

1) How is the Nervous System similar the Endocrine System? How are the two different?
2) Explain the difference between Sympathetic and Parasympathetic.
3) What is the phagocyte of the Nervous System?
4) What part of the neuron relays messages to other neurons / the body?
5) What 2 things can initiate an action potential?
6) What is the importance of the Schwann cell?
7) How are the lobes of the brain named?
8) What is the 1st part of the brain to be effected by alcohol?
9) Where is the true emotion center of the body?
10) What are the names of the 3 layers of the Meninges? What is their purpose?

Example Exam #1

Name: _____ Mr. Kuhlwein

Circulatory System and Blood

Exam

Part I: Multiple Choice (5 pts each)

1. This brings blood away from the heart and to the body.
a) Veins b) arteries c) capillaries d) capillary bed

2. This brings blood to the heart and away from the body.
a) Veins b) arteries c) capillaries d) capillary bed

3. This is the site of gas exchange in the circulatory system.
a) Veins b) arteries c) capillaries d) capillary bed e) both a and c f) both c and d

4. What is the purpose of the Intrinsic Conduction System?
a) It controls the valves and when they open and close
b) It keeps the heart beating in a normal rhythm
c) It is what turns the blood red
d) It protects the heart from foreign materials

5. What makes the "Lub" sound of the heart?
a) The closing of the AV valves
b) The opening of the AV valves
c) The closing of the Semilunar Valves
d) The opening of the Semilunar Valves

6. What helps the arteries support the constant pressure of the blood being forced through it by the heart?
a) A think Tunica Media
b) The Endothelium
c) The Valves
d) The blood plasma

7. Which is NOT a characteristic of Red Blood Cells?
a) Donut Shaped
b) Contain hemoglobin
c) Help in bodily defense
d) They do not contain a nucleus

8. The blood plasma is made up of all the following EXCEPT….
a) Proteins b) waste products c) water d) RBCs

9. What is the scientific name for Red Blood Cells?
a) Erythrocytes b) Lymphocytes c) Leukocytes d) Basophils

10. What structure is shared by all of the blood vessels?
a) Tunica Media b) Endothelium c) Tunica Intima d) Tunica Externa

Part 3: Short Answer (5 pts each)

11. What is the difference between the Semilunar Valves and Atrioventricular Valves? (think in terms of structure and location)

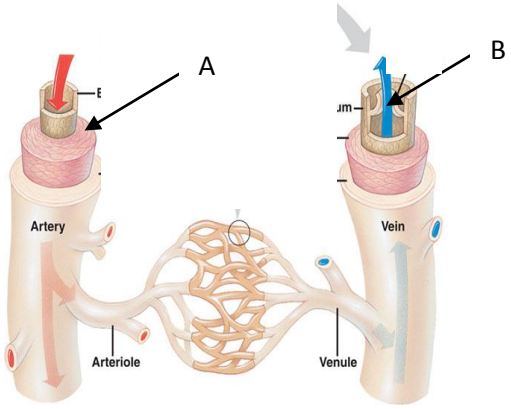
12. What is the difference between Systole and Diastole?

13. What is the advantage to capillaries being a part of a Capillary Bed?

14. Vena Cava→ _____ → Right Ventricle → _____ → Lungs → _____ → Left Atrium → _____ → Aorta → _____

Part 4: Identify (5 pts each)

15. What is the structure at A
16. What is the structure at B



Part 5: Essay (20 pts)

17. Describe the individual White Blood Cells. (Neutrophils, Eosinophils, Basophils, Lymphocytes, and Monocytes) (think of what they look like and what they do)

Extra Credit: (2 pts each)

-What is the role of histamine?

-What is the role of heparin?

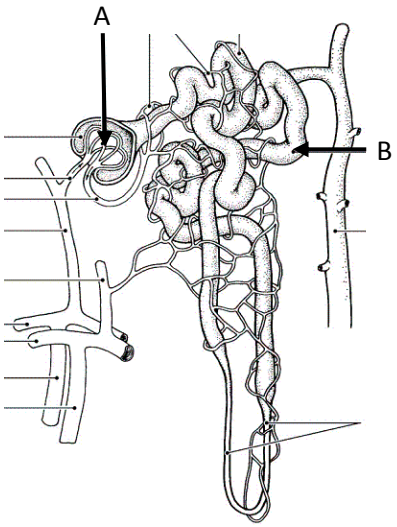
Extra Credit 2: (5 pts)

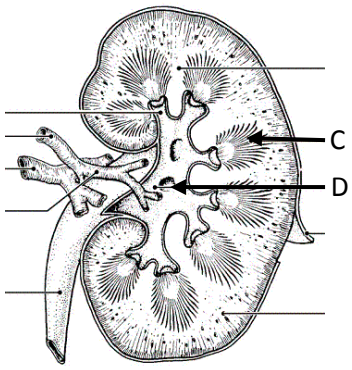
-Draw a diagram (with labels) of how the blood moves through the heart.

Example Exam #2

Exam: The Urinary System

1. What are the 2 things that the Urinary System is responsible for doing for the body? (8 pts)
2. Identify the following. (2 pts each)





3. Explain the relationship between the Glomerulus and Bowman's Capsule. What happens at this junction? (8 pts)

4. What is located within the Renal Pyramids? How many of these structures are located in 1 Kidney? (8 pts)

5. Explain Tubular Reabsorption and Tubular Secretion.

6. What are Transitional Epithelial Cells? How do they work? (Please include a picture demonstrating how they work) (8 pts)

7. How many sphincters are located in the Urethra? What purpose do they serve? (8 pts)

8. Explain the process of Urination? (8 pts)

9. Name the organs of the Urinary System. What is the purpose of each? (8 pts)

10. Describe the path that urine takes as it passes through the Urinary System. (Start at the Glomerulus, finish at the Urethra, and describe what is happening at each step of the way) (28 pts)

Poster Project:

Over the course of the second semester, the students in Vertebrate Anatomy were required to complete a poster project on a disease/disorder of one of the systems of the body. This project is designed in such a way that has students presenting periodically through the semester, all depending on what system they choose, and awards extra points to those students who choose to pursue a project with an early due date. This project also benefits students who decide to complete the entire poster project by themselves by offering them an extra test grade.

The Poster Project requires that students research their disorder in such a way that they can confidently educate the class as to how the disorder comes about, complications that come with the disorder, and treatments for the disorder. This information must be present on the poster board, along with a list of references, and the information is to be presented in an organized and thoughtful way to the rest of the class. The students are then graded, with the help of a rubric, on their information, how it is presented, and how prepared they are for the presentation. A copy of the Poster Project Criteria and Grading Rubric can be found on the following pages as well as in Appendix VIII. Furthermore, pictures of various Poster Projects submitted can be seen in the same Appendix.

Disease / Disorder Poster Project

Due: Feb. 4th	March 4th	March 25th	April 8th	May 6th	May 20th	June 10th
Respiratory System	**Cardiovascular/ Blood**	**Lymphatic/ Endocrine**	**Nervous System**	**Digestive System**	**Urinary System**	**Reproductive System**
+Pleurisy	+Sickle Cell Anemia	+Gigantism	+Multiple Sclerosis	+Emesis	+Hydronephosis	+Sexual Infantism
+Lung Cancer	+Leukemia	+Addison's disease	+Huntington's Disease	+Peptic Ulcers	+Renal Failure	+Sterility
+Emphysema	+Heart Murmurs	+Cushing's disease	+Meningitis	+Pancreatitis	+Kidney Stones	+Gonorrhea
+Chronic Bronchitis	+Congestive Heart Failure	+Autoimmune Disease	+Hydrocephalus	+Constipation	+Polycystic Kidney	+Breast Cancer
+Cystic Fibrosis	+Varicose Veins		+Alzheimer's			+Dystocia
			+Parkinson's			
+5 pts	*+3 pts*	*+1 pt*				

Poster Project Criteria

What: Poster Project

How Long: 5-10 minutes

What to Include: - How do you get this disease / disorder?
- What complications are there?
- Can this be treated? How?
- Is this fatal?

What to Have on the Poster:
- Images of the disease / disorder
- Information about the disease / disorder
- Name of the disease / disorder clearly visible
- Your name
- List of references (on back)

How Will you be Graded: Look at the rubric for grading criteria. If you choose to work in a group, this project will be worth *1 Test Grade*. If you choose to work alone, this project will be worth *2 Test Grades*.

Groups: If you choose to do so, you may be in a group of no more than 2 people.

Seniors: Seniors can **NOT** choose a topic relating to the Urinary System or the Reproductive System.

Poster Project Grading Rubric

Disease/Disorder Poster Project

Vertebrate Anatomy

Mr. Kuhlwein & Mr. King

Doherty Memorial High School

Student Name: _____

CATEGORY	4	3	2	1
Time	7-10 min	5-7 min	3-5 min	1-3 min
How do you get _____?	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a good understanding of parts of the topic.	Does not seem to understand the topic very well.
What complications are there?	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a good understanding of parts of the topic.	Does not seem to understand the topic very well.
How is it treated? Is it fatal?	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a good understanding of parts of the topic.	Does not seem to understand the topic very well.
Preparedness	Student is completely prepared and has obviously rehearsed.	Student seems pretty prepared but might have needed a couple more rehearsals.	The student is somewhat prepared, but it is clear that rehearsal was lacking.	Student does not seem at all prepared to present.
Organization	Student does an excellent job organizing both poster and presentation	Student does a good job organizing both poster and presentation	Student has somewhat organized their poster and presentation	Neither poster nor presentation are organized

1 point (because I am nice)

_____/25

x 4

_____/100

Chapter 6: Conclusion

The opportunity to teach at Doherty Memorial High School made many points very clear. Teaching is a creative and interactive profession for one to pursue for a career. Educating makes exacting demands on the individual's patience and requires a great deal of dedication for a long period of time. This being said, teaching is an extraordinary experience and a very rewarding career. Teachers from every department at Doherty have voiced this point and mentioned how it has been a great addition to their life.

Through this teaching practicum many obstacles had to be overcome and challenges faced. With time, nearly all college students develop into individuals who are accustomed to staying up late to complete assignments for classes. This style of living does not translate well into the lifestyle of a teacher. Early mornings made it quite hard to follow the normal routine that I have been accustomed to for such a long period of time. In addition to having teaching obligations, over the course of this teaching practicum I also had a full course load of classes to manage. Many a time the social aspect of college had to be put on hold in efforts to be fully alert the next day for the sake of the students and their education.

Teaching has proved to be a very emotionally draining career for one to undertake. With a classroom full of students, and wanting to provide them with the best possible lesson possible, a teacher is supposed to be constantly alert and upbeat. I believe that I rose to this occasion and was able to keep the students involved through the entirety of the lessons. This did, however, come at the expense of me. I would many a time leave Doherty Memorial High School, after a day of teaching, feeling tired and wanting to relax. These feelings grew, as the semester progressed, but were never successful in overcoming my alertness and attitude.

One last obstacle which needed to be overcome was the attentiveness of some students in the classes. It is quite disheartening when students blatantly do not care about school, let alone the topic that you are trying to teach. I feel that I overcame this obstacle in two ways. First, I made lessons relevant to the students. I feel that this was made easier due to the small age gap. Making the lessons relevant to the students along with coming up with various analogies to describe certain bodily functions is one of the aspects of my lessons that I feel helped in this area. I am also a very personable person and love interacting with individuals of every type. I feel that this personal trait aided in my connection with the students as well as helped them in the long run.

Many aspects of this practicum were very enjoyable and made the entire experience quite memorable. The ability to choose what topics to teach, and subsequently which areas of those topics to

stress, gave me a lot of possibilities in terms of creativity. Anatomy and Physiology being a subject area in which I am passionate, lead to many creative approaches at conveying material. With the background in the subject area that I have, I was able to have conversations with students on certain bodily systems with ease. The fact that I was also able to choose topics to stress during a lesson gave me plenty of time to show my love for the material. The level of enthusiasm had by me translated into the relative level of enthusiasm had by the students.

Student involvement was one of the driving forces to my continual enthusiasm and increased effort towards this teaching practicum. When students do not care about a topic, teachers often become discouraged. It is a disheartening to the educator feeling when a student does not share the same enthusiasm for the material. This being said, when a student does show that same enthusiasm it is a wonderful feeling. At times through the semester, students would ask about certain systems or processes outside of the classroom lesson. The fact that something that I said sparked interest and caused a student to do further research was, and still is, a great feeling.

Another enjoyable aspect to this practicum came from the conversations I had with many of the teachers from different departments in the school. Multiple friendships were made over the course of the practicum and regular contact is still had between me and some of the teachers from Doherty. Having the constant support of many professionals was a key factor to the insight that I had towards classroom management and trouble students. Most of the teachers knew the students and had tips to working with them that I was later able to use in the classroom. If it were not for the help of all of those individuals, I would have had a much harder time with the teaching practicum.

Overall, I had a great experience Student Teaching at Doherty Memorial High School. This has been an experience that I will treasure for a lifetime. Much was learned over the course of this practicum. Over the course of the Teaching Methods course, topics such as classroom management, lesson planning, and assessments were discussed. This practicum did much to practice those points and develop the skills needed to be a good professional teacher. Though I do not plan on teaching right after graduation from WPI, I do plan to pursue a career in secondary education at a later date.

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Appendix: