



# A Teaching Practicum in Biology/Anatomy

An Interactive Qualifying Project Report

Submitted to the faculty of Worcester Polytechnic Institute

In partial fulfillment of the requirements for the

Degree of Bachelor of Science

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Date: October 13, 2016

# Table of Contents

<b>Table of Contents</b> .....	<b>2</b>
<b>Abstract</b> .....	<b>3</b>
<b>Chapter 1: Background</b> .....	<b>4</b>
The Education Reform Act of 1993.....	4
Massachusetts Testing Achievements.....	5
Socio-Economic Profile .....	6
MCAS Profile and Demographics.....	7
English Language Learners/Class Breakdown.....	9
<b>Chapter 2: Well-Structured Lessons</b> .....	<b>10</b>
<b>Chapter 3: Adjustment to Practice</b> .....	<b>13</b>
<b>Chapter 4: Meeting Diverse Needs</b> .....	<b>15</b>
<b>Chapter 5: Safe Learning Environment</b> .....	<b>17</b>
<b>Chapter 6: High Expectations</b> .....	<b>19</b>
<b>Chapter 7: Reflective Practice</b> .....	<b>21</b>
<b>Chapter 8: WPI Education</b> .....	<b>23</b>
<b>Chapter 9: Class Dynamics</b> .....	<b>25</b>
<b>Conclusion</b> .....	<b>30</b>
<b>References</b> .....	<b>31</b>
<b>Appendix</b> .....	<b>32</b>
Appendix A: Weekly Plan	
Appendix B: Mr. King’s Quiz	
Appendix C: My Quiz	
Appendix D: Review Game	
Appendix E: Daily Lesson	
Appendix F: Special Education Accommodation Form	
Appendix G: Do Now Booklet	
Appendix H: Additional Student Work	

## **Abstract**

This paper serves to summarize the teaching practicum experience of a biology/biotechnology student. The practicum occurred during the 2016 spring semester at Doherty Memorial High school in Worcester, MA. The intended purpose of this paper is to fulfill the requirements of the Interactive Qualifying Project (IQP) at Worcester Polytechnic Institute, and to demonstrate completion and proficiency of standards set by the Massachusetts Department of Elementary and Secondary Education.

## **Dedication**

There are several people that I would like to dedicate this paper to. The first is my AP biology teacher Mrs. Linfield, who inspired me to love teaching, biology, and a combination of both. My IQP advisors John Goulet, Shari Weaver, and Katie Elmes who guided me along this journey; I wouldn't have made it without their help. My mentor teacher Brian King, a wonderful educator that I was fortunate enough to be placed with. And finally, my students. I miss each of them every day and I hope I made as big of a difference in their lives as they made in mine.

# Chapter 1: Background

## The Education Reform Act of 1993

Before 1993 the mandatory curriculum for Massachusetts state schools were few, with only a need to fill history and physical education requirements <sup>[1]</sup>. Students were only held accountable to very minimal standards, and schools were not held accountable for every child's success; there were no penalties for public schools if their students were not doing well in core subject matters <sup>[1]</sup>. The Massachusetts Reform Act was a legislation passed in 1993 to create learning standards for students within the other core subjects <sup>[2]</sup>. It mandated that over a seven year period, public school systems would need to make several major reforms in order to receive state funding <sup>[2]</sup>. These reforms included a school council in every school, more defined roles for teachers and principals, and clearer goals for students and educators <sup>[1]</sup>. After this act was passed, from 1993 to 2002 the state spending for public school increased 8 percent per year until the total reached over 2 billion dollars <sup>[1]</sup>.

The Reform Act included the addition of a statewide test known as the MCAS <sup>[1]</sup>. The test was created with the intent of reviewing the success of each student, to ensure that the schools were reaching academic standards <sup>[1]</sup>. The test is also used to view problem areas in the curriculum and with individual students <sup>[1]</sup>. The Act requires that the test be given to students in grades 4,8, and 10, however many schools choose to have students take the test every year in order to gain more state funding if the tests reach or exceed the requirements <sup>[1]</sup>. It is also required that all students must pass the 10<sup>th</sup> grade test in order to receive their high school diploma <sup>[1]</sup>. For those students that pass or do exceptionally well on the test, they are eligible to receive Certificates of Occupational Proficiency or a Certificate of mastery known as the John and Abigail Adams Scholarship <sup>[1]</sup>.

The Act also included the beginnings of charter schools, independent public schools that operate under 5 year charters, granted by the Board of Education <sup>[3]</sup>. These schools meet the same academic standards and criteria as other public schools, however they are free to structure their curriculum and school environment for further success <sup>[3]</sup>. While all public schools must reach a minimum of 900 academic learning hours for elementary schools and 990 hours for secondary schools, charter schools can make school days longer or instruct on

weekends in order to add more instructional hours and fit more material into every school year [3].

Lastly, the Act raised expectations for all educators [3]. Beginning in 1998, new teachers were required to pass two tests in order to receive licensure; one for their subject matter and one for literacy and communication skills [3]. Current teachers that wish to teach other subjects must also pass the test for that specific subject [3]. All of these requirements are overseen by the Board of Education, and schools are reviewed every year [3]. If a school is underperforming, they could receive extra requirements, goals to reach, or even a cut in state funding [3].

### Massachusetts Testing Achievements

Among the states, Massachusetts is regarded to have some of the best schools in the country, especially schools focusing on science and medical fields [4]. In 2015, the *Quality Counts Test* showed that Massachusetts had the top score in the nation, and it is notable that the state can usually be found in the top 5 when the test is performed [4].

TIMSS stands for the Trends in International Mathematics and Science Study [4]. This is an international assessment tool that assess the success of students in science and math, and is given in 4<sup>th</sup> and 8<sup>th</sup> grade (or the international equivalent) [4]. TIMSS test results were not available for the most recent 2015 test, however the 2011 science test shows the following scores in regards to 8<sup>th</sup> grade student’s scores and confidence levels:

**Table 44. Average science scores in grade 8 for selected student groups in public schools in Massachusetts: 2011**

Reporting groups	Science Grade 8
TIMSS scale average	500
U.S. average	525 *
Massachusetts average	567 *
Sex	
Female	564 *
Male	570 *
Race/ethnicity	
White	587 *
Black	514
Hispanic	494
Asian	576 *
Multiracial	576 *
Percentage of public school students eligible for free or reduced-price lunch	
Less than 10 percent	594 *
10 to 24.9 percent	589 *
25 to 49.9 percent	553 *
50 to 74.9 percent	550 *
75 percent or more	477

[4]

Individually, Massachusetts had a score of 567 <sup>[4]</sup>. While this is fairly behind some of the top scores internationally, this score reflects that Massachusetts was a lot higher than the national average of 525, however many states did not participate in the TIMMS test <sup>[4]</sup>. It is also important to note that there is a correlation between income and how well students performed on the test, as seen at the bottom of the table <sup>[4]</sup>.

### Socio-Economic Profile

I completed my practicum at Doherty Memorial High School, located on Highland Street in Worcester. The following information is taken from data collected in 2012-2013, the most recent data available. The student population is listed at 1,333 with 381 9<sup>th</sup> graders, 336 10<sup>th</sup> graders, 295 11<sup>th</sup> graders, and 321 12<sup>th</sup> graders <sup>[7]</sup>. Currently 56% of students are from a minority race, and the most recent breakdown of specific ethnicities is shown in the table below:

<b>Race</b>	<b>% of Total Student Body in 2013</b>
Caucasian	44.0
Hispanic	29.0
African America	14.0
Asian	10.0
Multi-Race, Non-Hispanic	2.0
Native American	1.0
Native Hawaiian, Pacific Islander	0.0

<sup>[7]</sup>

There are currently 50% males and 50% female students within the school <sup>[7]</sup>. 7% of the student body is enrolled in the reduced lunch program and 52% of all students are enrolled in the free lunch program <sup>[7]</sup>. Combined, this shows 59% of students are considered economically disadvantaged <sup>[7]</sup>.

### MCAS Profile and Demographics

The MCAS profile from Doherty Memorial High School is also from the 2012-2013 school year, and includes only the English and Mathematics proficiency distribution <sup>[8]</sup>. There was no data available for the results of the biology MCAS taken by 10<sup>th</sup> graders in order to receive their diploma. These scores and raw data can be seen in the tables below:

## English Proficiency Distribution 2012-2013

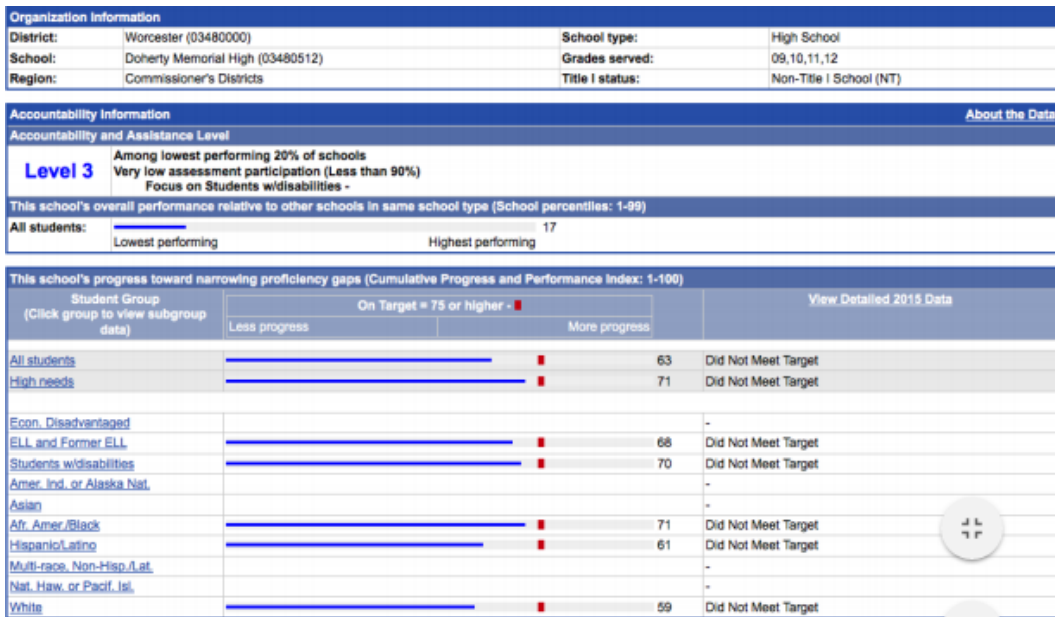
Failing	4%
Needs Improvement	10%
Proficient	53%
Advanced	32%

[8]

Failing	10%
Needs Improvement	18%
Proficient	24%
Advanced	48%

[8]

As of 2015 Doherty is considered a level 3 school, meaning that it is among the lowest performing schools, and its progress in closing in on proficiency gaps is still not enough to reach set goals [7]. They have a low overall performance rating when compared with other schools of the same type [7]. Doherty Memorial High School also noticeably struggles with student attendance [7]. Their average number of days absent per student during the school year is 11.6, and 43.3% of the student population is absent for 10 days or more [7]. From the tables shown below, it is indicative that a large portion of the absences are unexcused and a large number of students are chronically absent [7].



[7]

	School	District	State
Attendance Rate	93.0	94.7	94.7
Average number of days absent	11.6	8.8	9.0
Absent 10 or more days	43.3	32.5	32.0
Chronically absent (10% or more)	21.4	14.7	12.9
Unexcused Absences > 9	35.5	29.8	12.5
Retention Rate	3.4	2.1	1.5

[7]

In regards to students after graduation, Doherty Memorial High School has a higher number of students that attend a four-year college in comparison to district percentages [8]. The largest percentage of graduating students from Doherty enroll in a two-year public college, as seen in the figure below [8].

Plan	% of School	% of District	% of State
4-Year Private College	26	18	29
4-Year Public College	28	20	30
2-Year Private College	1	2	1
2-Year Public College	33	40	21
Other Post-Secondary	2	2	2
Work	6	9	8
Military	2	3	2
Other	1	1	1
Unknown	1	6	6

English Language Learners

An English Language Learner, or ELL, is a person that is learning to speak English in addition to their own native language [9]. This term is usually used to describe students in grades K-12, and they are the fastest growing segment of the student population [9]. New students to the school district that might be ELL students are asked to take an at-home survey and a written and oral exam before they begin attending school [9]. This exam allows the school district to see these student’s abilities in reading, writing, and speaking English, as well as the abilities of their parents and the languages spoken at home [9]. There are currently 5 levels used to place these students [10]. 1<sup>st</sup> level ELL students have little or no grasp on the English language [10]. They mostly speak their native language, may only know a few English words or phrases, and only speak their native language at home [10]. In contrast, level 5 ELL students are almost at or are the same level of native English



speakers; they can converse, read, and write in English at their grade level with little or no difficulties <sup>[10]</sup>. Once an ELL student is placed after the test, it is the goal of the school and the educators within to get each student to level 5 to reach their full academic potential <sup>[10]</sup>. To do this, educators use what is called Sheltered English Immersion, or SEI <sup>[11]</sup>. It is an approach used to teach ELL students the subject content at a level they can understand and do well in with the right amount of help <sup>[11]</sup>. All educators applying for their first initial license, including myself, must be SEI endorsed <sup>[11]</sup>.

### Class Breakdown

In my first period college-level Anatomy class there were thirteen students. Of the thirteen students, seven were male and six were female. Two students were considered English Language Learners (ELL) and five were considered part of the Special Education (SPED) program. While each student had vastly different needs, in general each of these students needed additional time and assistance with tasks. The first languages spoken by my ELL students in this class were Hindi and Albanian. The SPED program is a resource for students that have various learning disabilities that provides them with tools and additional assistance in order to perform on level with their peers, and informs the teacher of their specific accommodations. A few common accommodations in all of my classes included one-on-one instruction, preferential seating, and periodic breaks.

In my third period college-level Anatomy class there were twenty-two students. Of the twenty-two students twelve were male and 10 were female. Eight students were considered English Language Learners (ELL) and four were considered part of the Special Education (SPED) program. The first languages of my ELL students were Spanish, Arabic, and Vietnamese.

In my fifth period college-level Anatomy class there were fifteen students. Of the fifteen students 10 were male and five were female. Three students were considered English Language Learners (ELL) and four were considered part of the Special Education (SPED) program. The first languages of my ELL students were Spanish and Arabic.

## Chapter 2: Well-Structured Lessons

To me, a well-structured lesson has several important components. It must meet the education standards set by the state and the school, be highly engaging in order to retain the student's interest, and somewhat challenging so that students push themselves to think beyond what they believe they are capable of. What I learned right away was that my students thrived on routine, and so that was the way I structured my lessons. I not only created daily lesson plans, but weekly plans so that my students would know where our lessons were heading.

I always created a weekly plan for myself in advance so I could make sure that my daily lessons would include every necessary component for optimum student learning. Although there were not specific state standards, I wanted every lesson to have clear objectives, information, activities, and summaries, and creating weekly plans helped me to assure that everything was in place. An example of a weekly plan I created can be seen in Appendix A. My classroom's weekly routine was always very similar. On Monday I would write that week's objective on the board so that students would understand what our short term and long term goals were- for example, "This week we will be studying the endocrine system in order to understand what types of hormones our body has, what they do, and which organs release them. This will lead into our study of the brain and how it controls the release of hormones next week." I would then introduce the new subject by having them "remind me" what they had learned the previous week, and slowly incorporated the new material and vocabulary into our discussion. Homework would be assigned that would be due Friday, usually specific questions from their textbook. While I did assign other smaller homework assignments, I wanted my students to complete this homework throughout the week as they learned more about the subject. This system kept them thinking about the topic and taught them to connect that day's information to the things we learned in previous days.

Every Friday I would check to make sure that the students did their homework, and then give them a quiz. When I first looked at Mr. King's quizzes, I saw that they all looked the same: 10 short answer questions. Several of the questions were random homework questions pulled straight from the book. He didn't collect the homework, but added in these questions to make sure that students actually completed it instead of scribbling down random answers. An example of one of Mr. King's quizzes can be seen in Appendix B. As a person who

has always struggled with specific types of test questions, I knew that I had to change the way these quizzes were given. Each week my quizzes still had a few homework questions in them, but they also had a variety of question types; multiple choice, short answer, matching, true and false, and fill-in-the-blank. This way even if students had a hard time with one type of question, they still had the opportunity to do well and prove that they knew the material. An example of one of my quizzes can be seen in Appendix C.

Almost every Thursday I ran a review game during class to reinforce the information that was learned during the week, unless that week had a lot of subject material that needed an extra day to be covered. Students would group into teams of four or five and would answer questions that I asked them in order to score points. The questions were laid out like the game “Jeopardy”, as they were grouped into categories and listed from easiest to hardest. This game layout was extremely helpful for me to understand how the students would perform on the quiz the next day: if multiple students were having difficulties with the same question, we would pause the game and review the material. At first a lot of the students opposed the idea of playing the game, as I required each student to answer at least two or three questions in order to make sure that they had a good grasp on the material. However, once this game became part of their routine they looked forward to it and encouraged each other to study and pay attention so that they would do well and score a lot of points. An example of one of the review games can be seen in Appendix D.

My daily lessons also had a routine. An example of one of my daily lessons can be seen in Appendix E. Each day I would write an objective on the board so that students would know what they were expected to learn and master that day. When students walked into the room, they would have a “Do Now” activity on the board and their Do Now booklets would be on a table in the back of the classroom. It took about a week, but once the students learned the routine they would come in, grab their books from the table, go to their seats and complete the Do Now. The Do Now was always a question that related to the previous day’s lesson. This process made it so that when they walked into the classroom, they immediately started using their brains to recall information and get ready for the next lesson. In the study of human anatomy, it is vital to understand that all the systems in our body (vascular, immune, reproductive, etc.) are all connected and depend on each other in order to keep our bodies running and healthy. I noticed that, while Mr. King was extremely engaging with the students and kept their interest in the

subject matter, at the beginning of each week he would start a new subject without explaining how it connected to the things they learned previously. When I began to take over teaching these classes, I made sure in the Do Now to refer back to previous weeks and systems so that the students would store that information in their long-term instead of short-term memory, as it would be easier for them to remember later.

After we went over the Do Now as a class, I would introduce the new material for the day. This was done using a combination of writing on the whiteboard and using a projector. Writing the notes on the whiteboard made it so that I would set the pace of the class without going through the material too quickly or too slowly. It also allowed me to pause periodically and ask for questions. While I did sometimes use PowerPoints I found that although I could pack in more information, students could not take all of the notes and did not have time to participate or ask questions so I preferred the white board method. The projector always had a visual picture of what we were focusing on- anything from the inside of a kidney to the way blood flows through the body. This visual component was vital to lessons, as it gave the students a clear picture of what we were talking about, where in the body things were happening, and allowed me to discuss the material without attempting to draw figures, which I am terrible at. Once the notes were done I allowed for a 5 minute question and answer session so that I could go over anything they missed or weren't clear on. Usually I would take questions, and if no one had any I would cold-call students to come up with a question related to the material. If this happened, I would usually ask one of their peers to explain the answer, which not only helped the student with the question but allowed their peer giving the answer to memorize the material even better by delivering it in their own words.

Once the notes were done students would complete some type of activity to reinforce what they learned that day- a vocabulary or labelling worksheet, a flowchart to connect ideas and materials, etc. This activity was their exit ticket so that I knew they had paid attention during class, and if they did not finish it, it was assigned as homework. All of these things we did in the day (Do Now, notes, questions, activities) are the components of a well-developed lesson, and were the key to both myself and my students success within the classroom.

## Chapter 3: Adjustment to Practice

The second standard required of teacher candidates is adjustment to practice. I took several courses before entering the classroom, all designed to prepare me for teaching. And while those courses were helpful in certain aspects, it was not until I stepped into the role of a teacher for the first time that I realized there was a lot more to teaching than delivering a lecture in front of a chalkboard. The first lesson I learned was that teachers have to be flexible because things don't always go as planned. I created my weekly and daily lesson plans, and while I could go over them and practice them to myself I could not plan for the things that would happen during class time. I would never be able to plan for the off-the-wall questions my student's sometimes had. Instead, I had to learn to adapt and answer their curveball (and sometimes hilarious) questions and comments with good answers on the fly. There were also some times when students were just having a tough time with the material and I could not move forward like I had planned. Instead I had to slow down, review and go over the material they were struggling with, and rearrange the weekly plan. As a college student before teaching, moving around my schedule like that would have been an extremely stressful situation; but as a teacher, it was just something I had to do in order for my students to be successful.

That's not to say that all of my classes moved at the same pace. Usually, my period three anatomy class moved through the material more quickly than first and fifth period, and I had to adapt to this situation. Perhaps it was because that class had almost twice as many students as the other classes and therefore more peer help, but within the first week I learned that they needed less review. To solve this issue whenever they had mastered the original material, I would give them more complex problems and material to consider. For example, all three classes learned about the components of the urinary system. Since the third period class finished early, I would then ask them what would happen if certain organs within this system failed. This took their thinking to a higher level as not only were they taking the information I gave them, but they were using that information to form their own conclusions and hypothesis. The review game was a large component of adjusting my lessons to fit my individual classes' needs. Once I saw that several students were having trouble with a similar question, I would stop the game and review the topic. Each class usually had trouble in different areas, and this allowed me to go over the rough spots the class really needed to review the most.

The second lesson that I learned is that not all high school students are motivated to attend school or go to anatomy class. After being in a college setting for several years, and AP/honors classes in my high school years, it was easy to forget that not all students are eager for the information that teachers provide. I had to learn ways to keep student's attention and help them to absorb and remember the material I was teaching. Mr. King was the one to show me the best way to do this: by telling interesting stories, either from your personal life or from the news. He had a story for almost every lesson he taught. They were always either hilarious or gross, both components of keeping a teenager's attention. I quickly noticed that whenever he would tell these stories, every student would pay attention. When I became the teacher, I had to learn to pull away from my notes and structured "script" and reach into my own life and experiences, as well as theirs. When we learned about the brain and spinal cord, I asked if any of them had ever had a concussion. There were several in each class who had, and I asked them to share their stories about what happened and what their symptoms were. For the quiz that week almost every student got the questions related to that correct, because they remembered their peers stories. When I told my students about the time I broke my ankle in order to teach about tendons and muscles, they asked me questions about it for days afterwards and shared their own stories of broken bones and muscle tears, which helped them to retain the information I had taught them. By learning to be more flexible and relevant with my students, I adjusted to the practicum extremely well. These lessons that I learned cannot be taught, I only learned them by becoming a teacher myself.

## Chapter 4: Meeting Diverse Needs

As mentioned in Chapter 1, my classes were full of students with diverse needs and accommodations. One of the hardest things I had to adapt to during this practicum is that all students learn and progress at different levels. In my third period class alone, I had an English Language Learner (ELL) Spanish student that was a joy to have in class and could speak English rather well, but his reading and writing English skills were so limited that he completed his work more slowly than everyone else and had trouble understanding written instructions. The ELL Vietnamese girl that sat directly next to him had trouble with verbal English communication, but finished her written work quickly and usually attained perfect scores. These types of dilemmas seemed impossible to overcome at first, but with a few tricks and some practice I was able to accommodate every individual student's needs proficiently.

Those students in the Special Education (SPED) program had specific accommodations that were easily arranged. An example of a classroom accommodation form can be seen in Appendix F. Several of them needed preferential seating, meaning anything from sitting in the front to sitting near a door if they needed to leave quickly. Mr. King already had students in assigned seating with the accommodations taken into account. Some needed more time to complete their work. For those students, I spoke with them one-on-one to make arrangements to come to the classroom during free periods or after school to complete work if they needed it. For students that needed repeated directions/notes, I would walk around the room as students completed activities and repeated the directions to each group of students working, so that they would all hear the information and no single students were called out. These are just a few examples, however I made sure that each student had the tools they needed to succeed.

One of the most important things I did was to talk to each student one-on-one at least once a week. This became easier over time as my students became more comfortable with my presence and the knowledge that I would always meet their questions and comments with positive answers and reinforcement (further explained in Chapter 5). During these chats I would ask students if there was anything specific they needed help understanding, if they had any ideas or comments to take their learning further, and after that just about how their day was going. Most student accommodations include one-on-one time and positive reinforcement, and this is never a bad thing even for students with no

accommodations. Doing this assured me that each student was learning at an acceptable pace, that they had everything they needed, and that their personal lives were fine so that they were in an optimal learning mood. For ELL students, this gave me the opportunity to let them know how to best learn the information I gave them; by drawing pictures, making maps to connect ideas, etc. I reassured them that there were many ways to learn the material and always gave them several options and ideas on how to do so.

A big divide that I noticed right away was that some students answered questions all the time, and some did not. This also had a lot to do with student pacing- some students worked a lot faster than others. Over time this became less of an issue as students began feeling more safe in the classroom, however there were always students that were too shy to offer answers to questions. I knew that all of my students were more than capable of understanding and answering, so I began to use the cold calling method. This ensured that all students remained focused and that everyone would participate almost every day. This method showed me that most students knew the answers and had good information to add to classroom discussions, even if they were too shy to volunteer the information without a push from me. If a student didn't know an answer, I would ask their peers to help them out. Eventually even the shy or stubborn students began volunteering answers when they learned that they would not be judged by their peers or by me. Meeting all of these diverse needs was a challenge, but once I got into the routine of performing all of these tricks and tips it became second nature and assured me that each student had more than enough potential to succeed, no matter what level of learning they were at.



## Chapter 5: Safe Learning Environment

The number one thing I was told by my practicum advisors who came to observe me was that it was very clear to them that my classroom was a safe place, even when I was first starting out. The first thing I did to create a safe learning environment was to create a classroom routine, as described in Chapter 2. When students know the routine of the classroom and know what to expect from their teacher, their stress levels decrease and they are able to thrive and open up to answer questions and brainstorm ideas. Although students would complain about completing a Do Now every day, it was a large part of helping them settle into class and prepare for the lesson. There was one day that I did not put a Do Now on the board, as it was the week before a break and I had a project for students to complete instead of the normal notes/questions/activity. For each class, as my students filed into the room they were very confused about why their Do Now booklets were not on the back table. They were unsure of what to do, and instead of sitting in their seats they wandered around and chatted. It took several minutes to gain their attention and although they were working on group projects, for the rest of the class period they were rowdy and anxious. For the rest of that week I put a Do Now on the board even though it was not in my original plans, and the student's moods were much improved.

At first, very few students liked to answer questions or participate in class discussions. To fix this, whenever a student answered a question with a wrong answer, I would never say "no, you're wrong" and move on, which would most likely embarrass them and make them not want to answer anymore. I would always say something like "not quite but you're thinking in the right direction, can anyone tell me why?" and it would lead other students to help them out and make the connection from their answer to the correct answer. When their answers were correct, I would always praise them, saying things like "absolutely correct, great job!" This process was successful as more and more students began to participate in class discussions. Whenever I called on a student, I would say their name. This might not seem like a big deal, however when you learn your student's names they see that you care and that you know them, making them feel safer and more willing to answer questions aloud and discuss. There were a few quiet students that never asked for help or "zoned out". By interacting with them one-on-one both about their work and their personal interests/lives, they came out of their shells and began participating more both with me and with their classmates.

Towards the end of my time teaching, my students would talk to me about anything that was on their minds. Why their arm was hurting and how it could be connected to what we were learning in class. How it's possible for the human body to pump 2,000 gallons of blood per day. What their prom dresses looked like and how excited they were. Our mutual respect of each other was on such a great level that I created an activity that normally wouldn't be done in this type of high school: A debate on the usage of vaccines. Mr. King feared that the students would not debate peacefully and that fights would break out, however I was confident that my students could handle it. I was proven correct, as all three classes did fantastic research for the side they were assigned (either for or against vaccines) and used this information to debate with each other. While a few times their voices rose (some of them were very passionate about this subject), every student participated and was encouraged by their classmates on both sides. This activity ended with high praise from me and an explanation that this type of learning is an indication of content mastery and achievement. That week most student's got A's on their quizzes, and for the few weeks we had left they learned to debate and discuss anatomy topics with each other without fear of fighting, proving my classroom to be an extremely safe space to voice their opinions and ideas.

## Chapter 6: High Expectations

Before beginning my practicum, many of my family and friends warned me not to expect too much from my students; after all, I would be teaching at an inner-city public high school. Television, movies, and the media portray these types of schools as urban jungles where students run wild and refuse to learn anything. I was determined to set out and prove that every one of those kids had an endless amount of ability and brain power. From my observations of each class, I noticed that each day was exactly the same; forty five minutes of notes and an open-note quiz on Friday. While routine is important, and Mr. King's lectures were engaging, this type of learning is extremely ineffective. Students would copy the notes with glazed-over eyes, only half paying attention. Some of them wouldn't take notes at all and just take pictures of the board once Mr. King was done writing. Because they were allowed to use their notes, they just regurgitated the information they were told back onto the quiz paper without a deeper understanding of what they were writing down. I knew that their routine had to change in order for them to push themselves beyond what they believed possible.

The very first week I began teaching, I implemented my weekly and daily lesson plans (as explained in Chapter 2). I also warned them that from now on, notes and electronics would not be allowed with quizzes, as I believed that they could do well without them if they paid attention and worked hard. This was quite a shock to these kids that were never expected to perform activities or participate in class before. A lot of them still kept on not taking notes or taking pictures of the board and visuals. There were not many questions as students still zoned out. Truthfully the quizzes that first week were rough, as all the students thought I would let them use notes if enough of them still continued with their previous methods. Once they realized I was serious and would not be changing my mind, the majority began to take notes. This was the turning point for them. Because they were taking the notes as I was writing them down myself and explaining them, they were paying close attention to the material. By the end of my time there, student quiz scores rose dramatically- not one student failed my last quiz.

The human body is an interesting thing to most people, because we all have one. Once they were paying attention, they started realizing that they were interested and began thinking about what I was saying. This thinking led to questions. Because my classroom was such a safe space (as addressed previously in Chapter 5) everyone was comfortable asking questions about the material. A lot

of these questions were things that I hadn't even thought of. A lot of public schooling is teachers giving students information and expecting them to learn it. Once you reach the college level, you are asked to take this information and push further by questioning everything. As an example, you are not only expected to know the sections of a human heart, you need to question why it pumps, why there are four chambers, etc. This is what I wanted my students to do, and they exceeded my expectations greatly. Hands were raised throughout the classes every single day. Their questions were answered by myself with positive feedback, and eventually their peers answered with positive feedback as well. There were some days where I didn't answer a single question- if someone asked, one of their peers would say "I know the answer, can I tell him Miss?" and they would answer with great explanations and patience. As previously mentioned, by the last few weeks these students held a debate in the classroom with large amounts of knowledge, poise, and clarity. I told each class that these debates were college levels of thinking and learning, and because they could do that and push their thinking skills, they could do a lot more than they thought.

A lot of my students wanted to speak with me about their personal lives and issues as we got to know each other, because I shared some of my personal stories to relate to the material and the classroom was a safe space. As I heard a lot of their stories, I knew that not many people listened to them and they were relieved to have someone to listen to them. Several of my students had been in gangs for years. A lot of them worked one or even two jobs, or sold drugs, to support their families so they weren't in complete poverty. Some of them wore the same clothes to school almost every day. One of them had been shot and been close to death several times in his short life. I could understand why the media portrayed them in a certain light, and my heart still hurts for a lot of them. But they were all so much more than their stories, and my presence in the classroom proved it, not only to me but to themselves. With one-on-one guidance, help, and support, these students flourished. I helped them to organize their notebooks and keep track of their assignments even though they were extremely busy. During one lesson I taught them exactly how certain drugs work and what they do to destroy your body, and it shocked the students that were selling or taking them. My positive reinforcement and new rules reassured these students enough that they could push themselves without fear of judgement or negativity, and exceeded their own expectations by a wide margin.

## Chapter 7: Reflective Practice

The final standard is to reflect on practice. The purpose of this standard is to look at the effectiveness of lessons, activities, and student and colleague interactions in order to see progress and become a better and more effective teacher within the classroom. This is what sets apart a good from a great teacher. A good teacher will find a method that works for them within the first few years of their teaching, and run with it until the end of their career. A great teacher will consistently monitor their lessons and ask for other's feedback in order to improve themselves and their methods to become the best teacher they can be. Throughout the practicum, I consistently kept a daily journal. I did this to reflect on how I did that day, and what I could do to improve the next day. I would write down what happened in the class that day, if we had reached the learning goals and objectives I had set, and if there were any concerns I needed to address with my students. I know that if I were to teach this class again, I could look back in this journal and not make the same errors or minor mistakes I made before, alter things that didn't go as well as I wanted them to, and continue to improve upon the things that went well to make them even better.

One of the most important things I did to reflect on how I did was to ask my advisors, mentor teacher, and colleagues. My advisors, Shari Weaver and Katie Elmes, came to visit and grade my teaching performance several times, and after several days they would sit with me and provide feedback on how I did. While I appreciated and was glad of the things they saw I did well, I really welcomed the constructive criticism they gave me in order to improve upon certain things that were not as great. I took these criticisms and I improved upon them, and by the time they came back to observe again I had made great strides in improving myself in these areas. For example, at the beginning of the practicum I was pretty nervous to teach in front of a class, and when I get nervous I speak relatively quickly. I would go through the material so quickly that there were minutes unused and wasted at the end of the lesson, and students missed some of the information. Shari, Katie, and Mr. King gave me great tips on how to improve in this area, and within a week my lessons were perfectly timed and students caught everything that was said.

I also consistently spoke to Mr. King and other teachers about how I could improve, especially in the teacher's lounge during lunch. Every day I would sit with not only other science teachers, but ELA, history, and language teachers as

well. They would ask how my classes were going, and I would let them know about the things that went well and the things that didn't go so well. A lot of these teachers shared similar students with me or had them in the past. This was a huge advantage as they shared tips and tricks on how to motivate specific students, how to speak with them one-on-one, and different ways to create and deliver my lessons effectively. They laughed at the funny things that happened to me and sympathized and offered guidance when things didn't go as planned. They shared their own stories of their experiences as first time teachers, and what they learned over the years to make their teaching effective and better than ever before. Several other science teachers invited me to watch their classes and see what they did as well. It was interesting to see that each teacher had their own way of doing things in their own classroom. I observed a teacher that would pop in a movie, ignore their class unless they were being loud, and give them incorrect information. I also observed a teacher that had a great dynamic with all of his students, filled his lesson with funny anecdotes and great examples, and gave his students great ways to learn the material he was teaching. These observations were very important to my self-reflections, as they taught me what to do and what not to do in the classroom.

During the time I was teaching, Katie and Shari held a seminar once a week at WPI. This seminar was great for reflection, as it was a time to share everything that was going on in my classroom with my advisors and fellow student teachers. We were asked to write self-reflections every week and how we could improve upon certain things for the next week. I appreciated this time during the week; my fellow student teachers and I would all share the things that happened to us in the previous week. Whether they were good, bad, or neutral, we would give each other advice and appreciate that we were all at the same level, learning to improve ourselves. I know that without reflection, I would have left the practicum with the same knowledge that I entered it with. I would not have improved upon my teaching skills, and it would have caused me to continuously make errors and unwise decisions. Because I reflected, I know that I am a better teacher than I was before, and could enter a classroom again with confidence and great lessons.

## Chapter 8: WPI Education

My WPI education was a large part of what I taught my students in the classroom. As a biology major, a large part of what I do is to question the way the world works; why do cells, bacteria, fungi, etc. do the things they do? How do they do it? I wanted my students to learn to question the things in the world of anatomy the same way a student at WPI would, because it is important to question things that you don't understand- it's the best way to learn and remember.

I have really enjoyed all of my biology and anatomy professors at WPI. Every time I have taken one of their classes, I have never been disappointed. Each one of them has been so passionate about their subject that it's easy to pay attention to their lectures, and makes it easy to be excited about their material as well. As a female in the STEM field when I was a freshman I expected to be treated with less respect than my male peers. There is such a large gender gap in this field, because females are convinced that they aren't intelligent enough to do well and so they lose interest around middle and high school. Every one of my professors, both male and female, has treated me with immense respect and friendliness. My questions have always been met with positive feedback and I was never made to feel unintelligent or like I didn't belong in the biology field. That was how I wanted my students to feel. I took the way my professors treat me and put it towards my own teaching. My students were always made to feel smart enough to master the materials and activities I gave them, and I credit my professors for that skill.

WPI has also taught me the major importance of project-based learning. All high school students, at one point or another, have asked the question "What is the purpose of learning this?" Several of my own students asked me this question throughout the practicum. By taking the material learned and applying it to projects that relate to the real-world, student attention shifts beyond the classroom and they realize the importance and applications of what they're learning. One example of a project I asked my students to do was about human diseases. My students were split into teams, and were given a specific human disease to research. Instead of our normal routine, they had three days to use the computers in the computer lab to research their diseases and answer questions that I had given them. These questions were all about who the disease affects, what part of the body it affects, and how it works. Each team also created a PowerPoint presentation and presented their findings to the class. At the end of this project each student realized that all of the

organs and systems that we were learning about were important because we all have them. They also learned that they could all become unhealthy or damaged in different ways if they don't take precautions or don't understand how the human body works.



## Chapter 9: Class Dynamics

### Period One

This class was always my most challenging one, because it was the first period of the day for all students. Almost no student wants to start learning new material at 7:30 in the morning, including myself, so I understood how they were feeling as my first period students slowly dragged themselves into my classroom and slumped at their desks. At first, it was hard to engage these students to answer questions and participate, because their minds just weren't fully awake and alert yet. The Do Now booklets and questions actually helped to wake them up and stimulate their minds, as it was an easy way to get a good grade and prepare for the day. I always made sure to be as animated as possible while I was speaking and introducing new material, and I found that my personal stories and anecdotes were a sure way to wake everyone up and get their attention.

My first period students were also the ones who struggled the most with academic dishonesty. Quite a few of them were caught using cell phones during quizzes and sharing homework answers. I had to explain to them that academic dishonesty and cheating were extremely wrong and that serious consequences would occur if it continued. Several students did not heed my warnings, and I gave out a few zeros on quizzes and homework. One day, one of my ELL students in this class questioned why she had gotten a zero on her quiz. I explained to her that I had caught her looking at her neighbor's paper, and that all of her answers were exactly the same including spelling errors. She never cheated again after that.

One of my first period students was Matt. For the first few weeks that I began teaching, he would refuse to participate in class discussions, group activities, or the review game. He did not talk to anyone in the class and kept to himself. One day during homeroom, before the bell rang to signal school had begun, I noticed he was listening to a music player. I asked what he was listening to, and he replied that it was Metallica. Having a father and brother who were both interested in that type of music, I had enough knowledge to begin conversing with him about their music. It was the first time I had seen him light up and become genuinely excited about a subject. From that moment on Matt knew it was safe to speak with me about any subject and he began to open up. When we were studying the brain and spinal cord he came in with an article on Alzheimer's and asked several in-depth questions about how that article related to what I was teaching. He began to raise his hand and answer questions, timidly at first and then with confidence as most of

his answers were correct and I met them with positive reinforcement. His peers saw that he was interested in what we were learning and grasped the material quickly and they began asking him to be on their team for the review game, so he started participating. By the time I was done with my practicum, Matt had several friends in that first period class as well as several from my third and fifth period classes, as he and several other students would come after school on some days to review topics.

Irsida was an ELL student from Albania. She had a hard time speaking the English language, but understood that it was “cool” to cut class and not try in school, although she admitted that her parents wanted her to do well. She was never a disruption in the class, but barely put effort in and coasted by until she received a 70 on her first interim report. After tearfully asking me what she could do to bring her grade up, I gave her opportunities for extra credit and assured her that her grade would be alright if she worked hard from now on. She not only worked harder than ever, her attitude in the classroom improved greatly. She was still timid about participating orally in class because of her limited English, but she tried her best when she realized that no one would make fun of her. She turned in all of her homework on time and did well on all of her quizzes. She even asked me if she could come and observe my fifth period anatomy class every day, as she had a study period and wanted to see the lesson twice to make sure she understood what was going on. By the end of that grading period she had earned an 86. On my last quiz I asked the students what they thought about my class. On hers she wrote “She is very nice and I will miss her!”

### Period Three

My period three students were the easiest to work with, because they were inquisitive and grasped the material faster than my other two anatomy classes. By the time these students got to my class they were fully awake and ready to throw me off with hilarious comments and questions. They were also almost double the size of my other classes, so the dynamic was fairly different in the way that they behaved. As these students filed into the room and took their Do-Now books, almost every one of them would ask me how my day was going or share something that had happened with them in the previous twenty-four hours. Trying to motivate this class was never an issue, as they were always ready to learn, and they were all very good about putting honest effort in and being academically honest.

Gerson was the most challenging ELL student I had in all three of my classes. From the beginning he was very sweet, thoughtful and extremely quiet. Not many students in the class talked to him or even knew his name. He had a hard time understanding the material that I was teaching because his English skills were so poor. I had one-on-one chats with him at least twice a week, to make sure that he was keeping up and understanding the classwork. I learned that he was a really great artist and almost perfectly drew all the visuals that I used to teach with, but struggled with writing the words that went with them. I assured him that in biology and anatomy, visuals are, and if he could explain things better with pictures on his homework and quizzes that was alright as long as he was keeping up with the vocabulary words and worksheets as well. One of Gerson's biggest fears was the review game we played every week, because it required him to speak out loud in front of the class and answer questions that he had a hard time understanding. At first it was difficult for him, but all of his peers saw how hard he was trying and they all jumped in to help out. His teammates would help explain the questions to him and help him along with words to come up with a good answer. Usually, the other teams were extremely competitive and wouldn't allow other teams to give anything but a perfect answer in order to score points. For Gerson, if he was close everyone would say "He got it Miss, give him the points, he did good!" By the time I left Gerson was friends with almost everyone in the classroom.

Trey would always wander into class exactly as the bell rang or a little after; somehow he always made it before I shut the door and considered him late. He would chat with everyone as he made his way to his seat in the front, and it was a chore trying to get him to answer the Do Now questions in his booklet. It wasn't that he was refusing to do it, it was that he was so talkative and easy to chat with that he would distract other students and himself unless I stood right in front of him and watched him. He would always grin sheepishly at me and say "I'm doing it Miss, don't worry, I'll get a 100 for this answer", and usually he was right. Trey was extremely bright and had a really quick and funny sense of humor. Any time he would ask me a question, it was relevant but humorous and I usually found myself laughing along with his classmates and Mr. King when he was watching. Even on the day Katie and Shari came to observe this class, they couldn't control their laughter and commented on it when they spoke to me afterwards. When I asked Trey what he wanted to do after high school, he told me he wanted to become a physical therapist, and that he was glad I was teaching them anatomy because he was really interested in it and its applications in his future.

## Period Five

The day I began my practicum at Doherty, Mr. King told me about the potential classes I could take over. He mentioned period five, but he hesitated and said I might want to consider choosing one of his other biology classes. When I questioned him, he told me that I would see during my observations. As I met the students in this class for the first time, I saw why he told me this. It was as if a hurricane and a tornado collided and the outcome was the students of Mr. King's period five anatomy class. They came into the room yelling, jumping around, and could not be settled for more than two minutes before chatter would break out again. Throughout my observation period, I could see that the class dynamic changed daily based on the student's attitudes. One time, Mr. King had to leave the classroom to speak with another teacher. He was gone for maybe two minutes, but within this short amount of time a male and female student had begun arguing. Things escalated and it seemed as though they were about to begin physically fighting, but Mr. King came back just in time and sent them both to the assistant principal's office. Although I was nervous about doing it, I was determined to teach this class and do it successfully. By the time I was done teaching them, I learned that they were all really great kids with a lot of potential.

I never knew what to expect when Greicha walked into the classroom. On some days she skipped in wearing a really nice outfit, happy and ready to chat and learn. On other days she walked in wearing a sweatshirt with the hood on, put her head on her desk and angrily lashed out at anyone that tried to talk to her. Some days she skipped class and didn't turn in assignments. I never saw any of them, but other students said there were a lot of videos going around of her fighting other students. She wasn't too open about her personal life, but she spoke easily about her parents and siblings and was never afraid to share stories that related to the lessons we were learning on a given day. She began coming in to talk with Mr. King and I every morning before school even began. We both encouraged her to do well in her classes and not to skip. Slowly things turned around for her. When she realized that she could answer a lot of my questions, she began raising her hand almost more than anyone else. She was also wanted on every team for the review game because she knew her stuff. While her mood swings never changed, as a student she got better and better, and I hope this trend continued even after I left.

When I first saw AJ, I was honestly a little nervous. Bullet wound scars covered his arms and more often than not he reeked of marijuana. Over the course

of several days I learned from other teachers as well as himself that he was heavily into gangs and selling drugs, and his mother encouraged it. He only showed up to class about twice a week and never turned in homework or did well on quizzes. He wasn't a distraction to other students even when he was in the classroom, but it was very obvious that his self-destructive behavior wasn't helping him. When I sat down with him for the one-on-one chat I had with all of my students, I was surprised at how easy and pleasant he was to talk to. He opened up about his scars and how he received them, and I was sad to note that he was almost proud to show them off, that he had faced unnecessary death and survived. He also asked me a question; one of his scars had hardness underneath it, they had removed the bullet so what could it be? I asked if he had received physical therapy and he said that he had in the past but not for this particular wound. I told him that the hard area was most likely scar tissue that had built up. I told him about my own personal experience going through physical therapy for a broken ankle after surgery, and how they had to break down the scar tissue with a metal rod that they ran over the wound. His eyes lit up as he told me that was what his physical therapists did before, and he had no idea what they were doing it for until now. I told him that if he began coming to my class more and paying attention, he could learn a lot of cool stuff like that. AJ wasn't a miracle case; he still skipped a lot of school and, as far as I knew, still continued with his illicit business. But he did start coming to my class a little more, and when he did he participated. He surprised all of his classmates by answering some really tough questions on white blood cells and was able to explain to everyone the different types and what they did in the body. His quiz scores slowly improved over time and he did turn in a few homework assignments. On my last day he shook my hand and thanked me.

## Conclusion

The practicum at Doherty Memorial High School taught me a tremendous amount about how to be an effective and successful educator. After my time working at Doherty, I believe that I have successfully completed the practicum and demonstrated proficiency in the six professional standards: Well-Structured Lessons, Adjustment to Practice, Meeting Diverse Needs, Safe Learning Environment, High Expectations, and Reflective Practice. After taking a multitude of classes over the course of a year and a half before stepping foot in the classroom, I thought I knew what to expect and what would happen. It wasn't until I was actually in the classroom teaching students that I realized no amount of college courses could teach you what the real experience is like. I thought that I would maybe make an impact in a couple student's lives, but I had no idea how much they would impact me in return. I invested so much time and energy into my students, and I truly wanted each and every one of them to succeed and flourish. Even now, half a year later, I still remember all of their names, their personalities, interests, learning levels. I even remember where they sat in the classroom. I'm probably going to remember them for a very long time, if not the rest of my life, and I'm glad I will. They were all a large part of my success, and I wouldn't have been able to do so well without them. Teaching has become a large part of my life, and I'm glad WPI gave me the opportunity to become a truly great educator.

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## Appendix

### Appendix A: Weekly Plan

Topic: The Lymphatic System

#### Monday

**Objective:** Overview→ what is the lymphatic system? Introduce new vocabulary and create a word map that students will use throughout the week.

**Resources:** Whiteboard, Projector, Vocabulary matching worksheet

#### Tuesday

**Objective:** Lymphatic Organs: Nodes, Ducts, Capillaries and Vessels→ what are these? Where are they in the body and what do they do?

**Resources:** Whiteboard, projector, Lymphatic Organ worksheet

#### Wednesday

**Objective:** White Blood Cells→ what are white blood cells, where do they come from and what do they do for our bodies?

**Resources:** Whiteboard, Projector, White Blood Cell activity

#### Thursday

**Objective:** Review game. The point of the review game is to go over all the material that was learned about the lymphatic system this week. If students get stuck on a question, that particular topic will be reviewed.

**Resources:** White board, copy of review game for personal use

#### Friday

**Objective:** Lymphatic System Quiz. Students will take the quiz to demonstrate their knowledge of the lymphatic system.

**Resources:** Lymphatic System Quiz



## **Appendix B: Mr. King's Quiz**

### **The Endocrine System**

1. What is the name of the gland that produces melatonin?
2. What is the function of prolactin?
3. What are two important differences between endocrine and exocrine glands? (HW #6)
4. True or false: The endocrine system controls fast-paced functions.
5. The posterior lobe of the pituitary gland releases 2 hormones. Name these two hormones and their functions.
6. Insulin and glucagon are both pancreatic hormones. Which stimulates cellular uptake of glucose? (HW #16)
7. List 3 body functions that the nervous system controls; list 3 body functions that the endocrine system controls.
8. Multiple choice: Which gland produces corticotrophin? A) Posterior Pituitary B) Hypothalamus C) Adrenal D) Anterior Pituitary
9. What are three ways in which endocrine glands are stimulated to secrete their hormones? (HW #4)
10. Quickly draw the diagram of the pituitary gland and the hormones it secretes. (no pictures needed, just names)

## Appendix C: My Quiz

### Nervous System Quiz: Spine and Systems

**A. Multiple Choice** – Circle the best answer for each question. (10 pts. each)

1. Which part of the spine is protected by the rib cage?

- A) Thoracic      B) Cervical      C) Sacral      D) Lumbar

2. How does the sympathetic system affect the iris of the eyes?

- A) Constricts pupils    B) Dilates pupils      C) Loss of vision      D) No effect

3. Motor functions of the extensor muscles of the arm, forearm, and fingers would be affected by damage to which one of these nerves? (HW #10)

- A) Radial      B) Axillary      C) Ulnar      D) Median

**B. True or False** – Fill in the space with “true” if the statement is correct, or “false” if the statement is incorrect. (5pts.each)

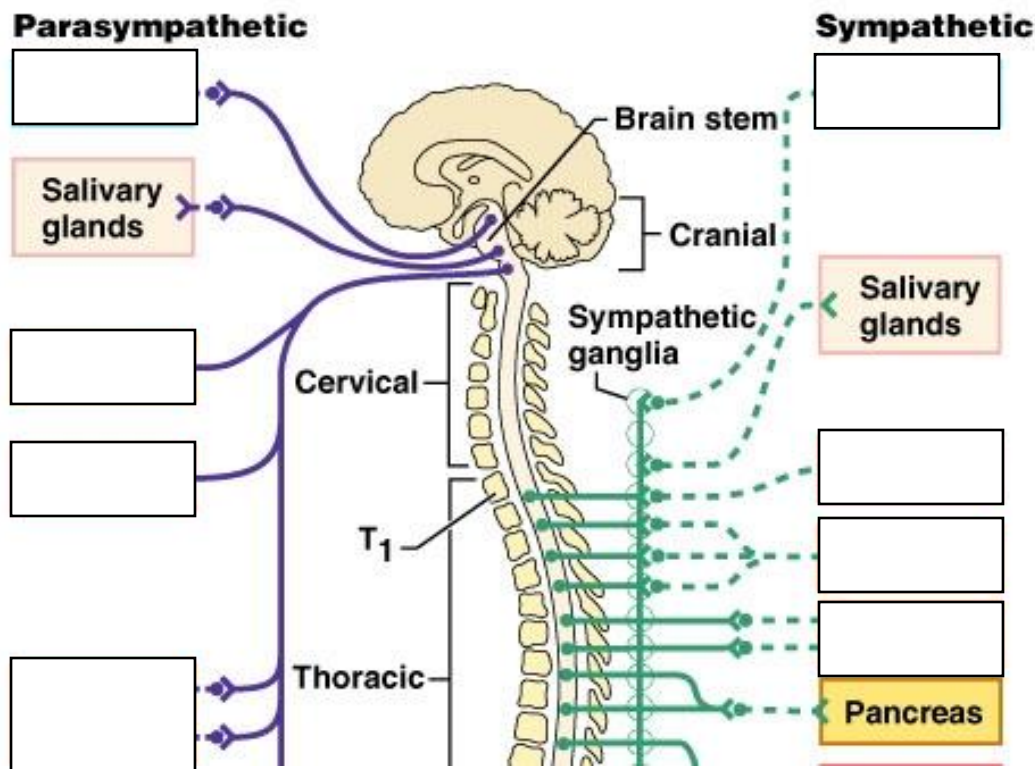
4. \_\_\_\_\_ The sympathetic system has no effect on the liver

5. \_\_\_\_\_ The parasympathetic system has no effect on sweat glands

6. \_\_\_\_\_ The medulla oblongata controls voluntary actions, like running.

7. \_\_\_\_\_ The spinal segments in the lower back are known as the cervical segments.

**C. Diagram** – Fill in the spaces with the correct label (2 pts. each)



**Appendix D: Review Game**

	<b>Lymphocytes</b>	<b>Phagocytes</b>	<b>Immunity</b>	<b>Illnesses</b>	<b>Miscellaneous</b>
100	Which cell destroys antigens that have been tagged?	What phagocyte is also considered a lymphocyte?	What type of immunity is borrowed for a short period of time?	Which child has a stronger immune system: one that plays in dirt or one that stays clean?	Why do people have more illnesses in the winter?
200	Which cell attacks other infected cells?	What phagocyte is most abundant in the blood and fights bacteria?	Skin and mucous membranes are considered to be which type of immunity?	Which virus can you only express symptoms for once?	Why do you feel sick after getting a vaccine?
300	Which cell locks onto and tags antigens?	What does “phagocytosis” mean?	What type of immunity protects us from getting animal diseases?	What’s it called when immune system reacts to something harmless?	Where are white blood cells created?
400	What does a B-cell release in order to tag an antigen?	What phagocyte is very motile and found in areas like your skin and lungs?	Which immunity is learned by white blood cells as you age?	Explain what cancer is (what it does to cells)	Why do organ transplants sometimes fail? (What does the immune system do to cause this?)
500	What are antibodies made of?	Which phagocyte gets rid of dead cells?	Which type of immunity is a vaccine considered to be?	A person gets a blood test done and finds that they have a low T-cell count. What illness could they have?	White blood cells make up what percentage of our blood?

Appendix E: Daily Lesson

The Endocrine System: Hypothalamus

Stage 1-Desired Results	
<p><b>Topic:</b> The Hypothalamus/ Endocrine System vs. Nervous System</p> <p><b>NGSS Standard(s):</b></p> <p>HS-LS1-2. Develop and use a model to illustrate the key functions of animal body systems, including (a) food digestion, nutrient uptake, and transport through the body, (b) exchange of oxygen and carbon dioxide, (c) removal of wastes, and (d) regulation of body processes.</p>	
<p><b>Understanding(s):</b></p> <p>Students will understand that . . .</p> <p>Communication among cells is required for coordination of body functions. The nerves communicate with electrochemical signals, hormones circulate through the blood, and some cells produce signals to communicate only with nearby cells</p>	<p><b>Essential Question(s):</b></p> <p>How does this system work with the rest of the body systems?</p>
<p><b>Science and Engineering Practices:</b></p> <p>4. Analyzing and interpreting data</p> <p>6. Construct explanations</p>	<p><b>Crosscutting Concepts:</b></p> <p>.1. Patterns</p> <p>4. Systems and System Models</p>
Stage 2-Assessment Evidence	
<p><b>Performance Task(s)</b></p> <p>Students will be able to identify why the hypothalamus is an important part of both the endocrine system and the nervous system.</p>	<p><b>Other Evidence:</b></p> <p>Students will be able to look at a list of bodily changes and movements, determine if they are caused by the endocrine system or the nervous system, and place them in the correct categories.</p>

## Stage 3- Learning Plan

### Learning Activities:

#### Do Now (5 Minutes)

Name a hormone and describe its function within the body. (Bonus points: Name the gland that secretes the hormone)

#### Lecture (15 Minutes)

Students will be viewing a slide with the layout of the endocrine system in the body throughout the lecture.

Yesterday was the introduction to the endocrine system. We learned that **the nervous system** controls fast paced movements in the body, such as heart rate and muscle movement. We then focused on **the endocrine system**, which controls the slower body processes, like mood change, growth and development, reproductive processes, etc. The system does this through the use of **glands**, which are bundles of cells that secrete hormones. **Hormones** are chemical messengers that, once secreted from these glands, travel through the bloodstream, around the body, and are specialized to control different areas. We also quickly reviewed what glands of the endocrine system we will be going through in the next couple weeks and what hormones some of them produce. The gland we will focus on in this lesson will be the hypothalamus.

#### Hypothalamus

- a collection of specialized cells (the “bundle” of cells that make up the glands)
- It is located in the lower central part of the brain
- The hypothalamus functions as the main link between the endocrine and nervous systems

#### Function of the hypothalamus:

- It is the section of the brain responsible for hormone production.
- The hormones produced by this area of the brain regulate body temperature, thirst, hunger, sleep, circadian rhythm, moods, and the release of other hormones in the body.
- Nerve cells in the hypothalamus control the pituitary gland by producing chemicals that either stimulate or suppress hormone secretions from the pituitary.  
The hypothalamus sends messages to control the pituitary gland, but the pituitary gland sends out messages that controls most of the other glands.

### Classroom Activity (15 Minutes)

Students will individually complete an activity worksheet that asks them to view a list of bodily functions and changes, and determine which system they are controlled by. (See attached worksheet). Students may converse with their peers, but will each have to turn in their own paper.

### Recap (10 Minutes)

Students will be randomly chosen and asked to come up to the board to fill in the categories so everyone can see the correct answers. Once they have filled in an answer, they must explain why they chose a certain category, and how each system might be able to perform the task (which gland/muscle/bones send the signal, where the signal gets sent, etc.)

### Multiple Intelligences Addressed:

- |                                     |   |  |   |
|-------------------------------------|---|--|---|
| <input type="checkbox"/> Linguistic | <input type="checkbox"/> Logical-<br>Mathematical | <input type="checkbox"/> Musical       | <input type="checkbox"/> Bodily-kinesthetic |
| <input type="checkbox"/> Spatial    | <input type="checkbox"/> interpersonal            | <input type="checkbox"/> Intrapersonal | <input type="checkbox"/> Naturalistic       |

### Materials and Equipment Needed:

Whiteboard/ Markers

Projector

Activity Worksheet

Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design*

Appendix F: Special Education Accommodation Form

STEP (Student identified with a social/emotional disab)

CLASSROOM ACCOMMODATIONS

Teacher [redacted] Date 9/4/15

Student [redacted] Class/Period ①

The above named student has an Individualized Educational Plan. To comply with the IEP, the accommodations that are checked are required for the student.

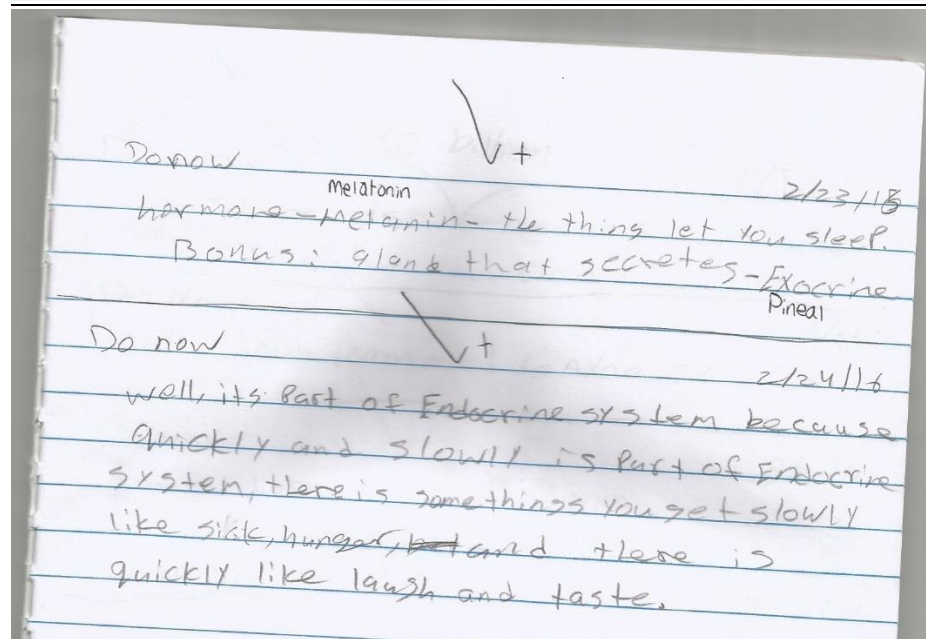
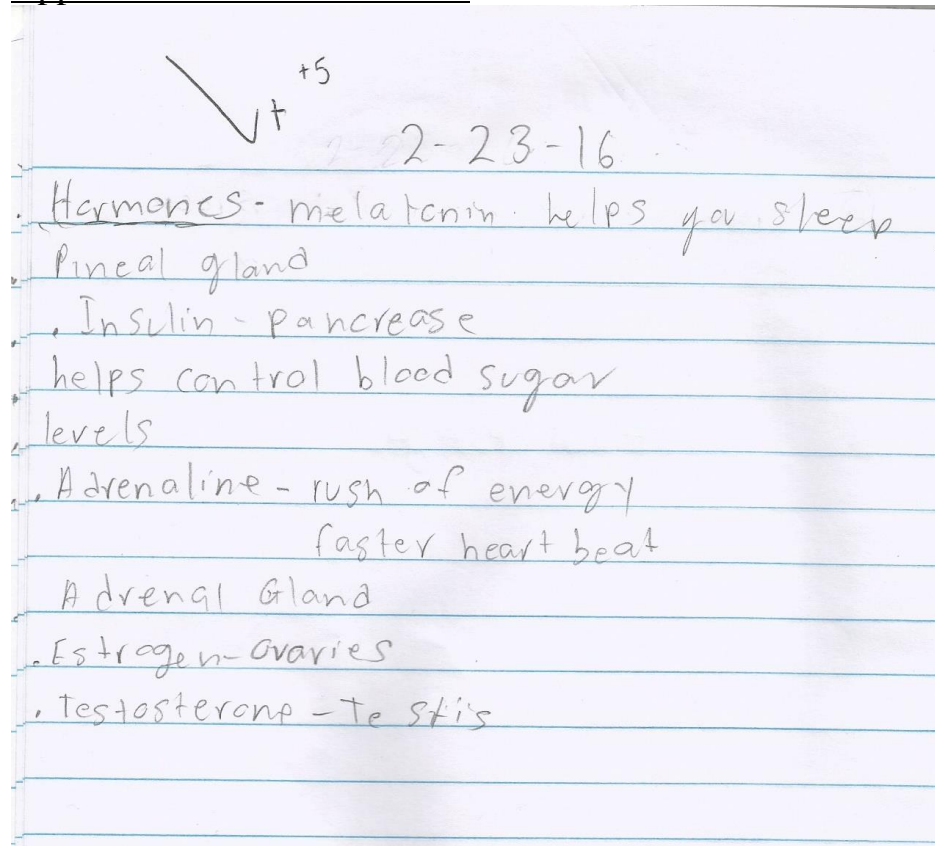
- Time required to process information before requiring a response
- Extra time for Tests, Projects, Long Written Assignments
- Take tests with Sped teacher after attempting them in class
- Take tests with Special Ed. teacher
- Not penalized for spelling errors on non-spelling assignments
- Preferential seating  Check for understanding of concepts
- Directions and information repeated/rephrased/clarified as needed \* Positive praise and encouragement
- Cues to remain on task, focused, redirection as needed
- Homework assignments written on board \* Advance warning of transitions and changes
- Calculator  Math reference sheet
- Content material may be read aloud to student if necessary
- Should not be required to read aloud in class unless he/she volunteers
- Structured environment with clearly defined expectations
- Model desired outcome  Concrete examples  Drill and repetition
- Multi-sensory approach  Pair visual/verbal instruction
- Encourage use of agenda  Graphic organizers as needed
- Glasses  Hearing Aids  Other

Special Education Teacher Ann Kernaghan Room 212

Complete IEP is available in the guidance office.



## Appendix G: Do Now Booklet



## Appendix H: Additional Student Work

7. Figure 7-1 is a diagram of a neuron. First, label the parts indicated on the illustration by leader lines. Then choose different colors for each of the structures listed below and use them to color in the coding circles and corresponding structures in the illustration. Next, circle the term in the list of three terms to the left of the diagram that best describes this neuron's structural class. Finally, draw arrows on the figure to indicate the direction of impulse transmission along the neuron's membrane.

- Axon
- Dendrites
- Cell body
- Myelin sheath

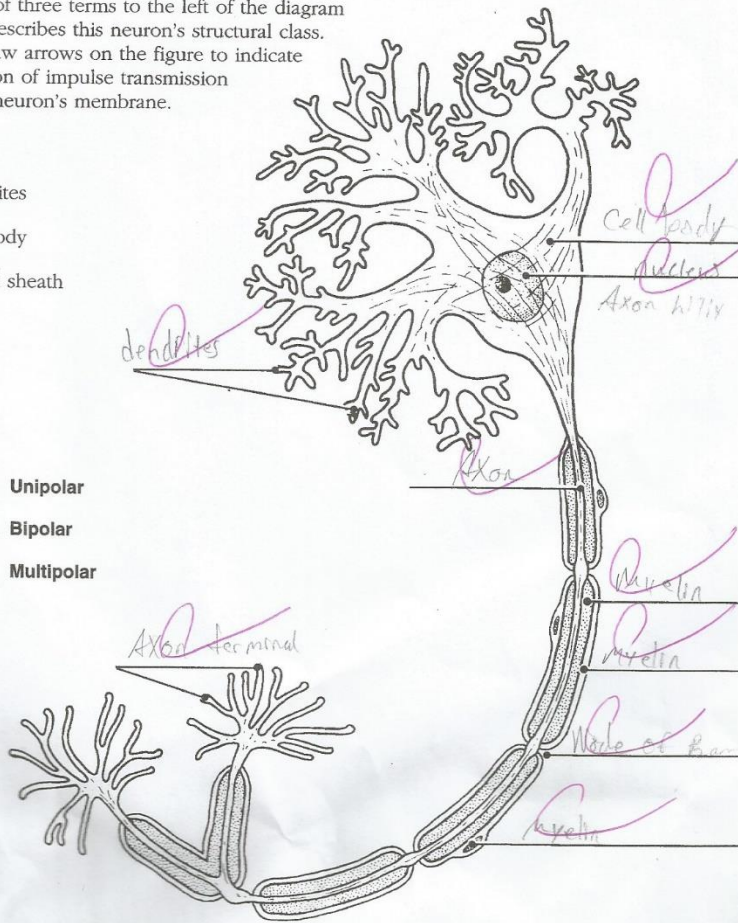


Figure 7-1

8. List in order the *minimum* elements in a reflex arc from the stimulus to the activity of the effector. Place your responses in the answer blanks.

1. Stimulus
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. Effector organ

Name



100

Period: 1

Match the words in the word bank below to their correct definitions. (10 pts. each)

<del>Leukocyte</del>	<del>Natural Killer Cell</del>
<del>Lymphocyte</del>	<del>Neutrophil</del>
<del>Phagocyte</del>	<del>Macrophage</del>
<del>T Cell</del>	<del>Dendritic Cell</del>
<del>B Cell</del>	<del>Phagocytosis</del>

1. Primarily fights bacteria. Abundant in the blood and quickly enters tissues. Neutrophil

2. Seeks out foreign substances and sends antibodies to lock on/ tag them. B-cell

3. Cells that chew up/ eat invading organisms. Phagocyte

4. Found in most body tissues, but are most abundant between internal and external environments.  
Dendritic cell

5. Attack infected cells and cells that might cause cancer. Natural Killer cells

6. A process in which a cell takes in a large object that it will eventually digest.  
Phagocytosis

7. White blood cells. Leukocyte

8. Destroys antigens that have been tagged by antibodies. T-cell

9. Act like scavengers by roaming around, searching for and digesting dead cells and antigens.  
Macrophage

10. Cells that allow the body to remember and recognize previous invaders.  
Lymphocytes