

## **Does Hollywood Stand and Deliver?**

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### **Overview**

The purpose of this unit is for students to look at how teachers, students, and classrooms are depicted on film as well as memoir writing. It is my job to introduce students to mathematical topics that are present in the real-world so they can see the relevance in them. The advantage of using this curriculum unit is that teachers can incorporate pieces of it, in any level of a classroom. Whether a teacher teaches Advanced Placement, Gifted, Scholars, or Mainstream students, all can benefit from this unit.

Personally, teaching an Advanced Placement class, it is expected that I add enrichment into the existing curriculum once the students have taken the Advanced Placement Exam. Our Advanced Placement AB Calculus Exam is usually scheduled every year for the first week of May, which gives us plenty of time to incorporate this unit of study. One of the benefits of teaching an Advanced Placement course is that I have the flexibility to add other topics of interest once the students have taken the exam. My students are always looking for new and exciting opportunities, so I think they will be very receptive to these new activities. I know I am excited to be able to try something new in class. I rarely have a chance to incorporate reading and writing into my mathematics classes. Problem solving activities where students are expected to read a problem situation, solve the problem for a correct solution, and then write why they solved it the way they did, is the extent to which reading and writing is built-in the curriculum.

The advantage of teaching this unit to my CAS Algebra 2 students is that I can treat it as an extension to the gifted curriculum. “The term “mentally gifted” includes a person who has an IQ of 130 or higher, when multiple criteria as set forth in Department Guidelines indicate gifted ability. Determination of giftedness ability is not based on IQ score alone. A person with an IQ score lower than 130 may be admitted to gifted programs when other educational criteria in the profile of the person strongly indicate gifted ability. Determination of mentally gifted includes an assessment by a certified school psychologist” (CAS Centers for Advanced Study Teacher Handbook 7). “The CAS program has been designed to meet the needs of the gifted students for individualized, accelerated and enriched learning. All CAS classes emphasize an inquiry approach to learning, problem solving techniques and the higher cognitive skills of analysis, synthesis and evaluation” (CAS Centers for Advanced Study Teacher Handbook 3). The CAS class sizes are limited to 10 – 18 students which helps allow more individualized attention. In addition to the regular course work for each class, students are required to complete a Long Term Project (LTP). The LTP should focus on a topic that interests the students because they have to research it in depth, work a minimum of 30 hours outside of the classroom, and then do a presentation to their class.

Each lesson that I develop for this curriculum unit will be independent. If another teacher would like to use a portion of my curriculum unit they will be able to incorporate it into one of their lessons very easily. I know from my own experience of trying to teach what is expected for a particular subject, it is sometimes very difficult to try to add anything else into your school year. The advantage to this curriculum unit is that if you have a day or two within the year, maybe during the week of a holiday break or during standardized testing, you can try one of my assignments. You can always do as much or as little as you see fit. Also, once you do one or two lessons, you may decide to assign some of the other lessons as homework for students to do outside of the classroom. This is still a beneficial enrichment activity and you do not have to use all of your class time to complete it. I will be incorporating movies into this curriculum unit based on three criterions: the mathematics that is used in movies, memoirs, and how Hollywood portrays the educational system. The movies involving mathematics are: *Cast Away*, *Die Hard with a Vengeance*, *Mean Girls*, and *Stand and Deliver*. I will show *Conrack* and *Freedom Writers* in order to include memoir writing and to show how Hollywood portrays our educational system, I am going to use *Blackboard Jungle*, *Dangerous Minds*, *Ferris Bueller’s Day Off*, and *Stand and Deliver*.

## Rationale

Why take a seminar called *Through the Lens Darkly*? What is so important about how movies portray the educational system that I would want to learn in order to inform my students about the topic? I think that when we go to the movies, most of the time we are there for enjoyment purposes. We want to escape for a couple of hours and be entertained. That is all well and good, but when movies are made about a true story, you cannot help but wonder how much of the movie is fact and what portion is fiction. We must realize that writers, producers, and directors, as well as actors, are all there to collect a pay check just like everyone else who goes to work everyday. In order to keep an audience's attention and make a good movie, you have to be creative at your job. You must create a movie that is going to entertain people and hold their interest. For this seminar, I had the opportunity to read *The Hollywood Curriculum* by Mary M. Dalton. Dalton, and I "began to think about the way popular culture constructs its own curriculum in the movies through the onscreen relationship between teacher and student" (Dalton 1). Dalton viewed various films and examined how different characters were portrayed. She examined how Hollywood sees the "good" teacher, the "bad" teacher, the "gendered" teacher, the "gay" teacher, the principals and finally the students. While reading this book, I began reflecting on movies that I have seen dealing with schools and education, and just how realistic the characters and schools were being portrayed. A lot of movies have the stereotypical characters in them. You usually have a principal or parent that is portrayed as not being in control. The students do not want to be in school and misbehave. There always seems to be a student who is the leader, the other student who is the outsider, the brain, or the jock. We see the cynical older teacher and the young teacher who is inspired and full of hope. In addition to examining the characters, I began to think about how realistic the teaching of the curriculum was in these movies. When you see a mathematics problem on the chalkboard, is the problem correct, or is just a bunch of letters and numbers scrawled across the chalkboard? Is the teaching that is being portrayed realistic? Could teaching honestly take place the way we are seeing it? And who is responsible for creating these movies? Are they doing their research? Are they concerned with correct facts, or are they concerned with selling movies by over dramatizing the story line? These are just a few questions that I hope to address in this curriculum unit.

Why would someone reading this curriculum unit want to try the lessons in their classroom? Actually there are a few reasons why I want to teach this unit about how Hollywood portrays our classrooms and hopefully you will agree that it is worth teaching to your students. I want my students to:

- understand the differences between reality and fantasy while watching a movie-based school
- see how teachers, students and classrooms are portrayed

- appreciate writing in a mathematics class
- write their own memoirs
- make connections between mathematics and the real world
- to expand students inductive, deductive, explicit, and recursive reasoning skills

There is more to this unit than just watching movies. This unit is not like something from a traditional textbook. Our students will be given the opportunity to learn about topics that otherwise they may never be exposed to. I cannot begin to explain how important I think it is to make connections between education and the real world when teaching. I believe that once students are exposed to this unit, they will want to pursue it at greater length. I am expecting this unit to reach some students that may not have been engaged in their studies. This is truly something different than what they have been taught in class before. If I am able to spark an interest in my students, I will be thrilled.

As a teacher it is my responsibility to learn about new developments in the teaching world, particularly mathematics. Being a member of the National Council of Teachers of Mathematics, I get a monthly subscription to the magazine, The Mathematics Teacher. Over the past few years, I've noticed the topic of motivating our students to study mathematics and writing in mathematics classes have been addressed and are becoming important topics discussed in the magazine. Prior to this seminar, I have never attended any classes or taught my students about writing in the curriculum. Due to what I learned in this seminar, I will incorporate more writing in my future lesson plans. Even though I have a specific curriculum to cover in my existing classes, I think it is important to inform students of new topics that are evolving in the mathematical world. Hopefully my students will enjoy writing in their mathematics class as much as they enjoy doing mathematics problems.

A focus of my curriculum unit will deal with Hollywood's portrayal of teachers, parents, students, and classrooms as seen in movies. I also will examine societal roles, gender biases, and stereotyping. The first movie that I will write a lesson on is *Stand and Deliver*. One of the main reasons I chose *Stand and Deliver* for my curriculum unit was because it dealt with taking the Advanced Placement AB Calculus Exam. I remember watching the movie when it came out in 1988. I was a junior in college majoring in mathematics, so I did not watch this movie from the perspective of a teacher, but instead as a student. I remember being excited to watch a movie about calculus and how a teacher was able to reach all of his students in the classroom. At the time, I was planning on going to graduate school to obtain my teaching certificate. On a personal level, this movie couldn't have been released at a better time. I can recall being intrigued at how a teacher was able to inspire his students. "Jaime Escalante is a mathematics teacher in a school in a Hispanic neighborhood. Convinced that his students have

potential, he adopts unconventional teaching methods to try and turn gang members and no-hopers into some of the country's top algebra and calculus students” (Murray Chapman, International Movie Data Base). Escalante taught at Garfield High School in East Los Angeles, which was a poor public school. The year was 1982, 18 of Escalante’s calculus students passed the Advanced Placement Exam, and the Educational Testing Service found the test scores to be suspect. The Educational Testing Service asked that 14 students retake the exam. Twelve of the 14 students took the exam again and passed. The students in this calculus class are portrayed as coming from underprivileged families and are poorly prepared for the calculus course. The movie takes us through the beginning of the school year and the struggles that Escalante has while he prepares his students for the Advanced Placement Exam. We also see a wide variety of personalities among the students. The first time I watched this movie I was surprised to see the students working so hard in order to prepare for the Advanced Placement Exam. There were moments in the movie where some of the students did not want to work and they had their problems, but for the most part it was amazing to see them working as hard as they performed. Now, almost 20 years later, I watch the movie as a teacher. I must say that I am just as excited watching the movie in terms of how the students worked and how their test scores showed how well they did. But as a teacher, and working on this curriculum unit, I ask, is what I am watching factual? Did Jaime Escalante have a group of students enrolled in his class with little or no mathematical knowledge and was he able to miraculously help them to pass the exam? I struggle daily teaching this course to students who have been on the “advanced mathematics track” and it is very difficult for them. Was it as easy as it seems in the movie?

Escalante stated that the movie *Stand and Deliver* was based on 90 percent truth and 10 percent drama. After researching this movie, I was surprised to find out how many facts were left out of the movie. Escalante was portrayed as a hard working teacher who was able to take unmotivated students from arithmetic to calculus in one year. What the movie did not include was:

- Escalante had established a program with the East Los Angeles College, where students could take a seven-week summer session to help prepare them for higher level mathematics courses.
- He and his principal were pivotal in getting feeder schools to offer algebra in eighth and ninth grades, so by the time they were in 12<sup>th</sup> grade, they could take calculus.
- One of the major points to the success at Garfield dealt with who taught the prerequisite courses to calculus. The movie never mentioned the prerequisites. Escalante actually hand-picked teachers to teach the courses. They prepared lessons together all the while Escalante was making certain the students would receive the mathematics necessary to be successful in calculus.

- The teachers are portrayed as getting along in the movie. However, there was talk that Escalante wanted too much power and that he was creating two mathematics departments, one for his group of students and then another with the other students in the school.

One major part of the movie that attributed to the success at Garfield dealt with tutoring. Escalante had a key to the building so he could tutor students before and after school. As a teacher I was upset with the movie for not including all that truly went into the success of the calculus program. I know what it is like to teach that course every day and have the pressures of covering all the topics in a timely manner while allowing the time to review and practice for the exam. How unfair to the public for Hollywood writers not to include everything that went in to making this a successful program. I realize they cannot include every detail, but people left that movie thinking Escalante had a group of students who could hardly solve a basic mathematics problem in September and passed the AP Exam in May.

Another movie I plan on incorporating into this piece of the curriculum unit is *Dangerous Minds*. I think what has attracted me to both *Dangerous Minds* and *Stand and Deliver* is that both of these movies were based on true stories. If I am going to have my students examine how Hollywood has portrayed schools and education, I would like them to examine true stories as opposed to fictional stories. In *Dangerous Minds*, the main character LouAnne Johnson is a retired US Marine who decides to take a teaching position at Parkmont High School which is located in East Palo, California. When Johnson interviewed for a teaching position, it was for a substitute teacher position but was offered a full time English position instead. Of course Johnson accepted the job. Johnson “finds a class of tough, street-wise kids, involved in gangs and drugs, whom Johnson quickly dubs the ‘rejects from hell’” (*Dangerous Minds*, Wikipedia). You can see in the film that Johnson actually becomes like her students in an attempt to reach them academically. She shows a karate move, she curses, offers student’s candy for correct answers, has a contest with the winners going to dinner with her, takes the class to an amusement park and has a student sleep at her house to protect him from other students who were trying to beat him up. All of these situations are not necessarily the most realistic in today’s classrooms. With the magic of movies, we see all of this and more within an hour-and-a-half and we are assuming that this is all taking place in one academic school year. However, all of these incidents stated, “may have taken years to unfold in reality” (*Dangerous Minds* 1995). We also see Johnson wearing numerous hats. “Johnson transforms herself to become not only a teacher to her students but also minister, mother, protector and mentor” (*Dangerous Minds* 1995). There are a lot of similarities between *Dangerous Minds* and *Stand and Deliver*; however, there is a major difference – curriculum. In *Stand and Deliver*, Escalante had a curriculum that he had to cover in order to have his students prepared to take the

Advanced Placement Exam. In *Dangerous Minds*, Johnson seems to be able to alter her curriculum in order to “reach” her students. How realistic is this in today’s classroom? Am I able to change the curriculum in one of my classes such as Advanced Placement AB Calculus or Algebra 2? We are so driven today by curriculum and meeting due dates and deadlines, that it is almost impossible to do this. Again, I am looking forward to seeing how my students view this. Are they able to recognize that Johnson did in fact throw out the English curriculum in order to try to get her students to enjoy and learn English? Do my students think that is ok? It will be interesting to see how my students who are from privileged homes view the characters in these movies from lower socio-economically disadvantaged homes.

The third movie which deals with how realistic Hollywood portrays our classrooms is *Blackboard Jungle*. *Dangerous Mind* and *Stand and Deliver* were based on true stories; where as *Blackboard Jungle* was fictional. The basic themes in this movie were the same as the other two movies. We are shown a very idealistic teacher name Richard Dadier, teaching in a tough urban school, with no classroom control, and very disrespectful students. Somewhere in the movie there is a turning point and the students who initially wanted nothing to do with Dadier, end up growing to respect him. Being a teacher I feel as though there are always those students who try to push you to your limits. It is up to us as teachers to make sure we have control in our classrooms, treat students with respect, and make certain we try to reach and teach each student. Unfortunately, there are teachers who do not have good classroom management may cause chaos in their classrooms. How realistic was this movie? Can the students that I teach relate to this movie at all? Have they had classes where the students were in control of the classroom? How did they feel?

The fourth and final movie in this section of my unit is *Ferris Bueller’s Day Off*. This movie like *Blackboard Jungle* was fictional. The main character Ferris Bueller decides to skip school and convinces his girlfriend and best friend to join him. They spend the day in Chicago going to the Sears Tower, visiting the stock market, eating lunch, watching a Cubs game, going swimming at his girlfriend’s house, participating in a parade, and returning his best friend’s car to his house, before walking home. When they show Ferris looking at his watch as he leaves his girlfriend, it reads 6p.m. Not very realistic. This is a classic case of Hollywood making movies for entertainment purposes only. In addition to the unrealistic timeline, every adult portrayed in this movie was seen as an idiot. Ferris definitely was able to get away with faking his sickness, calling his girlfriend off of school, and successfully cutting school. Of the four movies we will discuss in this unit, I would think that my students will agree with this as being the most unrealistic movie.

Another section of this curriculum unit is that of Memoir writing. During this seminar, we read *Writing a Life: Teaching Memoir to Sharpen Insight, Shape Meaning – and Triumph Over Tests* by Katherine Bomer. I have never used memoir writing in my classroom before, and I am actually looking forward to this. One may ask, why incorporate memoir writing into a mathematics class? I do not think that writing in school should be limited to English classes. “When young people write memoir, they can hold onto those moments, freeze them right now, before they escape” (Bomer xiv). If I can get my mathematics students to think about something, such as their first experience with mathematics and have them write about it, I can only imagine what they will discover. If they are honest with themselves, they will be able to reflect on a past personal experience and write about it. “Writing is a valuable way of reflecting on and solidifying what one knows” (Principles and Standards for School Mathematics 352). Bomer has many reasons as to why we write memoir:

- to break the silences surrounding who we are
- to make meaning of our lives and, by doing so, to heal them
- to awaken the “I” and come to know who the “I” is
- to give the gift of personal and family history to loved ones
- to record what must never be forgotten
- to bear witness
- to help us understand broader social and political realities

Throughout this seminar we watched numerous films dealing with Hollywood’s perception of the educational system as well as films based on memoirs, such as, *Conrack*. The film was based on the autobiographical book *The Water is Wide* by Patrick Conroy. Conroy was born in Atlanta, Georgia on October 26, 1945. He was raised by a very strict father who was a Marine fighter pilot and a very docile mother. Due to the fact that his father was in the service, they moved many times during Conroy’s childhood. Conroy went to school at the Citadel Military Academy in Charleston, South Carolina. It was there that Conroy wrote his first book, *The Boo*. When Conroy graduated he took a teaching job teaching English on the Daufuskie Island, a remote island off the coast of South Carolina occupied by mostly African Americans. The year was 1969 and Conroy taught in a one-room schoolhouse to fifth to eighth grade students. His students were living in poverty; some of the students were illiterate, couldn’t recite the alphabet, didn’t know what country they lived in, and didn’t know what ocean surrounded their island. The students could not pronounce Conroy’s last name and called him Conrack, hence the title of the movie. Conroy was not a traditional teacher. He did not listen to the school board about what textbooks to teach from. He decided his students needed to learn by seeing the world and having experiences for themselves. Some of the things that Conroy taught his students were the importance of brushing their teeth, he showed them movies, let them listen to Beethoven, taught them how to swim, played football to

show teamwork, and described Isaac Newton's law of gravity by dropping an apple on one of the students heads. His unconventional teaching methods were not appreciated by the superintendent, principal, or school board. He was able to win the hearts of the students and parents, but not the school officials. The students on the island never heard of going trick-or-treating. Conroy wanted to take the students into Beaufort to trick-or-treat but the superintendent told him not to do it. Conroy made certain he was going to take the students to Beaufort; he even found families who let the students sleep in their homes for the evening. Unfortunately the superintendent held to his word and fired Pat Conroy for not following official school curriculum. There are so many ideas from the movie that I want my students to think and write about. I know the importance in our educational system to follow the curriculum units thoroughly. Would my students find Conroy's way of teaching acceptable? If my students were in the same position as Conroy, how would they react? What do they think of Conroy as a role model? I also will incorporate memoir writing in the activity section of this unit as well. I would like my students to brainstorm and think about their own memories of being a student in elementary school. What do they recall about their school experiences? Are they able to relate or empathize with the characters? What if they were able to talk to Pat Conroy? What things would they most like to ask him? I also would like to know what my students think about Bomer's reasoning for writing memoirs as mentioned above. Do they think Pat Conroy can relate to any of the eight reasons Bomer listed?

Another movie that we watched during this semester and one that I plan on including in this part of memoir writing is *Freedom Writers*. *Freedom Writers* was based on a true story about a 23 year-old English teacher, Erin Gruwell, who worked at Wilson Classical High School in Long Beach, California. Gruwell was fresh out of college, very idealistic, and ready to make a difference in her classroom. The movie deals with one specific English class in which Gruwell teaches. Her class had a variety of students in it, including one white boy, African Americans, Asians, and Latinos. Some of the students in her class were poor, belonged to gangs, were physically abused, and homeless. This movie was based on the book which was inspired by the writings of these students. The classroom scenes in this movie are closely related to those of *Blackboard Jungle*, *Dangerous Minds*, and *Stand and Deliver*. We are shown a group of students who are not paying attention to their teacher, talking while she talks, singing, and simply ignoring her, an all too familiar scene that we are used to seeing portrayed in the movies. Gruwell is not able to reach her students through the traditional curriculum that she is supposed to teach from, so she tries other methods. We see her taking her class on field trips and working two and three other jobs in order to raise money to buy her students books to read, including *The Diary of Anne Frank*. The class actually did fund raising to have Miep Gies, a Holocaust survivor and the woman responsible for hiding Anne Frank, come to their school

to talk to them. It was while reading this book that the class found similarities in their own lives with their own personal struggles they faced daily. Gruwell decided at this time to have students keep a journal of their own. The students could have Gruwell read their journals if they liked, which they did and they shared some of their entries with each other. Their entries were very moving, talking about their own lives and the hardships they faced. It was these journal entries which the book "The Freedom Writer Diary" was based on. I am looking forward to incorporating this movie into my unit and seeing the writing that my students will produce.

My mathematics classes are not centered on group discussions. I primarily have to teach a new topic every day and then students practice the skills they learned. Of course discussions take place, but not in the same way as in an English or Social Studies class. I am excited to try something new with my students. I am really looking forward to reading their work, and I am even more excited to have my students share their personal experiences with each other. I do have some reservations with incorporating writing into my curriculum. Because this is new to me, some questions such as what type of prompts will I use, how should I respond to my students, when, how often, and how long should a writing assignment be? However with time and practice I am sure I will become more comfortable integrating writing in my mathematics classes. "Writing to learn can be a positive component of an academic mathematics program, but its effectiveness depends on whether the students and the teacher see how they might benefit from their efforts. When students perceive the teacher as an authentic and interested audience, what they write is more likely to be worth reading" (Mason and McFeetors October 2002: 536).

When I was growing up I thoroughly enjoyed learning mathematics. "Research has shown that many students actually like mathematics in elementary grades. Unfortunately, this enjoyment seems to decrease as students advance to high school" (Lewkowicz February 2003: 92). I am hoping this unit of study will enlighten some if not all of my students. I do not want them to just sit in my classroom, watch me work out problems and then practice the same concepts at home. I want them to explore and investigate other topics.

The third and final piece of my unit deals with mathematics that is depicted in movies. I am looking forward to having my students look at different movies which show mathematics in them. I chose *Cast Away*, *Die Hard with a Vengeance*, *Mean Girls*, and *Stand and Deliver*. There is not a central theme to these movies like the first two pieces of my unit described above. The reason I chose these movies is that because somewhere in the movies, mathematics was shown. I plan on writing lessons which first will have students determine if the mathematics is even correct and then I plan on having the students actually work

on mathematical problems. *Cast Away* and *Die Hard with a Vengeance* actually have characters working out mathematical problems in order to survive.

Not only is the way students think and perceive things important, but I also would like them to make connections between mathematics and the real world. Being a mathematics teacher is not only about doing problems from a textbook – it is necessary to give thorough explanations of the topics you are teaching and make connections to real world situations. I am looking forward to teaching this lesson because this is a major opportunity for me to truly connect how mathematics is perceived in the real world.

## **Objectives**

Even though I am a high school mathematics teacher, this unit that I am writing can be added into any curriculum. I am delighted to have the opportunity to try something new in my classroom. I am optimistic that my students will enjoy trying something new in class other than the major emphasis being mathematics. The main objectives for this unit are:

- students will view certain movies or pieces of movies and observe how Hollywood portrays the educational system
- students will observe the roles of teachers and students, while taking into account stereotyping, societal roles and perceptions, and factuality
- students will write memoirs and share them with the class

It is imperative that I incorporate the Pennsylvania State Standards (Appendix 1) into my lesson plans. During this unit, the seven mathematics standards will be addressed in this curriculum unit. Students will be expected to use number systems, compute and solve practical problems, apply the concepts of patterns, formulate and solve problems, and communicate the mathematical processes used, understand and apply basic concepts of algebra and geometry to solve theoretical and practical problems, evaluate, infer and draw appropriate conclusions from charts, tables, and graphs, showing the relationships between data and real world situations, and lastly, make decisions and predictions based upon the collection and interpretation of statistical data and the application of probability. It also is important that I incorporate the communication standard. “In high school, there should be substantial growth in students’ abilities to structure logical chains of thought, express themselves coherently and clearly, listen to the ideas of others, and think about their audience when they write or speak. Consequently, communication in grades 9 – 12 can be distinguished from that in lower grades by higher standards for oral and written exposition and by greater mathematical sophistication” (Principles and Standards for School Mathematics 348 – 349).

## **Strategies**

This unit of study will be composed of watching movies or excerpts of them, group discussions, and writing assignments. I believe it is important for students to become active participants in the classroom to enhance their learning process.

To do this, I will:

- foster an environment of respect to help students feel comfortable as they learn
- offer history of the movies to give students background information about the movie
- provide supplemental resources, such as “video viewing guides” to facilitate discussion and writing topics

## **Classroom Activities**

### **Lesson 1 – Journal Entry**

In order to incorporate more writing in my curriculum, I plan on having students keep a journal. The first journal entry that I would like my students to write about is their attitude toward mathematics.

Assignment: For your first journal entry, write about your feelings toward mathematics. If you thoroughly enjoy mathematics, what exactly is it that you like? If you have a negative viewpoint, explain why. What are some specific examples or instances that support your feelings? Could something have been done differently for you to appreciate mathematics?

### **Lesson 2 – Quotes**

For every chapter in our Algebra 2 textbook, I will present a quote about the mathematics that we are covering, a mathematician, or education. The students will be expected to write a three paragraph essay about the quote.

Textbook: Boswell, Laurie, Kanold, Timothy D., Larson, Ron, Stiff, Lee.  
Algebra 2. Illinois: McDougall Littell, 2007.

Below is a quote about the mathematics we are covering in this chapter. Write a three paragraph essay about the quote.

Chapter 1: Equations and Inequalities

Quote: “The most powerful single idea in mathematics is the notion of a variable.”

- K. Dewdney

## Chapter 2: Linear Equations and Functions

Quote: “One of the most important concepts in all of mathematics is that of function.”

- T.P. Dick and C.M. Patton

## Chapter 3: Linear Systems and Matrices

Quote: “Algebra is the intellectual instrument which has been created for rendering clear the quantitative aspects of the world.”

- Alfred North Whitehead

## Chapter 4: Quadratic Functions and Factoring

Quote: “A mind is a fire to be kindled, not a vessel to be filled.”

- Plutarch

## Chapter 5: Polynomials and Polynomial Functions

Quote: “The essence of mathematics is not to make simple things complicated, but to make complicated things simple.”

- S. Gudder

## Chapter 6: Rational Exponents and Radical Functions

Quote: “I hear and I forget. I see and I remember. I do and I understand.”

- Chinese Proverb

## Chapter 7: Exponential and Logarithmic Functions

Quote: “Mathematics is the gate and key to the sciences.”

- Roger Bacon

## Chapter 8: Rational Functions

Quote: “Failure is the opportunity to begin again, more intelligently.”

- Henry Ford

## Chapter 9: Quadratic Relations and Conic Sections

Quote: “The value of a problem is not so much coming up with the answer as in the ideas and attempted ideas it forces on the would be solver.”

- I. N. Herstein

## Chapter 10: Counting Methods and Probability

Quote: “The most important questions in life are, for the most part, really only problems of probability.”

- Pierre Simon de La Place

## Chapter 11: Data Analysis and Statistics

Quote: “There are three kinds of lies: lies, damned lies, and statistics.”

- Benjamin Disraeli

## Chapter 12: Sequence and Series

Quote: “Mathematics should be fun.”

- Peter J. Hilton

### **Lesson 3 – Memoirs in Movies**

One of the movies that we watched in this seminar dealing with memoir was *Conrack*. In this assignment, I plan on having my class watch the entire movie which is 111 minutes long. Our class periods are 42 minutes long, so it will take three class periods to watch. I will have a video viewing guide (Appendix 2) for the students to read and think about while watching the movie.

#### **Lesson 3a**

Students will write in their journals about their elementary school experiences and how they relate to this movie.

Assignment: Think back to your experiences in elementary school. Write a journal entry describing whether you are able to relate or empathize with the characters in the movie *Conrack*.

#### **Lesson 3b**

Students will write a five-page paper dealing with the movie *Conrack*.

Assignment: Write a five-page paper concentrating on the character of Pat Conroy from the movie *Conrack*. Knowing the importance of following official school curriculum, did you find Mr. Conroy’s teachings methods acceptable? Would I be able to teach like this at Taylor Allderdice High School? If you were in his situation, how would you have taught these students? Do you agree with

the firing of Mr. Conroy? Do you think Mr. Conroy was a good role model? If you were able to talk to Pat Conroy, what would you most likely want to ask him? And finally, even though this movie is based on a true story, how would you change the ending of the movie?

### **Lesson 3c**

In the book, *Writing a Life: Teaching Memoir to Sharpen Insight, Shape Meaning – and Triumph Over Tests*, by Katherine Bomer, Bomer talks about specific reasons why people write memoir. Students will write about whether they feel Pat Conroy could relate to the reasons stated.

Assignment: In the book, *Writing a Life: Teaching Memoir to Sharpen Insight, Shape Meaning – and Triumph Over Tests*, by Katherine Bomer, Bomer states many reasons why people write memoir:

- to break the silences surrounding who we are
- to make meaning of our lives and, by doing so, to heal them
- to awaken the “I” and come to know who the “I” is
- to give the gift of personal and family history to loved ones
- to record what must never be forgotten
- to bear witness
- to help us understand broader social and political realities

After watching the movie *Conrack*, do you think Pat Conroy can relate to any of the seven reasons, if so, why? Explain.

### **Lesson 4 – Memoirs in Movies**

Another movie that we watched in this seminar was *Freedom Writers*. *Freedom Writers* is 122 minutes long so it will take three class periods to complete watching it. I will have a video viewing guide (Appendix 3) for students to read and think about while watching the movie.

#### **Lesson 4a**

In this assignment, students will write about a specific action performed by one of the characters in the movie *Freedom Writers*. They will have to explain why the character performed the action, discuss what motivated them, and describe what that motivation had to do with the theme of the movie.

Assignment: Select an action performed by one of the characters in the movie *Freedom Writers*, and explain why the character took that action. What motivated him or her? What did this motivation have to do with the theme of the movie?

#### **Lesson 4b**

In this assignment, students will write an essay describing who their favorite and least favorite character was in the movie *Freedom Writers* and explain why.

Assignment: Write an essay describing who your favorite and least favorite character was in the movie *Freedom Writers* and explain why.

#### **Lesson 5 – Memoirs in Movies**

Students will begin to write more often in their journals about their own thoughts and experiences.

Assignment: In addition to the chapter journal entries that you are already writing, begin to write more often, even daily if you would like. Write about your own thoughts and experiences.

#### **Lesson 6 – Hollywood’s Portrayal of Education in Movies**

This assignment is written for an Advanced Placement AB Calculus class and should be used once the students have completed taking the Advanced Placement AB Exam. Students should watch the complete movie of *Stand and Deliver* which is 103 minutes long and *Dangerous Minds* which is 99 minutes long. I will have video viewing guides for students to read and think about while watching *Stand and Deliver* (Appendix 4) and *Dangerous Minds* (Appendix 5). After the students have watched the movies, we will have a discussion about both movies and I will inform them about the important information/facts that Hollywood did not include in the movies. Once the group discussion is completed, the students will be given the writing assignment.

Assignment: Compare and contrast Jamie Escalante in *Stand and Deliver* and LouAnne Johnson in *Dangerous Minds*. Each teacher was successful in overcoming barriers in their classrooms using two totally different approaches. How much did Hollywood influence the outcome of both movies? How realistic was each teachers approach?

#### **Lesson 7 – Hollywood’s Portrayal of Education in Movies**

In keeping with the theme of Hollywood portrayals, *Ferris Bueller’s Day Off* could be used for all grade levels. The movie is 102 minutes long, so we will spend 2 ½ days watching it in class. I will supply the video viewing guide (Appendix 6) to provide the students with specific ideas to read and think about while watching the movie.

Assignment: Ferris, the main character, is portrayed as a hero, while his principal, teachers, and parents are depicted as being clueless or buffoons. Discuss some of the ways in which Hollywood glamorized the movie in an unrealistic light.

## **Lesson 8 – Hollywood’s Portrayal of Education in Movies**

The final movie that I will have my classes watch to show how Hollywood portrays the educational system is *Blackboard Jungle*. *Blackboard Jungle* is 100 minutes long and will take 2 ½ class periods to complete. I will supply a video viewing guide (Appendix 7) to the class of specific ideas to read and think about while watching the movie. After the students have finished watching the movie and we had a chance to discuss it, I will show the movie clip from 6:06 to 8:15. This is one of the beginning scenes in the movie where Mr. Dadier meets and speaks to other teachers on the first day of school.

Assignment: Write a journal entry about how this conversation made you feel. If you were Mr. Dadier and another teacher responded to you in the way the older cynical teacher Mr. Murdock did, how would that affect the way you would deal with your students? What may have been the better way for Mr. Murdock to respond to Mr. Dadier? Do you think this is realistic? If so, how do you think these types of situations affect the way teachers interact with each other and their students?

## **Lesson 9 – Mathematics in Movies**

### **Lesson 9a**

The first assignment dealing with mathematics incorporates the movie *Die Hard with a Vengeance*. The two main characters, Detective John McClane and Zeus, are playing a game of “Simon Says” with a villain. The villain is making the two characters solve puzzles in a specific amount of time. If they fail, he sets off a bomb. In one scene, the two main characters are given the following task to complete: within five minutes, they have to weigh on a scale exactly four gallons of water to diffuse a bomb. However, the catch is that they are given two plastic bottles to use -- one five gallons and one three gallons. I will divide my class into partners and give them the same assignment to see who can complete the task in five minutes. After the exercise, we will have a group discussion about the mathematics involved in solving the problem. I also will show the class the clip which explains the problem situation (1:00:16 – 1:00:45) then the movie clip showing John McClane and Zeus successfully solving the problem (1:02:28 – 1:03:05). Due to some vulgarity in the movie, you cannot show the complete clip in its entirety. We’ll then discuss how realistic the students think this problem situation is.

## Lesson 9b

In the movie *Mean Girls*, the main character, Cady Heron, is taking calculus and joins the math team. Toward the end of the movie, Cady competes with four other members from her team in the “Mathletes Championship.” There are three questions that are shown in the movie that I would like my class to try:

Question 1: Twice the larger of two numbers is three more than five times the smaller and the sum of four times the larger and three times the smaller is 71.

What are the numbers?

Question 2: Find an odd three digit number whose digits add up to 12. The digits are all different and the difference between the first two digits equal the difference between \_\_\_\_\_ (the other school, Mary Mount Prep, quickly answers the question not allowing the facilitator to finish reading the question).

Question 3: Find:  $\lim_{x \rightarrow 0} \frac{\ln(1-x) - \sin x}{1 - \cos^2 x}$

I plan on presenting the questions one at a time on the overhead projector (Appendix 8) for the calculus students to solve. I will not give them a time limit, but will stress the importance of trying to solve it as quickly as they can, as if in a competition. Once a student has a correct answer, we will discuss the problem. After we finish the three questions, I will show the clip from the movie (1:22:35 – 1:23:09) and (1:23:49 – 1:25:45). I want my class to see how quickly the answers were derived and I want to discuss how realistic the students felt this was. We also will discuss the level of difficulty of the questions to see if students think they were appropriate for a mathematics competition for that grade level.

## Lesson 9c

The movie *Cast Away* has a few scenes where the main character, Chuck Nolan, is stranded alone on a tropical island after an airplane crash. During this time, he uses math to help him survive. I will discuss two specific situations with my class.

Situation 1: Movie: *Cast Away* – movie clip (1:14:19 – 1:15:17).

The main character Chuck Nolan states: “in route from Memphis for 11 ½ hours, 475 mph.” He then draws a straight line marking where he thinks searchers would think he would be, versus where he actually believes he is. From the point where he ventured out to, he then draws a circle to determine the area in terms of a circle.

X \_\_\_\_\_ X

think            venture out  
we are          of radio contact  
here            and flew around  
                  the storm 1 hour  
                  so that is a distance  
                  of 400 miles

He continues talking: “400 squared is 160,000 times Pi ( $\pi$ ).  $160000 \times 3.14$  equals 502,400. That’s a search area of 500 square miles. That’s twice the size of Texas. They may never find us.”

In this scene, Chuck Nolan uses his knowledge of the area of a circle to determine the size of his search area. I would like my class to determine if Chuck Nolan used the correct formula for the area of a circle. Did Chuck Nolan calculate the area correctly? Did rounding  $\pi$  to 3.14 make a significance difference in the search area? Why or why not? We will discuss the importance and significance of rounding. Nolan mentions that the search area is twice the size of Texas. How big is Texas? How could you calculate the square miles of Texas? Is this an accurate analogy to use in this movie?

Situation 2:    Movie: *Cast Away* – movie clip (1:24:25 – 1:26:01).

Again we see Chuck Nolan talking to himself. He states: “22, 44 lashings. We have to make rope again. Eight lashings make structural, 20 feet a piece 160. Gives us a month and a half. High tides, March and April. Need 424 feet of good rope plus 50 miscellaneous around 475 feet of good rope. If average 15 feet a day and build it, stock it, launch it, not much time.”

Assignment: I will first show the movie clip to the whole class. I will then break the class up into small groups. Each group will discuss the scene and determine if it makes sense to them. They will decide if the mathematics that Chuck Nolan used was accurate. Was his approach realistic? Once each group has had enough time to discuss the scene, we will discuss this scene together as a whole class.

## **Lesson 9d**

Movie: *Stand and Deliver* – movie clip (33:35 – 35:40)

I will use this movie clip with either my AP AB Calculus or Gifted Algebra 2 class. I will have the question written on the board and have my class try to solve it.

The main character Jaime Escalante states this problem situation. “Juan has five times as many girlfriends as Pedro. Carlos has one girlfriend less than Pedro. If

the total number of girlfriends between them is 20, how many does each gigolo have?”

I would like my students to try the problem and see if they are able to successfully solve it. Once someone has answered it correctly, we will discuss the mathematics necessary for solving the problem. I will then show the movie clip, which shows several students answering the question incorrectly before one girl answers it correctly. At that point, we will discuss how she was able to solve the problem at the same time she entered the classroom. Was anyone in my class able to solve it that quickly? Do they think this was reasonable or realistic? The class will have to explain why.

### **Annotated Bibliography/Resources**

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A movie dealing with a new teacher in an inner-city school and the challenges he faces.

Bomer, Katherine. Writing a Life: Teaching Memoir to Sharpen Insight, Shape

Meaning – and Triumph Over Tests. New Hampshire: Heinemann, 2005.  
A book which discusses why and how to write memoir.

Cast Away. Prod. Hanks, Tom, Rapke, Jack, Starkey, Steve, Zemeckis, Robert.  
DVD. Twentieth Century Fox and DreamWorks LLC, 2006.  
A movie about a FedEx systems engineer whose plane crashes and he finds himself trying to survive on a deserted island alone.

Chapman, Murray. “Plot Summary for *Stand and Deliver*.” The International Movie Database. 1988. 20 April 2007.  
<<http://www.imdb.com/title/tt0094027/plotsummary>>.  
This site is an internet movie database. It offers many categories of interest.

Conrack. Prod. Frank Jr, Harriet, Ritt, Martin. VHS. Twentieth Century and Fox Films, 1985.  
A movie based on an autobiographical book about a white teacher teaching on an island off the coast of South Carolina to mostly poor uneducated black students and the challenges he faces.

Dalton, Mary M. The Hollywood Curriculum: Teachers in the Movies. New York: Peter Lang Publishing, 2004.  
A book which discusses popular culture and how Hollywood portrays the educational system.

Dangerous Minds. Prod. Bruckheimer, Jerry, Simpson, Don. DVD. Hollywood Pictures, 1995.  
A movie about an ex-marine who becomes a teacher in an inner city school and the challenges she faces.

“Dangerous Mind (1995).”  
<<http://www.filethirteen.com/reviews/dangerousminds/dangerousminds.htm>>.  
A movie review of the movie *Dangerous Minds*.

“Dangerous Minds.” Wikipedia. March 19, 2007.  
<[http://en.wikipedia.org/wiki/Dangerous\\_Minds](http://en.wikipedia.org/wiki/Dangerous_Minds)>.  
Wikipedia is a free encyclopedia that anyone can edit. This was an entry on the movie *Dangerous Minds*.

Die Hard with a Vengeance. Prod. McTiernan, John, Tadross, Michael. DVD. Twentieth Century Fox, 1995.  
A movie about a New York detective who becomes a target of a terrorist who threatens to blow up the city if he does not get what he wants.

“Discussion Questions and Projects for Use with Any Film.” Teach With Movies. 4 June 2005. 26 May 2007.  
<<http://www.teachwithmovies.com/members/standard-questions.htm>>.  
Teach with Movies is a website that offers lesson plans and learning guides for movies.

Freedom Writers. Prod. Devito, Danny, Shamberg, Michael, Sher, Stacey. DVD. Paramount Pictures, 2007.  
A movie about a teacher teaching inner-city students and the challenges she faces to change their life for the better.

“Freedom Writers.” Wikipedia. 28 May 2007.  
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“Freedom Writers: Express Yourself Discussion Guide.” National Collaboration for Youth. 2006. 28 May 2007.  
<<http://www.youthfilmproject.org/film/documents/FreedomWriters-ExpressYourself.pdf>>.  
This is a discussion guide to be used after viewing the movie *Freedom Writers*. It offers discussion topics to be used with you students.

Jessness, Jerry. “Stand and Deliver Revisited: The untold story behind the famous rise – and shameful fall – of Jaime Escalante, America’s master math teacher.” July 2002.  
<<http://www.reason.com/news/show/28479.html>>.  
This is an online article discussing the untold story behind the movie *Stand and Deliver*.

“Learning Guide To: Conrack.” Teach With Movies. 8 November 2004. 5 September 2006. <<file:///C:/twmnet-com/members/Guides/conrack.html>>.  
Teach with Movies is a website that offers lesson plans and learning guides for movies.

“Learning Guide To: Stand and Deliver.” Teach With Movies. 2005. 5 September 2006. <<file:///C:/twmnet-com/members/Guides/stand-and-deliver.html>>.  
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Lewkowicz, Marjorie L. “The Use of “Intrigue” to Enhance Mathematical

Thinking and Motivation in Beginning Algebra.” Mathematics Teacher Volume 96, Number 2 February 2003.

Mathematics Teacher is an official journal published by The National Council of Teachers of Mathematics. It is published nine times a year and you must be a member in order to receive the magazine. There are problem solving activities in the magazine as well as mathematical articles.

Mason, Ralph T. and McFeetors, Janelle. “Interactive Writing in Mathematics Class: Getting Started.” Mathematics Teacher Volume 95, Number 7 October 2002.

Mathematics Teacher is an official journal published by The National Council of Teachers of Mathematics. It is published nine times a year and you must be a member in order to receive the magazine. There are problem solving activities in the magazine as well as mathematical articles.

Mean Girls. Prod. Michaels, Lorne. DVD. Paramount Pictures, 2004.

A movie about a 15 year old girl who was home schooled and now faces new challenges by attending a public school.

Moss, J. L. “The Timeline Problem.” 1997. 28 May 2007.

<http://www.80s.com/saveferris/essays/moss.txt>.

An online article discussing the timeline from approximately the time Ferris wakes up to 6:00p.m. when he heads home. Can he seriously do all of the things mentioned in time given?

“Movie Index – *Conrack* 1974.” Power to Learn. 26 May 2007.

<[http://www.powertolearn.com/spotlights/black\\_history\\_month\\_2004/conrack.html](http://www.powertolearn.com/spotlights/black_history_month_2004/conrack.html)>.

An article about the movie *Conrack* as well as questions for discussion and/or reflection.

National Council of Teachers of Mathematics. Principles and Standards for School Mathematics. Virginia: NCTM, 2000.

A book published by the National Council of Teachers of Mathematics which includes mathematical understanding, knowledge, and skills that students should acquire from Pre-K through grade 12.

“Pat Conroy.” American Society of Authors and Writers. 2006. 26 May 2007.

<<http://amsaw.org/amsaw-ithappenedinhistory-102604-conroy.html>>.

An article discussing the life of Pat Conroy.

Pittsburgh Public Schools Committee Members. CAS Centers for Advanced Study Teacher Handbook. Pittsburgh: Pittsburgh Public Schools, March

2005.

A Teacher Handbook published by the Pittsburgh Public Schools which contains information on Gifted Education.

Roberts, Matt. "Love Thy Teacher." February 19, 2004.

<<http://www.dooyoo.co.uk/dvd-title-d/dangerous-minds/433696/>>.

A review of the movie *Dangerous Minds*.

## **Appendices - Standards**

### Appendix 1

#### Mathematics Content Standards

1. All students use numbers, number systems, and equivalent forms (including numbers, words, objects and graphics) to represent theoretical and practical situations.

2. All students compute, measure and estimate to solve theoretical and practical problems, using appropriate tools, including modern technology such as calculators and computers.
3. All students apply the concepts of patterns, functions and relations to solve theoretical and practical problems.
4. All students formulate and solve problems and communicate the mathematical processes used and the reasons for using them.
5. All students understand and apply basic concepts of algebra, geometry, probability and statistics to solve theoretical and practical problems.
6. All students evaluate, infer and draw appropriate conclusions from charts, tables and graphs, showing the relationships between data and real-world situations.
7. All students make decisions and predictions based upon the collection, organization, analysis and interpretation of statistical data and the application of probability.

## Appendix 2

### Video Viewing Guide for the movie *Conrack*

1. What advantages and disadvantages are there in going to school in a one-room school house?

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2. How does the teacher Mr. Conroy interact with his principal, Mrs. Scott and the superintendent, Mr. Skeffington?

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3. How were the students treated?

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4. Do you agree with Mr. Conroy's teaching methods?

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5. Besides the day to day classroom teaching, what did these children learn from Mr. Conroy?

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### Appendix 3

#### Video Viewing Guide for the movie *Freedom Writers*

1. Why are the students not willing to associate with others not in their ethnic or racial group?

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2. Do the students face similar struggles in their lives with each other?

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3. Are there similarities in your school with the lack of respect for others not like you?

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4. What are some inequalities among students and classrooms in Wilson High School?

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5. How is Ms. Gruwell portrayed in comparison to other teachers at Wilson High School?

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6. How are the students in Ms. Gruwell's class compared to other students in the advanced classes? How are the classrooms similar or different?

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7. Can you relate to a specific character in the movie?

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#### Appendix 4

##### Video Viewing Guide for the movie *Stand and Deliver*

1. How realistic was it for these students to successfully complete the course and pass the Advanced Placement AB Exam?

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2. How were the teachers portrayed in the movie?

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3. How were the students portrayed in the movie?

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4. Did Jamie Escalante get along with the principal, Henry Gradillas? How important is their relationship in dealing with the mathematics program in the school?

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5. What were Jamie Escalante's expectations for his students?

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6. Do the students change from the beginning of the movie to the end? Did they change for the better or for the worse?

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Appendix 5

Video Viewing Guide for the movie *Dangerous Minds*

1. How realistic was it for these students to successfully complete the course?

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2. How were the teachers portrayed in the movie?

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3. How were the students portrayed in the movie?

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4. Did LouAnne Johnson get along with her principal, Mr. Grandey? How important is their relationship in dealing with the English curriculum that Ms. Johnson is supposed to teach?

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5. What were LouAnne Johnson's expectations for her students?

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6. Do the students change from the beginning of the movie to the end? Did they change for the better or for the worse?

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Appendix 6

Video Viewing Guide for the movie *Ferris Bueller's Day Off*

1. What time was it when Ferris decided to stay home from school and what time did he actually return home from skipping school? Could he have done everything you saw in the movie in the allotted time?

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2. How were Ferris, Sloan and Cameron portrayed in comparison to Ferris' parents, teachers, and principal?

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3. Pay close attention to everything that Ferris does throughout the movie, from the time he wakes up and decides he is not going to school to the time he makes it back home and in bed. Did Hollywood portray this movie as a realistic day in or out of school?

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## Appendix 7

### Video Viewing Guide for the movie *Blackboard Jungle*

1. Is the teacher, Mr. Dadier, concerned with the learning of every student in the class or only a few who are paying attention?

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2. Does Mr. Dadier follow the specified curriculum?

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3. How are the teachers portrayed in the movie? What different roles do they play – young, innocent, idealistic, naive, old, sarcastic and/or cynical?

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4. How are the students spoken to by the principal on the first day of school?

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5. The teacher, Mr. Murdock who has been teaching for 12 years has a couple of opinions for Mr. Dadier, what are they?

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6. When Mr. Dadier is reprimanding his students, does he treat them with respect? Was he fair?

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7. How did Mr. Dadier's wife respond to him when he told her about Ms. Hammond, the teacher that was attacked?

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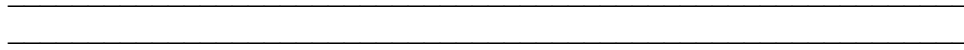
8. This movie was made in 1955; think about the similarities and differences of the characters as compared to today.

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## Appendix 8

Movie: *Mean Girls*

Worksheet needed to make an overhead transparency.

Question 1: Twice the larger of two numbers is three more than five times the smaller and the sum of four times the larger and three times the smaller is 71. What are the numbers?

Question 2: Find an odd three digit number whose digits add up to 12. The digits are all different and the difference between the first two digits equal the

difference between \_\_\_\_\_ (the other school, Mary Mount Prep, quickly answers the question not allowing the facilitator to finish reading the question).

Question 3: Find:  $\lim_{x \rightarrow 0} \frac{\ln(1-x) - \sin x}{1 - \cos^2 x}$