

PreCalculus Final Project 2010: Video of a Mathematical Modeling Problem

Choose a mathematical model that we have learned in PreCalculus. I want to show your project to classes in the future. Sign up for the type of model and specific application. You can sign up for the same type of model as a classmate but the applications must be different.

Prepare a short video (around 3 minutes, shorter than 5 minutes) that shows your application visually (photos and/or video clip). Write a mathematical problem that can be solved by PreCalculus students. Solve your problem using at least three different representations (data table, equation, graph of data, graph of equation, sequences). Explain your problem and your solution in your video with both written work, graphs, tables and narration.

During presentation week, present your project to the class. Introduce your topic, show your video, explain your video and then show it again. Be prepared to answer questions from the class and teacher on your problem.

Potential Topics:

1. Quadratic (projectile motion)
2. Parabola (curve)
3. Power curve (Kepler's Law)
4. Exponential growth (percent growth, money)
5. Exponential decay (Newton's Law of Cooling)
6. Log (earthquake -- Richter scale)
7. Log (decibels)
8. Logistics (population based)
9. Sinusoid (music, sound)
10. Sinusoid (daylight, sunset, etc)
11. Elliptical (planetary orbit)
12. Optimization (garden fencing, cut out box, ht-radius of cylinder)
13. Parametric Equations (simulating motion)
14. Systems of Linear Equations

There are MANY other ideas. See me if you are stuck.

Your task

- I. Research and prepare a modeling problem. Sign up for a unique application/model.
- II. Prepare a video of your problem and solution. Sources should be credited at the end of the video.
- III. At the beginning of your presentation, hand in a 1 – 2 page paper that includes the problem, the solution with all its representations, and citations for sources including any videos or photos used. Send this paper to me electronically, either as an email attachment to mclemens@ccsdc12.org or place it in the Clemens folder in the HS drop box. Put the video file in the HS drop box (it will probably be too big to email) or bring it to me the day BEFORE your presentation on a USB key so I can copy it to the laptop.
- IV. Give an oral presentation to the class (5 – 10 minutes.) Be sure to use the rubric as a checklist to prepare your presentation and video.
- V. Enjoy your classmates' videos. Your attendance at your classmates' presentations is part of your grade.

Precalculus Final Project 2010

Name _____

Score _____

Type of model and application:

0	-	$\sqrt{-}$	$\sqrt{}$	$\sqrt{+}$	+
Not done	Below standard on a major point or a major mistake	Below standard on a minor point or a small mistake	Meets standard, all areas correctly performed	Above standard on a minor point or in small way	Above standard on a major point or in an impressive way
-10	-7	-4	0	+3	+5
Criteria					
Topic: PreCalculus model; appropriate for classroom; original: everyone must choose a different topic					
Visual Representation: video or images of the application, realistic, funny is good if it doesn't detract from the problem;					
Video/photo/music source(s): original is a plus, all sources must be cited in your paper and on a title slide at the end of the video					
Math Problem: can be solved with PreCalculus skills, clear, concise					
Solution: accurate, clear, concise					
Different representations in problem and/or solution: at least three – data table, graph of data, equation, graph of equation, sequences					
Expertise: Know your problem and solution so you can answer questions from the audience (your classmates and me)					
Narration: organized, clear, interesting voice and manner (do NOT read your paper), must be your voice					
Submitted video: appropriate length, around 3 min, definitely not longer than 5 minutes; final presentation: music, colors, themes, transitions (appropriate and not distracting), plays on Windows XP (not sure? test it), submitted electronically <i>before</i> the presentation					
Written problem and solution: neat, clear, typed summary with details as needed, watch spelling! Submitted electronically and on paper.					
Timeliness: you will lose points if you are not prepared or absent for your scheduled presentation (-10 points)					
Learning from others: attendance (missed class -5 points/ -10 points for the double period class)					

95 is the baseline score—met the standard in each category. If you want a higher score, be prepared to impress me!

My Inspiration

My AP Calculus students did this video project several years ago. Mr Dixon has VideoPoint software to model from a video clip.

<http://www.ccsdk12.org/mclemens/HPGrant/ProjectList.htm>

I love this video ☺

Optimization Prime Saves Christmas!

<http://www.youtube.com/watch?v=4pzMFXprFQo>

Technology

In early April, we will have several class periods in the computer lab to learn how to make a video. We will use MovieMaker software. You may use other software if you know what you are doing.

CAUTION: the MovieMaker software on Windows XP is different than the version on Windows Vista. If you use MovieMaker, once you start your project, you must use the same operating system to finish it.

What you need to learn:

1. How to import a video clip
2. How to insert title slides
3. How to put graphs and equations on title slides
4. How to add your voice explanation
5. How to add a music track (optional)
6. How to finish the project so it is playable on any computer

Resources

The district has digital camcorders you can borrow. See Ed Tech. They have both the tape variety and Flip camcorders.

See Mr Chamberlain in Ed Tech if you need help converting a video format.

Ed Tech has microphones you can borrow for the narration.

Digital music (mp3 or wma) can be used as a soundtrack. You must give credit in your paper and at the end of the video for any music that is not original.

Need something else? Just ask! I have lots of digital music (well, oldies) if you are looking for the perfect soundtrack.

Computer lab time

Fridays in May will be scheduled computer lab time. There are two student computers in my room you may use after school or during periods 1, 4, 5, 6, 8.

Help

This is not a group project; however, you may help your friends and get help from others (even adults.) Each student is solely responsible for his/her video and presentation.