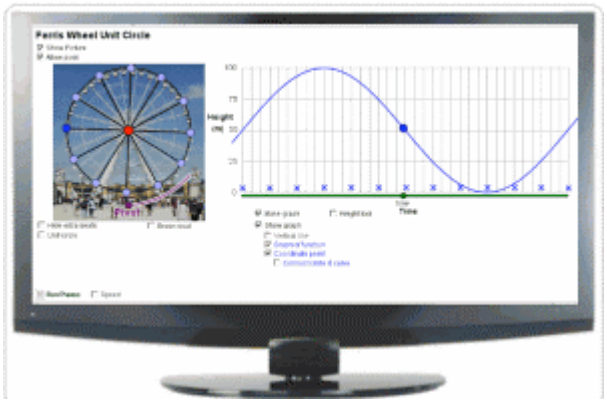
Modelling Periodic Behaviour – Assessment



In this unit of study, we have looked at many examples of periodic behavior, including Ferris wheels, the average monthly high temperatures, and water levels with tides.

Now it's your turn to research and model periodic data of your choice. In this project, you will create a newsletter, report, brochure or television report (video) that informs your audience about a certain periodic trend. Here are the specifics:

1) Choose a topic that you think will be periodic and easily modeled by a sine/cosine function.

   (a) What type of person would study this topic? **You will take on that role for the rest of your project.** For example, an engineer might study rides at amusement parks, so if that was my topic, I would write my entire project from the perspective of an engineer. **(COMMUNICATION & KNOWLEDGE CRITERIA)**

   (b) What type of person would be interested in the results of your study? **For the rest of your project, assume that you are researching and writing with this audience in mind.** For example, as an engineer studying rides at amusement parks, one group of people who may be interested in my results are park operators or safety inspectors who want to know about the design of rides. So my chosen *audience* will be park operators. **(COMMUNICATION & KNOWLEDGE CRITERIA)**

2) Research your topic to find good data that you can use. If you can't find good data, you'll have to choose a new topic. **(KNOWLEDGE CRITERIA)**

3) Display your data in a clear table. Make sure to cite your source(s). You need to have at least 10 data points. Make sure to include a title for your table, and label your variables clearly. **(APPLICATION & COMMUNICATION CRITERIA)**

4) Create a graph (by hand) that clearly represents the data and that will help your audience understand the data. Make sure to include the following: **(APPLICATION & COMMUNICATION CRITERIA)**
   - A title
   - Axes labeled with clear, specific variable values and appropriate scales
   - Points plotted clearly

5) Create a scatterplot graph on the calculator/DESMOS. Make sure your window size is set well so that you don't have wasted space and so that everything is clearly visible. You will need to show screen shots of the following: **(APPLICATION & COMMUNICATION CRITERIA)**
   - your scatterplot
   - your window settings (also true for DESMOS graphs)

   For your screen shots, you may depart from your role and your chosen audience, as your role for this part is really just "math student" and your audience is just your math teacher. ☺

6) Come up with a sine/cosine function that models your data as perfectly as possible. Present your final equation to your audience, and then explain to your audience how you came up with this equation. Explain how you found parameters A, k, C, and D, making sure to include: **(KNOWLEDGE & APPLICATION CRITERIA)**
   - specific numbers from your data in each part of your explanation,
   - enough math work so that your audience knows you didn't just make something up or "guess and check",

7) Graph your sine/cosine function on your calculator, along with your existing scatterplot. Include screen shots of: **(APPLICATION & COMMUNICATION CRITERIA)**

- your scatterplot and graphed equation on the same axes
- your window settings
- your "y=" screen with the equation that you graphed

8) Discuss the fit of the equation. This is where you really need to think about your role and your audience as they look at your findings. Really **discuss** the fit of the equation with them, showing good analytical skills and some critical thinking about how good is good enough for the fit of your equation for your particular audience. **(THINKING/PS CRITERIA)**

9) Use your equation to make a prediction. Communicate clearly about what you are predicting, and what this means for your audience. **(KNOWLEDGE & APPLICATION CRITERIA)**

10) Include any other comments on your equation/scenario that may show some critical thinking or analytical skill. For example, is my prediction from my equation about the ride after 20 seconds going to be exactly the same as my data point for 20 seconds? What might I communicate to the park operators regarding this? **(THINKING/PS CRITERIA)**

*For these comments, be careful not to "overreach" the intent here. Don't just guess at things to say, don't try to "sound smart", and don't say what you think your teacher might want to hear. An entire paragraph of fluff won't show thinking, where one good sentence of insight can. Just **reflect** on your findings, and clearly communicate these reflections with your audience.*

You will work individually for this project.

Your DATA is must be approved before or on March 30/31, 2016

Your FINAL PROJECT is due April 18/19, 2016

Read the rubric and score your own project before you turn it in, so that you are confident that you have met all the expectations.

MAXIMUM LENGTH OF REPORT → 3 PAGES FRONT AND BACK

READ the project guidelines all the way through:

1. **Before beginning the project**
2. **Each time that you sit down to work on your project**
3. **As you work through the project**
4. **After "completing" the project**