

Modeling Periodic Behavior – Assessment



In this unit of study, we have looked at many examples of periodic behavior, including the population of migratory birds in Bahrain, the average monthly high temperatures in Kapuskasing, Ontario, and water levels in the Bay of Fundy.

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

- 1) a) Choose a topic that you think will be periodic and easily modeled by a sine function.
 - b) What type of person would study this topic? **You will take on that role for the rest of your project.** For example, a biologist might study bird population, so if that was my topic, I would write my entire project from the perspective of a biologist.
 - c) 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 a biologist studying bird population, one group of people who may be interested in my results are wildlife photographers who want to photograph the birds. So my chosen *audience* will be a wildlife photographer.
- 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.
- 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.
- 4) Create a beautiful graph (by hand) that clearly represents the data and that will help your audience understand the data. Make sure to include the following:
 - A title
 - Axes labeled with clear, specific variable values and appropriate scales
 - Points plotted clearly
- 5) Create a beautiful scatterplot graph on the calculator. 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:
 - your lists of data
 - your scatterplot
 - your window settingsFor 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 , b , c , and d , making sure to include:
 - 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",
 - enough words so that your thinking is clear,
 - appropriate mathematical terminology (for example, say "...because the period is 24 hours", rather than "...because it goes on for one day").

- 7) Graph your sine function on your calculator, along with your existing scatterplot. Include screen shots of:
- 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.
- 9) Use your equation to make a prediction. Communicate clearly about what you are predicting, and what this means for your audience. For example, if I were presenting my findings to wildlife photographers who would be trying to do a photo shoot in the second week of June, I would make a prediction about the probable bird population during that time.
- 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 bird population in the second week of June going to be exactly the same as my data point for June? What might I communicate to the photographers regarding this?

*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 may work in pairs or alone for this project. It is due on _____.

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.

You may be presenting your final project in class, so be prepared to make a 2-3 minute presentation.

READ the project guidelines all the way through:

- Before beginning the project**
- Each time that you sit down to work on your project**
- As you work through the project**
- After "completing" the project**