

When Is the World Going to Be Full?

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This project was designed to fit in the Alberta Math 30-2 curriculum. Feel free to alter as you see fit.

Pose the question: When is the world going to be full?

Give students five minutes to talk in groups, then discuss and share possible hypotheses.

Next, ask for information that might be needed to answer this question more accurately. Here are some other possible questions:

1. How many people can fit on the planet?
2. How many people can the planet sustain? (Different question from the first.)
3. What is our current growth rate?
4. What is our current population?

Some of these questions will be easy to solve, while others might be more difficult. I would ask students to research the answers to their questions in groups. Some questions will have an answer all will

agree with, such as “What is our current population?”, while other questions might have a range of answers depending on the website found, such as “How many people can the planet sustain?” Create answers that the whole class can agree with or common answers in different groups that the whole group can agree with.

Body

Creating an Extrapolation of Our Population

Our current growth rate can be searched; however, this number most likely has no meaning or even understanding of how it was derived. As a class, possible growth rates will be explored. On the next page is a chart of recent population numbers on our planet. (You might want to use different or more years).

Now the question becomes, “What sort of data is this?” This is when I would pause and teach exponential, sinusoidal, linear, quadratic, cubic and logarithmic functions. Using this data, I would create an equation of each type of function. Below is a graph of the functions displayed together. (I used 1970 as year 0. This occurred as I needed more data points after deciding this. I also added a logistic curve to show what would happen if population growth becomes 0.)

Here are some questions to ask during discussion time:

- Any general thoughts?
- Any similarities?
- Could you create a possible scenario in which each graph would be accurate?

The critical learning of each function could be embedded into this; for example, you could ask:

- What are the amplitude, period and median values for the sine function? What does that mean in this context?
- What are the zeros of the cubic function? What does this mean in this context?
- What is the growth rate of the exponential function? What does this mean in this context?

You may want to remove any functions in which the class agrees might be inaccurate, such as cubic, sinusoidal and linear.

Using the remaining graphs determine when the earth would be full, using the number the class researched earlier. The answers might be earlier or later than the class first hypothesized.

Conclusion

Discuss “Should population growth be addressed? Why or why not?”

Do not rush this project. Stop throughout to teach certain skills or concepts. Also allow students to research on their own and pose their own questions throughout.

Year	Population (Billion)
2016	7.4
2015	7.3
2010	6.9
2005	6.5
2000	6.1
1995	5.7
1990	5.3
1985	4.9
1980	4.4
1975	4.0
1970	3.7
1965	3.3
1960	3
1955	2.8

