My NASA Data - Lesson Plans

Data Literacy Cube: Graph Data with Antarctic's Contribution to Sea Level Rise Graph

Overview

Use the Data Literacy Cubes to guide students’ exploration of data to enrich their observations and inferences. This is a flexible resource that may be used with a variety of graphical representations of data. This activity requires a graph for students to evaluate.

Learning Objectives

- observe and interpret physical characteristics of the Earth System using graphs of NASA data
- write a claim about the variables in the graph
- analyze how the phenomena changes of time and space
- characterize the independent and dependent variables
- brainstorm the phenomena connects to other parts of the Earth System
Essential Questions

- How are the data represented in the graph?
- How do we identify a change in these data?
- How does a change in the independent variable affect the other variable?
- What relationship do you claim exists among these variables?

Materials Required

- 1 Graph Cube per group/student (or die)
- 1 differentiated Graph Cube Question Sheet per student
- 1 sheet of paper per student
- Pencil
- Graph (as a handout or projected on the screen)

Teacher Preparation:

Print copies of the cube on cardstock and cut out. Assemble the cube with glue. Note: consider laminating after you cut these out for multiple uses. (Gaming dice may be substituted for the cubes.) Also, print off copies of the differentiated Graph Cube Questions. Distribute to students for group or independent work.

Technology Requirements

- Standalone Lesson (no technology required)

Teacher Background Information

For more information about the procedures for accessing MND data on the Earth System Data Explorer, visit our YouTube page and watch the tutorials.

Procedure

1. Distribute one Graph Cube per group (or die), as well as the related Graph Cube Questions sheets and the graph.
2. Students roll the cube and find the matching question on the Graph Cube Question sheet.
3. Answer one question found under matching question on a sheet of paper, labeling the question with the number and letter of the question.
4. Repeat Steps 2-4 until at least 10 are answered.
Graph Cube

1. Examine the graph.
   - The title tells me ________.
   - The bottom of the graph is the ___ axis. The variable is ________.
   - The left side of the graph is the ___ axis. The variable is ________.
   - The time frame for the data is ________ to ________.

2. Summarize the graph.
   - The x axis shows the (independent/dependent) variable.
   - The y axis shows the (independent/dependent) variable.
   - The data ________ (increase/decrease/follow a pattern). Explain.

3. Analyze the graph.
   - ________, caused the change.
   - The variable that changed as a result of something else changing is ________.
   - If ________ (increases/decreases/stays the same), then ________ (increases/decreases/stays the same).
   - The numbers on the graph show ________.

4. Brainstorm a question that you can answer using these data.
   - How does ________?
   - I wonder ________.
   - How is ________ the same as ________? Different from ________?
   - How many ________?

5. Who would be interested in this graph?
   - I think ________ (i.e., farmers, snow skiers, etc.) would be interested in this graph.
   - These data are important to the ________ community because ________.

6. Assess the data values.
   - The label on the x axis is ________.
   - The label on the y axis is ________.
   - The unit for the x axis is ________.
   - The unit for the y axis is ________.
   - The scale for the x axis is ________.
   - The scale for the y axis is ________.
Graph Cube Questions

1. Examine the graph.
   A. What variable is represented on the x-axis? What is the range of values?
   B. What variable is represented on the y-axis? What is the range of values?
   C. Describe the relationship between the variables: positive, negative, or none.
   D. Are the units of measurement consistent for both axes?
   E. Does the graph represent a geographic location, identify it on a map or globe.

2. Summarize the graph.
   A. How do the data points compare to the overall trend?
   B. What kind of pattern or trend do you see in the distribution of the data?
   C. How do you interpret the patterns seen in the graph in relation to other things you know?

3. Analyze the graph.
   A. Describe the relationship between the variables: positive, negative, or none.
   B. Brainstorm one variable that you predict to be directly proportional.
   C. Brainstorm one variable that you predict to be inversely proportional.

4. Brainstorm a question that you can answer using these data.
   A. Ask a question beginning with how, what, where, when or why.
   B. Form a hypothesis using the data on the graph. If _______ then _______.

5. Who would be interested in this graph?
   A. Brainstorm who would be interested in the data presented in this graph (i.e., farmers, snow skiers, etc.)
   B. Why do you think these data are important to this community?

6. Assess the data values.
   A. What is the numerical range of the data? Mean? Median? Mode?
   B. How does the range of the data compare to the overall trend?
   C. Are there any outliers? If so, what are they?
Graph Cube Questions

1. Examine the graph.
   A. The bottom of the graph is the ____ axis. The variable is _____.
   B. The left side of the graph is the ____ axis. The variable is _____.
   C. The time frame for the data is ____ to _____.
   D. The title says _____. It means _____.

2. Summarize the graph.
   A. The x-axis shows the (independent/dependent) variable.
   B. The y-axis shows the (independent/dependent) variable.
   C. The data _____. Increase/decrease/follow a pattern. I know this because _____.

3. Analyze the graph.
   A. The independent variable, _____. caused the change.
   B. The dependent variable _____. changes when the independent variable changes.
   C. If _____. increase/decrease/stays the same. Then _____. increase/decrease/stays the same.
   D. The numbers on the graph show _____.

4. Brainstorm a question that you can answer using these data.
   A. How does ___? I wonder _____.
   B. How is _____. the same as _____. Different from _____.?
   C. If _____. then _____.

5. Who would be interested in this graph?
   A. I think _____. (i.e., farmers, snow skiers, etc.) would be interested in this graph.
   B. These data are important to the _____. community because _____.

6. Assess the data values.
   A. The label on the x-axis is _____. The label on the y-axis is _____.
   B. The unit for the x-axis is _____. The unit for the y-axis is _____.
   C. The scale for the x-axis is _____. The scale for the y-axis is _____.

Credit: NASA