My NASA Data - Lesson Plans

Data Literacy Cube: Graph Data using Soil Moisture Data

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. For the purposes of this lesson, students will analyze a graph of the Monthly Soil Moisture of the Mojave National Preserve, south of Las Vegas, NV shown in mm.

Learning Objectives

- Observe and interpret physical characteristics of the Earth System using graphs of NASA data
- Characterize the independent and dependent variables
- Analyze graphs values with statistics
- Research how the phenomena changes of time and space
- Identify relationships among variables
- Summarize trends in the data
Essential Questions

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

Materials Required

- 1 Graph Cube per group/student
- 1 matching differentiated Graph Cube Question Sheet
- 1 Sheet of paper per student
- Pencil
- Graph

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](https://www.youtube.com) and watch the tutorials.

Procedure

1. Distribute one Graph Cube per group, as well as the related differentiated Graph Cube Questions 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 Questions

1. Examine the graph.
   A. The title tells me ________________
   B. The bottom of the graph is the ___ axis. The variable is ________________
   C. The left side of the graph is the ___ axis. The variable is ________________
   D. The time frame for the data is ________________ to ________________

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/tells a pattern). Explain.

3. Analyze the graph.
   A. ________________ caused the change.
   B. The variable that changed as a result of something else changing is ________________
   C. If ________________, 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 ________________?
   B. I wonder ________________
   C. How is ________________ the same as ________________? Different from ________________?
   D. How many ________________?

5. Who would be interested in this graph?
   A. I think ___ (e.g., 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 ________________.
   B. The unit for the x-axis is ________________.
   C. The scale for the x-axis is ________________.
   D. The label on the y-axis is ________________.
   E. The unit for the y-axis is ________________.
   F. The scale for the y-axis is ________________.
Graph Cube Questions

1. Examine the graph.
   A. The variable on the x-axis is _____ It is the (independent/dependent) variable.
   B. The variable on the y-axis is _____ It is the (independent/dependent) variable.
   C. The value of the independent variable affects the dependent variable by _____.

2. Summarize the graph.
   A. The variable that changes as a result of another variable changing is _____
   B. The variable that causes the change is _____
   C. As the independent variable _____ (increases/decreases), the dependent variable _____ (increases/decreases) by the same.
   D. The time frame represented in the graph is from _____ to _____.
   E. The data _____ (increase/decrease/follow a pattern). Explain.

3. Analyze the graph.
   A. Write a hypothesis about the two variables to explain the graph. If _____, then _____.
   B. The quantitative evidence that supports my testable statement is _____.

4. Brainstorm a question that you can answer using these data.
   A. How does _____ (i.e., farmers, snow storms, etc.) I 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 _____.
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 ______ increases/decreases/stays the same, then ______ increases/decreases/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 _______ (e.g., farmers, zoologists, 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 ______