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 graph 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](#) 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.
5. Who would be interested in this graph?

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. 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/follow 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 __________ 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 __________?
   - 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 __________.

3. Analyze the graph.
   - A. The data __________ (increase/decrease/follow a pattern). Explain.
   - B. The variable that changed as a result of something else changing is __________.
   - 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 __________?
   - 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 __________. 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 variable on the x-axis is ________ It is the (independent variable) or (dependent variable).
   B. The variable on the y-axis is ________. It is the (independent variable) or (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/tends to stay the same).
   D. The time frame represented in the graph is from ________ to ________.
   E. The data ________ (increase/decrease/trend for 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 those data.
   A. How does ________? How many ________?
   B. I wonder....
   C. How is ________ the same as ________? Different from ________?

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 ________. 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 _axes_. 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, the y-value increases/decreases/stays the same.
   D. The numbers on the graph show ________.

4. Brainstorm a question that you can answer using those 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, shoe sellers, etc.) would be interested in this graph.
   B. These data are important to the ________ 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 ________.