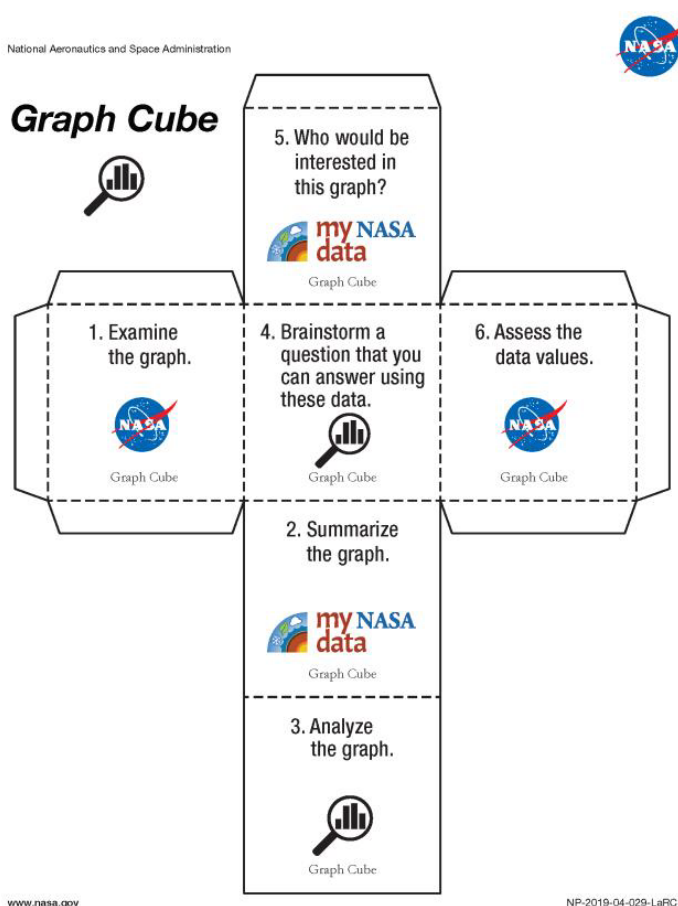


## My NASA Data - Lesson Plans

### 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

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## 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

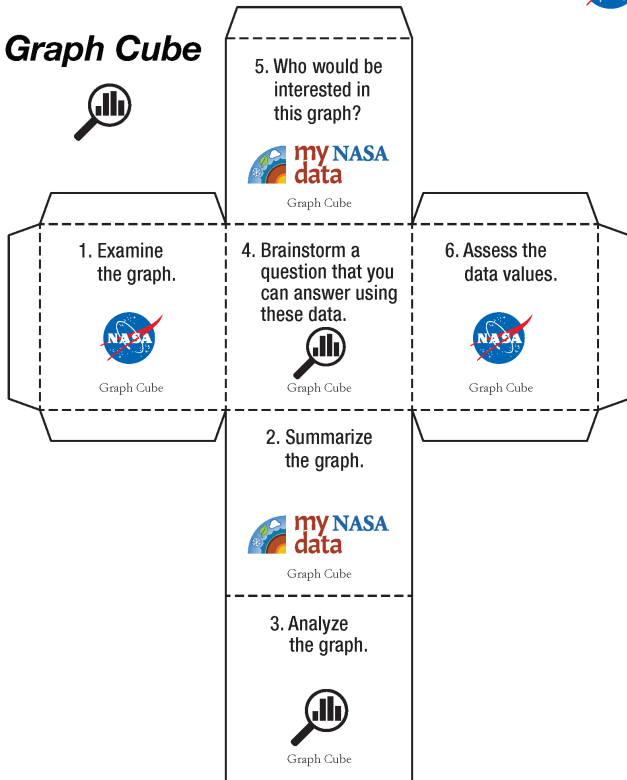
For more information about the procedures for accessing MND data on the Earth System Data Explorer, visit our [YouTube page](#) and watch the tutorials.

## 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



## Graph Cube Questions

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

- The variable on the x axis is \_\_\_\_\_. It is the (*independent/dependent*) variable.
- The variable on the y axis is \_\_\_\_\_. It is the (*independent/dependent*) variable.
- The value of the independent variable affects the dependent variable by \_\_\_\_\_.

### 2. Summarize the graph.

- The variable that changes as a result of another variable changing is \_\_\_\_\_.
- The variable that causes the change is \_\_\_\_\_.
- As the independent variable \_\_\_\_ (*increases/decreases*), the dependent variable \_\_\_\_ (*increases/decreases/stays the same*).
- The time frame represented in the graph is from \_\_\_\_\_ to \_\_\_\_\_.
- The data \_\_\_\_\_ (*increase/decrease/follow a pattern*). Explain.

### 3. Analyze the graph.

- Write a hypothesis about the two variables to explain the graph. If \_\_\_\_\_, then \_\_\_\_\_.
- The quantitative evidence that supports my testable statement is \_\_\_\_\_.

### 4. Brainstorm a question that you can answer using these data.

- How does...? How many...?
- I wonder...
- How is \_\_\_\_\_ the same as \_\_\_\_\_? Different from \_\_\_\_\_?

### 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 \_\_\_\_\_.

B



## Graph Cube Questions

### 1. Examine the graph.

- What variable is represented on the x-axis? What is the range of values?
- What variable is represented on the y-axis? What is the range of values?
- What are the units of measurement for the x and y axes?
- If this graph represents a geographic location, identify it on a map or globe.

### 2. Summarize the graph.

- Do the data repeat in recognizable ways? Explain.
- What kinds of patterns or trends do you see in the distribution of the data?
- How do the patterns you see in the graph relate to other things you know?

### 3. Analyze the graph.

- Describe the relationship between the variables; positive, negative, or none.
- Brainstorm one variable that you predict to be directly proportional.
- Brainstorm one variable that you predict to be inversely proportional.

### 4. Brainstorm a question that you can answer using these data.

- Ask a question beginning with how, what, where, when or why.
- I wonder...
- Form a hypothesis using the data on the graph. If \_\_\_\_\_, then \_\_\_\_\_.

### 5. Who would be interested in this graph?

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

### 6. Assess the data values.

- What is the numerical range of the data? Mean? Median? Mode?
- How is the mean different from the mode?
- Are there any outliers? If so, what are they?

C





## Graph Cube Questions

### 1. Examine the graph.

- 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 \_\_\_\_\_.
- The title says \_\_\_\_\_. It means \_\_\_\_\_.

### 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*). I know this because \_\_\_.

### 3. Analyze the graph.

- The independent variable, \_\_\_\_\_, caused the change.
- The dependent variable \_\_\_\_\_ changes when the independent variable changes.
- 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 \_\_\_\_\_?
- If \_\_\_\_\_, then \_\_\_\_\_.

### 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.

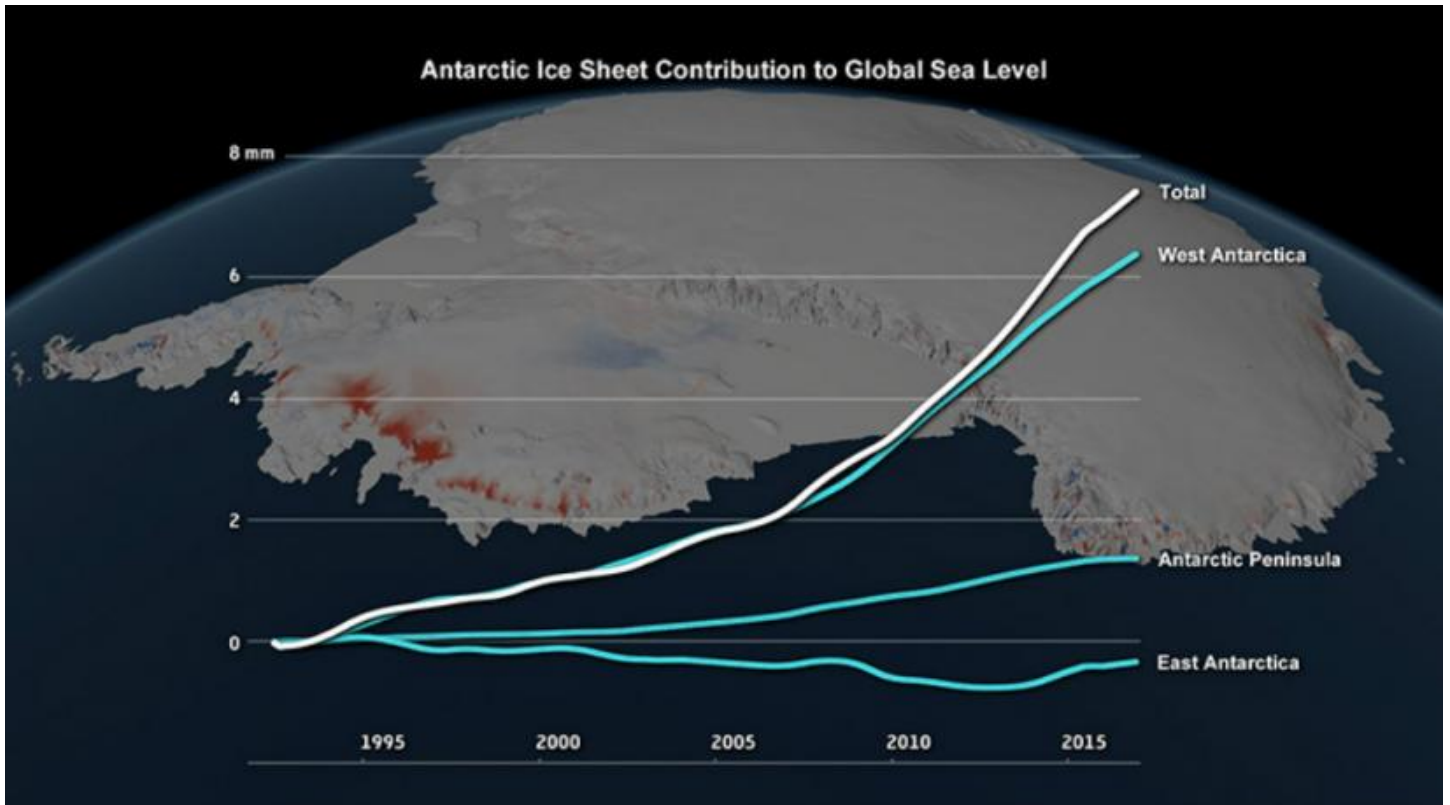
- The label on the x axis is \_\_\_\_\_. The label on the y axis is \_\_\_\_\_.
- The unit for the x axis is \_\_\_\_\_. The unit for the y axis is \_\_\_\_\_.
- The scale for the x axis is \_\_\_\_\_. The scale for the y axis is \_\_\_\_\_.

D



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