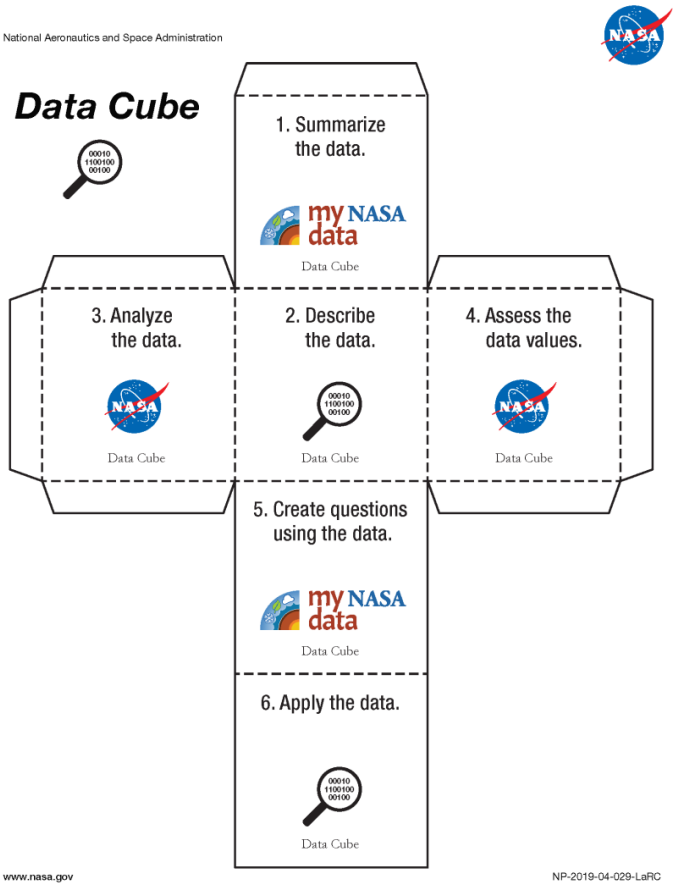
My NASA Data - Lesson Plans

Data Literacy Cube: Global Atmospheric Temperature Anomaly Data



Purpose

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 data, whether the data originates from students' investigations with personally-collected data or data that they have accessed/downloaded. This activity requires a data table for students to evaluate.

For the purposes of this lesson, students will analyze *Global Atmospheric Temperature Anomaly Data.*

Learning Objectives

- Summarize the data
- Research how the data was collected
- Identify the geographic area and time range the data represent
- Assess the data values and their characteristics
- Analyze data values using statistics

- Develop research questions using the data

Essential Questions

- What are key features of these data?
- Where do the data come from?
- What do these data represent?
- What patterns exist in these data?

Materials Required

- Data Cube
- Differentiated Question Sheets
- *Dataset: Global Atmospheric Temperature Anomaly Data

*MND offers a variety of Earth System data. To access and download tabulated data, visit the MND Data Visualization Tool, Earth System Data Explorer.

Technology Requirements

- Standalone Lesson (no technology required)
- Internet Required
- One-to-a-Group

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 Data Cube per group, as well as the differentiated question sheets, along with the data table.
2. Students roll the cube and find the matching question on the Data Cube Question sheets.
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.

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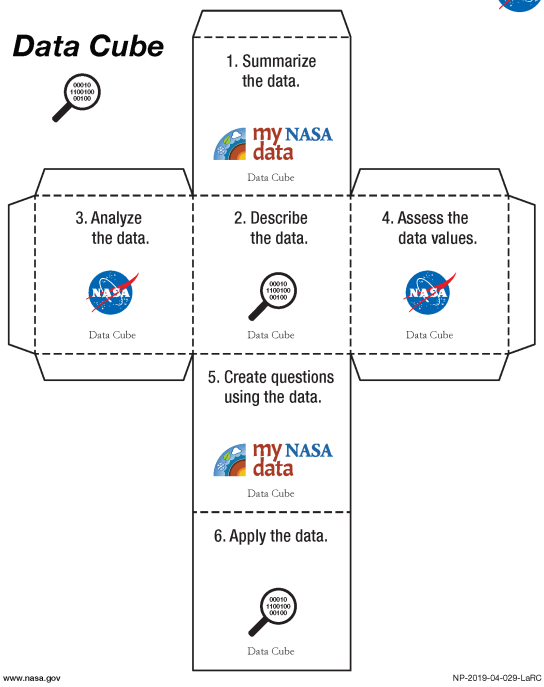
Data Cube



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Data Cube Questions

1. Summarize the data.

A. The data are displayed in a *(table, chart, etc.)* _____.
B. The title tells me the data are about _____.
C. The data measure...
D. The lowest value is _____.
E. The highest value is _____.

2. Describe the data.

A. The data were collected using _____ *(i.e. thermometer, instrument, etc.)*.
B. The data are collected every _____ *(day, week, month, quarter, year, etc.)*.
C. The unit used to describe the data is _____.

3. Analyze the data.

A. The geographic area of Earth where the data were collected is _____.
B. The time range is from _____ to _____.
C. These data show that _____.

4. Assess the data values.

A. The mean is _____. The median is _____. The mode is _____.
B. The highest value is _____. The lowest value is _____.
C. This variable belongs in the _____ sphere of the Earth System.

5. Create questions using the data.

A. I wonder ...
B. If ___ changed, I think the data would *(increase/decrease/stay the same)* ___.
C. How does....?
D. Why...?

6. Apply the data.

A. These data help us understand _____.
B. These data can explain why _____.
C. Graph the data.

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Data Cube Questions

1. Summarize the data.

A. The variable is _____. It represents _____.
B. The range of the data is from _____ to _____.
C. The independent variable is _____. The dependent variable is _____.

2. Describe the data.

A. The _____ instrument collected these data.
B. The data are collected every _____ *(day, week, month, quarter, year, etc.)*.
C. The unit used to describe the data is _____.

3. Analyze the data.

A. The geographic area of Earth that is represented is _____.
B. The time range is from _____ to _____.
C. This variable belongs in the _____ sphere of the Earth System.

4. Assess the data values.

A. The average is _____. The median is _____. The mode is _____.
B. The measure of central tendency that best represents the data is the _____ *(mean, median or mode)*. This is because _____.
C. The highest value is _____. The lowest value is _____.

5. Create questions using the data.

A. These data make me wonder _____.
B. I would like to compare _____ with these data because _____.
C. How do these data affect another sphere in the Earth System?

6. Apply the data.

A. These data help us understand _____.
B. These data can explain the phenomenon of _____ because _____.
C. Technology is related to these data because _____.
D. Engineering is connected to these data because _____.
E. Graph the data.

B

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Data Cube Questions

1. Summarize the data.

A. What does the variable represent?
B. What is the range of the data?
C. In which sphere of the Earth System does this variable belong?

2. Describe the data.

A. What instrument/s collected these data?
B. How frequently were the data collected?
C. What unit describes the data?

3. Analyze the data.

A. What geographic area on Earth do the data represent?
B. What time range do these data represent?
C. What area and time data would you like to collect to help you analyze these data?

4. Assess the data values.

A. What is the mean? Median? Mode?
B. Are there any outliers? If so, what are they? Why don't they meet your expectations?
C. Graph the data.

5. Create research questions using the data.

A. Identify a question related to these data that you could research.
B. Identify another scientific variable that you could evaluate with these data.
C. How do you think this area compares to other geographic provinces in your region? *(i.e., coastal plain, highlands, etc.)*

6. Apply the data.

A. What science questions do these data help us understand?
B. Describe how you may use these data to explain a scientific phenomenon.
C. How is Technology connected to these data?

C

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Data Cube Questions

1. Summarize the data.

A. The data are displayed in a *(table, chart, etc.)* _____.
B. The title tells me the data are about _____.
C. The variable measured is _____.
D. The lowest value is _____.
E. The highest value is _____.

2. Describe the data.

A. The data were collected using _____ *(i.e. thermometer, instrument, etc.)*.
B. The data are collected every _____ *(day, week, month, quarter, year, etc.)*.
C. The unit used to describe the data is _____.

3. Analyze the data.

A. The geographic area of Earth where the data were collected is _____.
B. The time range is from _____ to _____.
C. These data show that _____.

4. Assess the data values.

A. The mean is _____. The median is _____. The mode is _____.
B. The highest value is _____. The lowest value is _____.
C. This variable belongs in the _____ sphere of the Earth System.

5. Create questions using the data.

A. I wonder...
B. If _____ changed, then the data would *(increase/decrease/stay the same)* _____.
C. How does...?
D. Why...?

6. Apply the data.

A. These data help us understand _____.
B. These data can explain why _____ happens.
C. Technology was used to get these data by _____.

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