My NASA Data - Lesson Plans

Data Literacy Cube: Map Data Using Seasonal Vegetation Mapped Images

Grade Band

- 3-5
- 6-8

Time

- 30 minutes

Overview

Use the Data Literacy Cube to guide students' exploration of mapped data of the Earth System to enrich their observations and inferences. This is a flexible resource that may be used with a variety of mapped images. This activity requires a map of Earth data for students to evaluate.

Materials Required

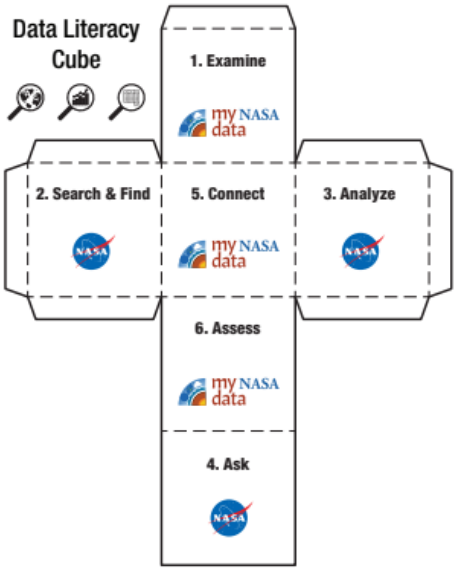
- 1 Cube per group/student
- 1 differentiated Map Cube Question Sheet per student
- 1 sheet of paper per student
- Pencil
- *Dataset:
    - Vegetation Map in December
    - Vegetation Map in June
- *MND offers a variety of Earth System maps to integrate with the Data Literacy Cube tool. Look for the icon which indicates that activities have an appropriate map. To access and download mapped data, visit the MND Data Visualization Tool, Earth System Data Explorer.

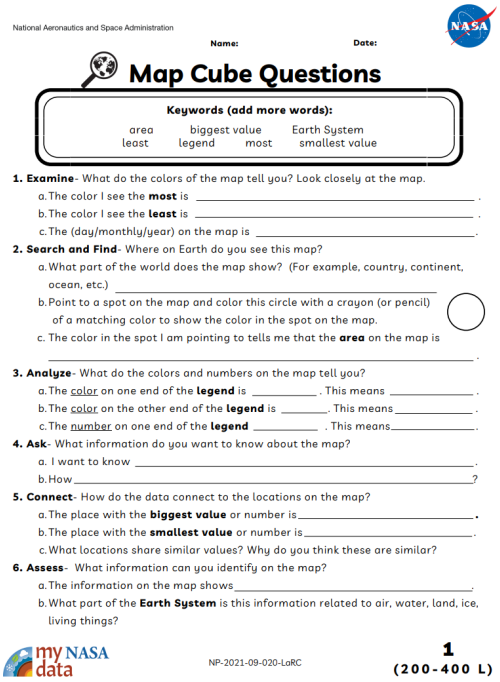
- **Teacher Preparation:**
    - ***Print copies of the cube on cardstock and cut out. Assemble the cube with glue. Note: consider laminating after you cut these out for multiple uses. (Gaming dice may be substituted for the cubes.) Also, print off copies of the***

differentiated Map Cube Questions. Distribute to students for group or independent work

Procedure

1. Distribute one Cube per group, as well as the differentiated Map Cube Question sheets, and mapped images.
2. Students roll the cube and find the matching question on the Map 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.





National Aeronautics and Space Administration

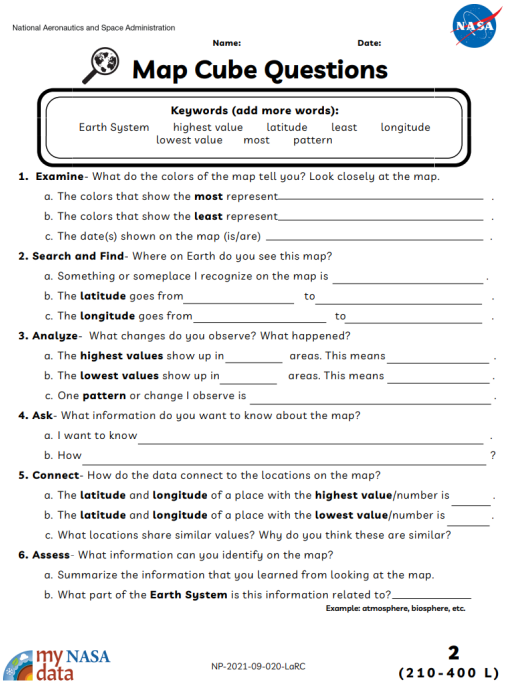
Name: Date:

Map Cube Questions

Keywords (add more words):
area biggest value Earth System
least legend most smallest value

1. **Examine**- What do the colors of the map tell you? Look closely at the map.
   a. The color I see the **most** is _____ .
   b. The color I see the **least** is _____ .
   c. The (day/monthly/year) on the map is _____.
2. **Search and Find**- Where on Earth do you see this map?
   a. What part of the world does the map show? (For example, country, continent, ocean, etc.) _____
   b. Point to a spot on the map and color this circle with a crayon (or pencil) of a matching color to show the color in the spot on the map.
   c. The color in the spot I am pointing to tells me that the **area** on the map is _____ .
3. **Analyze**- What do the colors and numbers on the map tell you?
   a. The color on one end of the **legend** is _____ . This means _____ .
   b. The color on the other end of the **legend** is _____. This means _____ .
   c. The number on one end of the **legend** _____ . This means_____.
4. **Ask**- What information do you want to know about the map?
   a. I want to know _____.
   b. How _____?
5. **Connect**- How do the data connect to the locations on the map?
   a. The place with the **biggest value** or number is_____.
   b. The place with the **smallest value** or number is_____.
   c. What locations share similar values? Why do you think these are similar?
6. **Assess**- What information can you identify on the map?
   a. The information on the map shows_____.
   b. What part of the **Earth System** is this information related to air, water, land, ice, living things?

my NASA data NP-2021-09-020-LaRC **1** **(200-400 L)**



National Aeronautics and Space Administration

Name: Date:

Map Cube Questions

Keywords (add more words):
Earth System highest value latitude least longitude
lowest value most pattern

1. **Examine**- What do the colors of the map tell you? Look closely at the map.
   a. The colors that show the **most** represent_____ .
   b. The colors that show the **least** represent_____ .
   c. The date(s) shown on the map (is/are) _____ .
2. **Search and Find**- Where on Earth do you see this map?
   a. Something or someplace I recognize on the map is _____ .
   b. The **latitude** goes from_____ to_____ .
   c. The **longitude** goes from_____ to_____ .
3. **Analyze**- What changes do you observe? What happened?
   a. The **highest values** show up in_____ areas. This means_____ .
   b. The **lowest values** show up in_____ areas. This means _____ .
   c. One **pattern** or change I observe is _____ .
4. **Ask**- What information do you want to know about the map?
   a. I want to know _____ .
   b. How _____?
5. **Connect**- How do the data connect to the locations on the map?
   a. The **latitude** and **longitude** of a place with the **highest value**/number is _____ .
   b. The **latitude** and **longitude** of a place with the **lowest value**/number is _____ .
   c. What locations share similar values? Why do you think these are similar?
6. **Assess**- What information can you identify on the map?
   a. Summarize the information that you learned from looking at the map.
   b. What part of the **Earth System** is this information related to?_____
   Example: atmosphere, biosphere, etc.

my NASA data NP-2021-09-020-LaRC **2** **(210-400 L)**

National Aeronautics and Space Administration

Name: Date:

Map Cube Questions

Keywords (add more words):
coordinates Earth System longitude latitude
time frame unit variable

1. **Examine**- What do the colors of the map tell you? Look closely at the map.
   a. What **variable** is represented by the colors?
   b. This **variable** explains _____.
   c. The **unit** used for the **variable** is _____.
   Example, cm, mm, inches, m, km, etc.
   d. The **time frame** for the map is_____.
2. **Search and Find**- Where on Earth do you see this map?
   a. The **latitude** and **longitude coordinates** are_____.
   b. An area (or **coordinates**) with the highest values is _____.
   This represents_____.
   Example: North, West, Asia, Africa,13.4° N, 144.7° E
   c. An area (or **coordinates**) with the lowest values is _____.
   This represents_____.
   Example: North, West, Asia, Africa,13.4° N, 144.7° E
3. **Analyze**- What changes do you observe? What happened?
   a. I observe the following pattern_____.
   b. What changes (or similarities) do you observe in the data values along lines of **latitude**? What may influence this pattern?
   c. What changes (or similarities) do you observe in the data values along lines of **longitude**? What may influence this pattern?
4. **Ask**- What information do you want to know about the map?
   a. My hypothesis is that if_____, then_____.
   b. How many_____? How long _____? How often_____?
5. **Connect**- How do the data connect to the locations on the map?
   a. Select a location on the map. What does the information on the legend tell you about the location?
   b. Scan the entire map and select a few locations. How does the **variable** change?
   c. What events or processes could cause these data **values** to change?
6. **Assess**- What information can you identify on the map?
   a. Summarize the information that you observed on the map.
   b. What part of the **Earth System** is this information related to atmosphere, biosphere, cryosphere, geosphere, or hydrosphere?
   c. Explain the changes in this part of the **Earth System**?
   d. How does this **variable** affect other parts of the **Earth System**?

my NASA data NP-2021-09-020-LaRC **3** **(410-600 L)**

National Aeronautics and Space Administration

Name: Date:

Map Cube Questions

1. **Examine**- What do the colors of the map tell you?
   a. The color scale represents the variable _____.
   Example, temperature, precipitation, etc.
   b. This variable explains_____.
   c. What is the unit for the variable?_____
   Example, cm, mm, inches, m, km, etc.
   d. What is the range for the unit?_____
2. **Search and Find**- Where on Earth do you see this map?
   a. What is the latitude and longitude range?
   b. Identify a place you recognize and its approximate latitude and longitude.
   c. What type of map projection is this?
3. **Analyze**- What changes do you observe? What happened?
   a. What patterns are there for the high values?
   b. What patterns are there for the low values?
   c. What time frame does this map represent?
4. **Ask**- What information do you want to know about the map?
   a. Form a hypothesis about the data displayed on the map.
   b. What inference can you make about the cause of the data displayed?
5. **Connect**- How do the data connect to the locations on the map?
   a. Look at the legend on the map. What do you interpret that is happening?
   b. How does the variable change by latitude and longitude on the map?
   c. How do the values change by area?
   d. What events or processes could cause these data values to change?
6. **Assess**- What information can you identify on the map?
   a. Why do you think this variable changed by area?
   b. How does this variable affect other parts of the Earth System?
   c. How could you determine the impact of this variable on other parts of the Earth System?

my NASA data NP-2021-09-020-LaRC **4** **(610-800L)**

NGSS Three Dimensional Learning

NGSS Crosscutting Concepts

- Patterns
- Cause and Effect
- Scale, Proportion, and Quantity
- Systems and System Models
- Stability and Change

NGSS Science and Engineering Practices

- Analyzing and Interpreting Data

- Constructing Explanations and Designing Solutions
- Engaging in Argument from Evidence
- Obtaining, Evaluating and Communicating Information

Learning Objectives

- observe and interpret physical characteristics of the Earth System using maps of NASA data
- analyze how the phenomena changes of time and space
- brainstorm the phenomena connects to other parts of the Earth System
- identify patterns and relationships in data

Essential Questions

- How are the data represented in the model?
- How do we identify a change in these data?
- Where on Earth were these data collected?
- When were these data collected?
- What areas have high and low values? Why?
- What other questions do you have about the map?

Student Resources

- Vegetation Map - December

- Vegetation Map - June