The tools in this guide are resources to support data literacy in your instructional setting with My NASA Data Earth science materials. These flexible resources may be used with graphs, data tables, and mapped images of NASA Earth science data. To access NASA data, visit the My NASA Data visualization tool, Earth System Data Explorer (https://mynasadata.larc.nasa.gov).

The Data Literacy Cube set includes:

- Cube templates *(Gaming dice may be substituted for the cubes.)* Each cube type has an icon associated with it. Icons are displayed on the right side of My NASA Data pages to indicate which cubes could be used with the content on the page. It is also possible to search content by cube type.

- Leveled question sheets to help you differentiate your instruction

  Note: This guide provides a labeled version identifying the different question sheets, as well as an unlabeled version for you to use at your discretion. See the bottom left for this designation on each labeled question sheet.

<table>
<thead>
<tr>
<th>Beginner</th>
<th>Intermediate</th>
<th>Advanced</th>
<th>English Language Learners</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

How to use the Data Literacy Cubes and leveled questions:


2. Differentiate your lesson based on your students’ needs and abilities. See versions A-D to select the leveled question sheets and distribute to students.

3. Instruct students to roll cube (or numbered die) to answer appropriate question/s.

4. Visit the Maps, Graphs, and Data sections on My NASA Data to access mini lessons and resources from each of the following spheres:
   - Atmosphere https://mynasadata.larc.nasa.gov/atmosphere
   - Biosphere https://mynasadata.larc.nasa.gov/biosphere
   - Cryosphere https://mynasadata.larc.nasa.gov/cryosphere
   - Geosphere https://mynasadata.larc.nasa.gov/geosphere
   - Hydrosphere https://mynasadata.larc.nasa.gov/hydrosphere
   - Earth as a System https://mynasadata.larc.nasa.gov/earthsystem
Graph Cube

1. Examine the graph.

2. Summarize the graph.

3. Analyze the graph.

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

5. Who would be interested in this graph?

6. Assess the data values.
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 ___ (i.e. 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 _________.

www.nasa.gov

my NASA data

NP-2019-10-093-LaRC
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 ___ (i.e. 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/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/stays 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...? How many...?
   B. I wonder...
   C. How is ______________ the same as _____? Different from ___________?

5. Who would be interested in this graph?
   A. I think _______ (i.e. 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/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/stays 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...? How many...?
   B. I wonder...
   C. How is ______________ the same as _____? Different from ___________?

5. Who would be interested in this graph?
   A. I think _______ (i.e. 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 _______.

www.nasa.gov
NP-2019-10-093-LaRC
Graph Cube Questions

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

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

3. Analyze the graph.
   A. Describe the relationship between the variables: positive, negative, or none.
   B. Brainstorm one variable that you predict to be directly proportional.
   C. Brainstorm one variable that you predict to be inversely proportional.

4. Brainstorm a question that you can answer using these data.
   A. Ask a question beginning with how, what, where, when or why.
   B. I wonder...
   C. Form a hypothesis using the data on the graph. If ____, then ____.

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

6. Assess the data values.
   A. What is the numerical range of the data? Mean? Median? Mode?
   B. How is the mean different from the mode?
   C. Are there any outliers? If so, what are they?
Graph Cube Questions

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

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

3. Analyze the graph.
   A. Describe the relationship between the variables: positive, negative, or none.
   B. Brainstorm one variable that you predict to be directly proportional.
   C. Brainstorm one variable that you predict to be inversely proportional.

4. Brainstorm a question that you can answer using these data.
   A. Ask a question beginning with how, what, where, when or why.
   B. I wonder...
   C. Form a hypothesis using the data on the graph. If ____, then ____.

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

6. Assess the data values.
   A. What is the numerical range of the data? Mean? Median? Mode?
   B. How is the mean different from the mode?
   C. Are there any outliers? If so, what are they?
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 ____ (i.e. 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 ___ 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 ____ (i.e. 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 ________.