

Patterns of Earth and Sky:

Analyzing Stars on Ancient Artifacts



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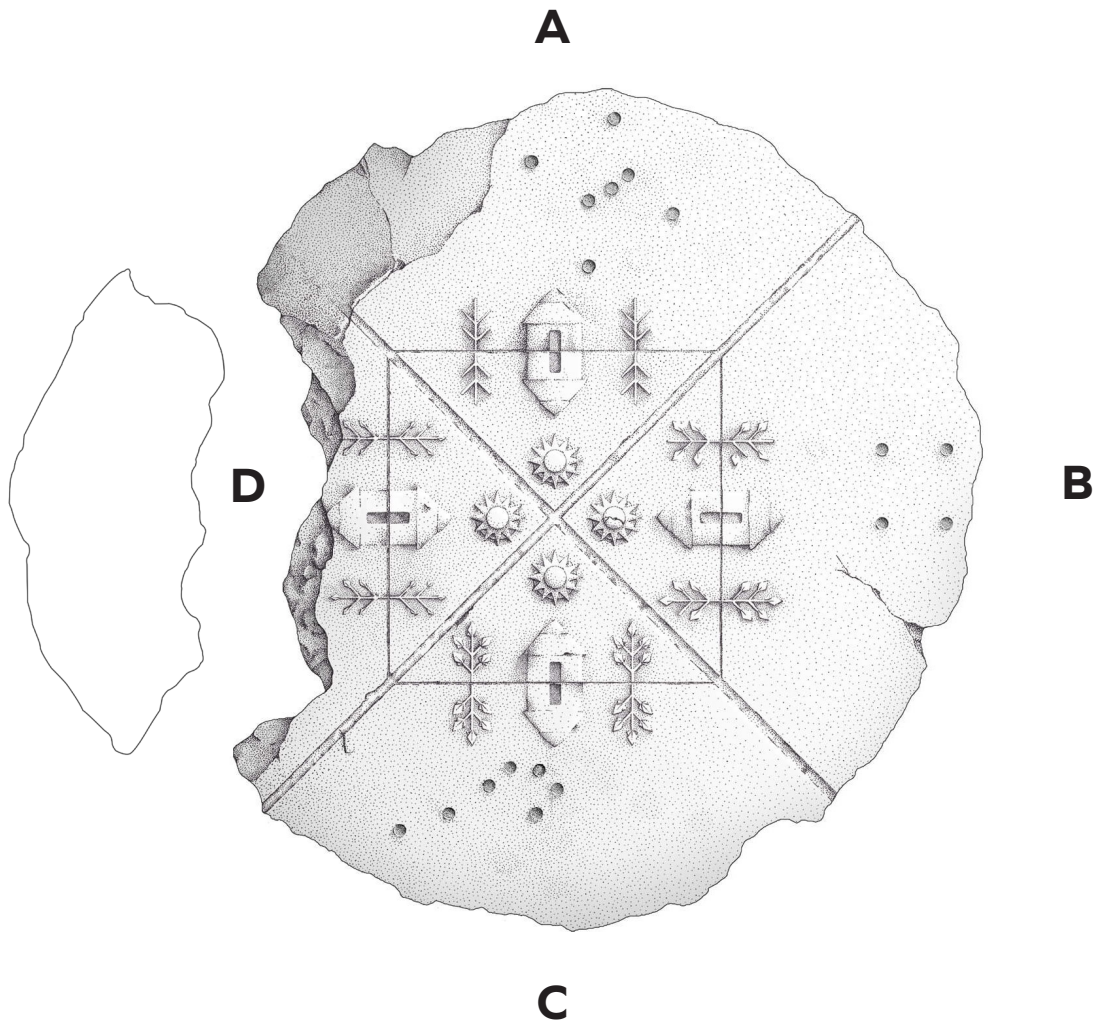
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Name: _____ Date: _____

Pre-Unit Writing: Explaining the Discovered Artifact

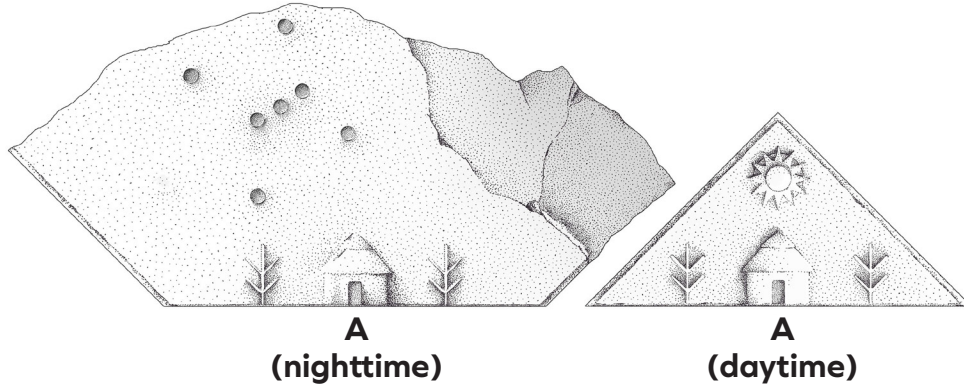
Scientists discovered this while digging for ancient artifacts, but the artifact is missing part of section D.



On the following pages, answer the questions as completely as you can.

Pre-Unit Writing: Explaining the Discovered Artifact (continued)

Part 2



1. Why does the nighttime section of the artifact show other stars, but not the sun?

2. Why does the daytime section of the artifact show only the sun, but not other stars?

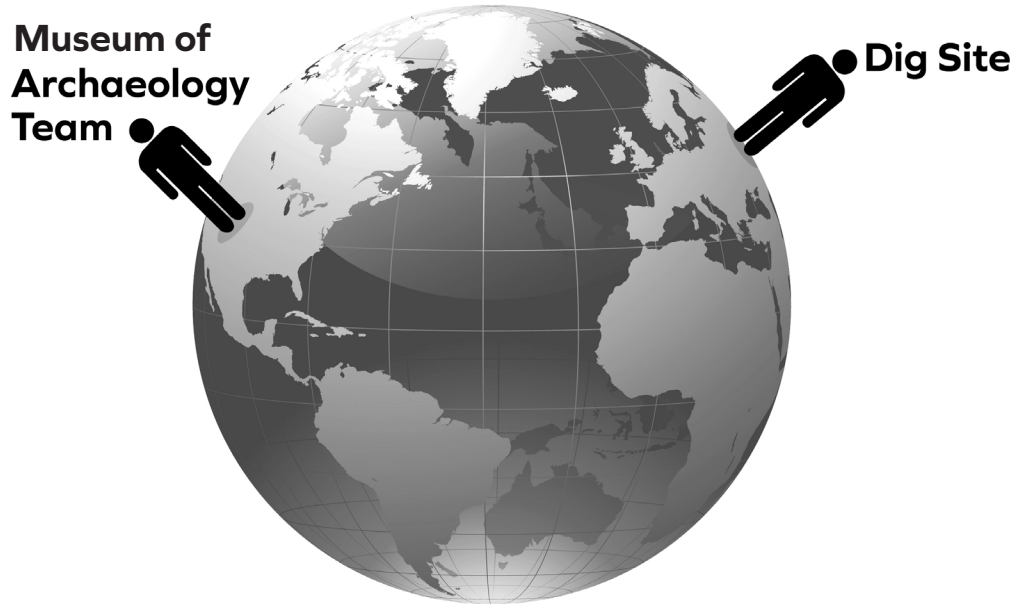
3. On Earth, why does the pattern of daytime and nighttime repeat every day?

Name: _____ Date: _____

Pre-Unit Writing: Explaining the Discovered Artifact (continued)

Part 3

This image shows a person standing near the Museum of Archaeology and another person standing near the dig site where the artifact was found.



1. Draw an arrow next to each person so it shows which direction is *up* for that person.
2. Why doesn't the person at the dig site fall off Earth?

Name: _____ Date: _____

Chapter 1 Home Investigation: Observing the Stars

- A. Interview someone at home about their experiences observing the stars or other objects in space. Record the person's name.
- B. List three of your own interview questions on the lines below. **Ideas:** Which stars or other objects in space has the person seen? Do they have a special memory connected with seeing the stars? Does the person have a favorite star?
- C. Interview the person and record their responses.

Name of person interviewed: _____

1. _____

Response: _____

2. _____

Response: _____

3. _____

Response: _____

4. What do you still wonder about the stars?

Response: _____

Name: _____ Date: _____

Scientific Explanation: Stars in the Daytime

1. Write a scientific explanation that answers the question, Why don't we see a lot of stars in the daytime?
2. Make a drawing if it helps you explain your ideas.

We don't see a lot of stars during the daytime because _____

This is because _____

This means that _____

Name: _____ Date: _____

Investigating How Shadows Change

1. Predict how your shadow will change throughout the day in Part 1.
2. Go outside to measure the length and direction of your shadow at different times using a meter stick and record your data in Part 2.
 - Create a rough sketch in the Part 2 box to show where you will stand to measure your shadow.
 - Record your measurements and direction descriptions in the Part 2 table.
3. Discuss the reflection questions in Part 3 with a partner, then record your ideas.

Part 1. Predict

Describe how you think your shadow changes over the course of a day. Why do you think this happens?

Part 2. Measure and Record

- Choose a location outside where you will stand each time you measure your shadow. Draw a rough sketch of your location in the box on the next page, including a few landmarks in different directions (for example, a school building, a play structure, a tree). Mark the location so that you can return to it each time you measure your shadow.
- Each time you go outside to measure your shadow, record the date and time. The times should be about the same each day. Have a partner help you measure the length of the shadow and record this in the table. Write a few notes about the shadow's direction (for example, toward the tree, away from the tree).

Name: _____ Date: _____

Investigating How Shadows Change (continued)

Date	Time	Shadow length	Shadow direction

Name: _____ Date: _____

Investigating How Shadows Change (continued)

Part 3. Reflect

1. How does the length of your shadow change over the course of a day?

2. How does the direction of your shadow change over the course of a day?

3. Why do shadows change length and direction over the course of a day?
Use evidence you collected to support your explanation.

Name: _____ Date: _____

Chapter 2 Home Investigation: Earth and Stars Quiz

- A. Using what you have learned so far about Earth and the stars, create a quiz by recording five statements. Some statements should be true, and some statements should be false. The first statement is done for you.
- B. Give the quiz to someone at home. Have that person read each statement and indicate whether they think it is true or false.
- C. Talk about the answers with the person who took the quiz. You might teach them something!

1. The sun is the closest star to Earth.	<input type="checkbox"/> true	<input type="checkbox"/> false
2.	<input type="checkbox"/> true	<input type="checkbox"/> false
3.	<input type="checkbox"/> true	<input type="checkbox"/> false
4.	<input type="checkbox"/> true	<input type="checkbox"/> false
5.	<input type="checkbox"/> true	<input type="checkbox"/> false

Name: _____ Date: _____

Scientific Explanation: Why the Sun Is Up Sometimes, but Not Other Times

1. Write a scientific explanation that answers the question, Why is the sun up sometimes, but not other times?
2. Make a drawing if it helps you explain your ideas.

We observe the sun up sometimes, but not other times because _____

When the sun is up, we are _____

When that happens, we see _____

When the sun is **not** up, we are _____

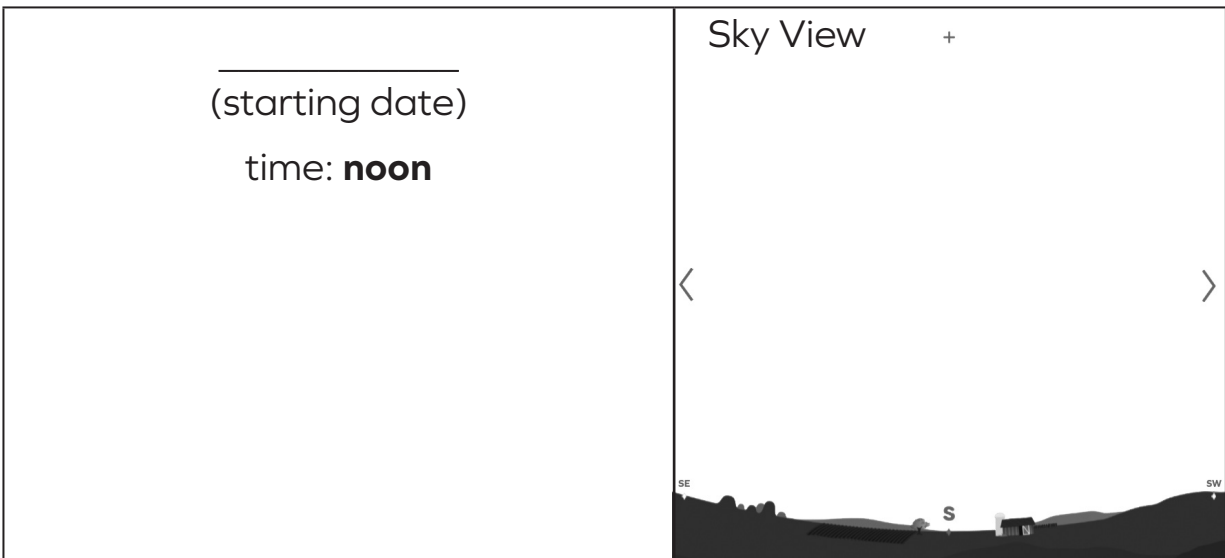
When that happens, we see _____

Name: _____ Date: _____

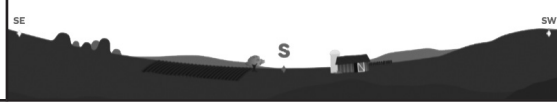
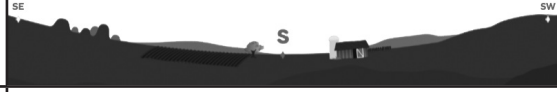

Investigating the Sun Throughout the Year

1. In the Sim, choose the observation year and record it on the line below.
2. Choose a starting date and record it in the first row of the data table.
3. Choose the dates of the remaining observations and record them in the table.
4. In the Sim, change the date to the starting date and set the time to NOON.
5. In the data table, draw the sun's position from the Sim in the Sky View box.
6. Repeat Steps 4 and 5 for all remaining dates in the table.
7. For all but your first observation, decide if the sun is in the same position as the previous month. If not, explain how it has changed.
8. Answer the reflection question after the table.


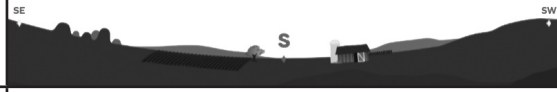

Year:



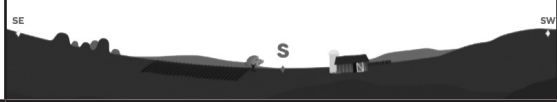
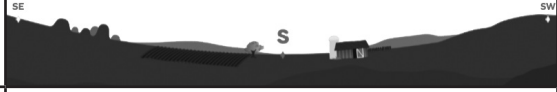

Investigating the Sun Throughout the Year (continued)

<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 
<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 
<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 

Investigating the Sun Throughout the Year (continued)

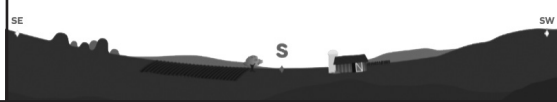

<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 
<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 
<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 

Investigating the Sun Throughout the Year (continued)

<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 
<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 
<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 

Name: _____ Date: _____

Investigating the Sun Throughout the Year (continued)

<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 
<p>_____</p> <p>(date)</p> <p>time: noon</p> <p>Is the sun in the same position as it was in the previous month?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If not, how has it changed?</p>	<p>Sky View +</p> <p>< ></p> 

Does the sun's position change throughout the year? If so, how?

Name: _____ Date: _____

Chapter 3 Home Investigation: Planning and Conducting a Systematic Investigation

1. With an adult, make a plan to systematically observe which stars are visible in an area of the sky over a period of two weeks.
2. Fill in the dates and times when you will observe the sky (first column).
3. Go outside and choose an area of the sky that you would like to investigate. Choose an area that is near a reference point (a telephone pole, a building, or a tree), so you can be sure you are looking at the same area every time. Draw the stars you see and the reference point for this and every observation that follows (second column).
4. Follow your plan. You may wish to look at a star map or a digital device so you can learn more about the stars you are investigating.

Date and Time	Observation: Stars and Reference Point
_____ date	
_____ time	
_____ date	
_____ time	

Name: _____ Date: _____

Chapter 3 Home Investigation: Planning and Conducting a Systematic Investigation (continued)

Date and Time	Observation: Stars and Reference Point
_____ date	
_____ time	
_____ date	
_____ time	
_____ date	
_____ time	
_____ date	
_____ time	

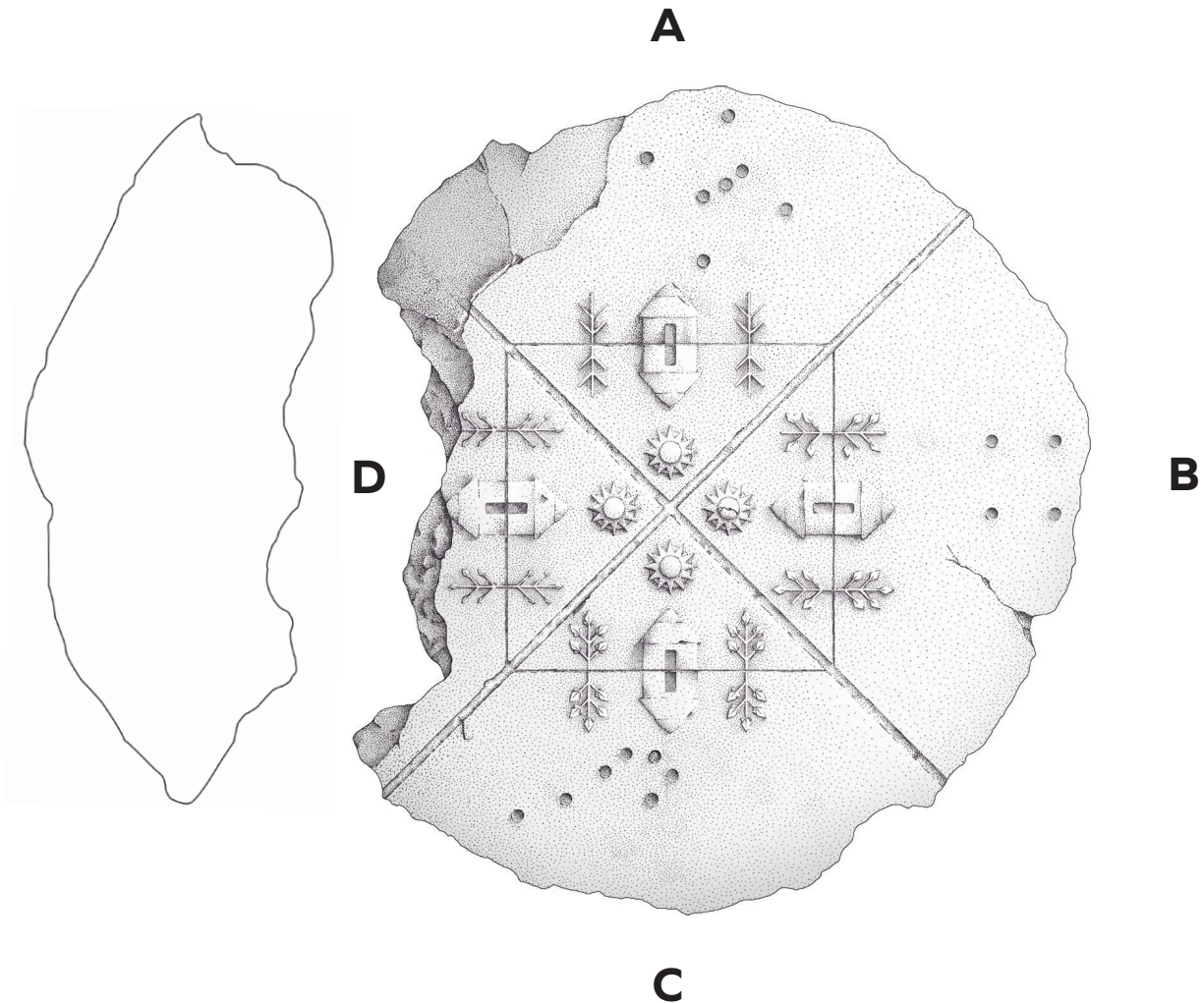
Name: _____ Date: _____

End-of-Unit Writing: Explaining the Artifact

Scientists discovered this while digging for ancient artifacts, but the artifact is missing part of section D.

Part 1. The Artifact

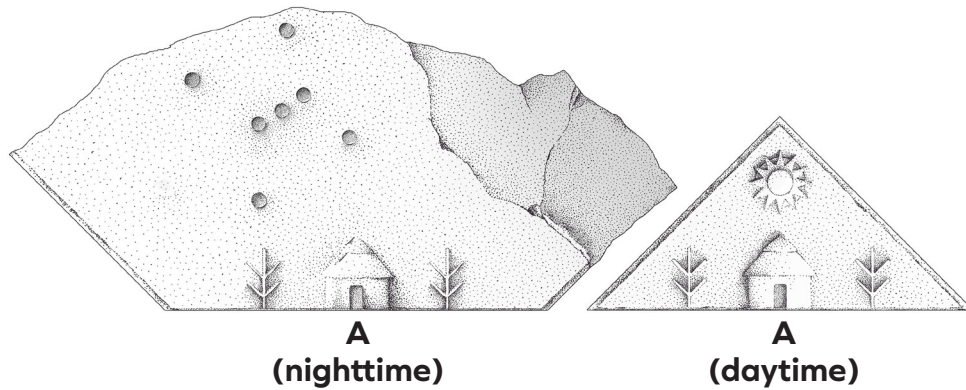
Draw what you think the missing piece looks like on the artifact below.



End-of-Unit Writing: Explaining the Artifact (continued)

Part 3: The Sun and Other Stars in the Artifact

People have been asking many questions about the artifact. Share your answers to these frequently asked questions:



1. Why does the nighttime section of the artifact show other stars in the sky, but not the sun?

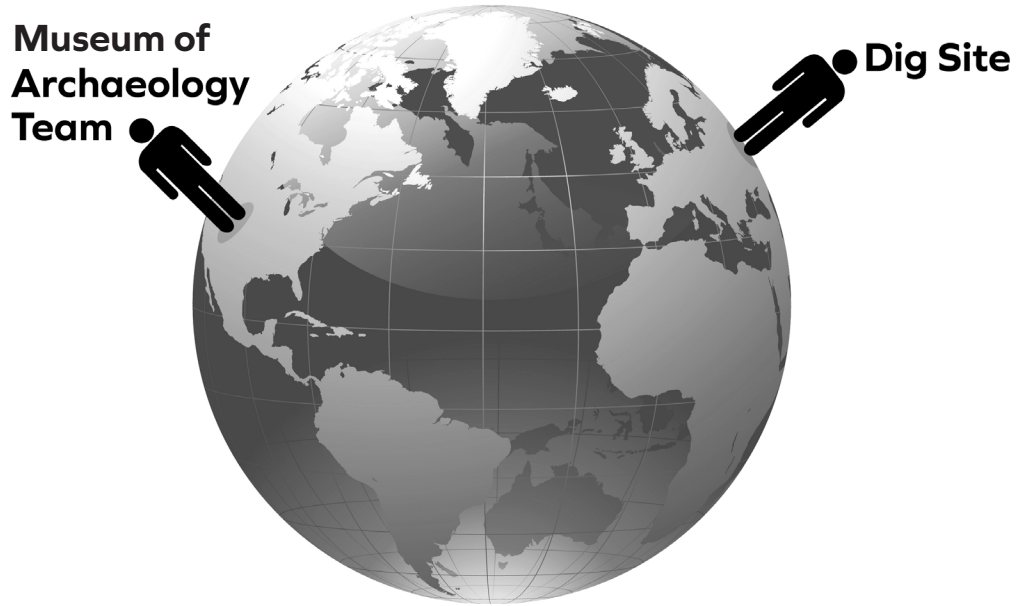
2. Why does the daytime section of the artifact show only the sun in the sky, but not other stars?

3. On Earth, why does the pattern of daytime and nighttime repeat every day?

End-of-Unit Writing: Explaining the Artifact (continued)

Part 4: Providing More Information About the Dig Site

This diagram shows a person standing near the Museum of Archaeology and another person standing near the dig site where the artifact was found.



1. Draw an arrow next to each person so it shows which direction is *up* for that person.
2. Why doesn't the person at the dig site fall off Earth?

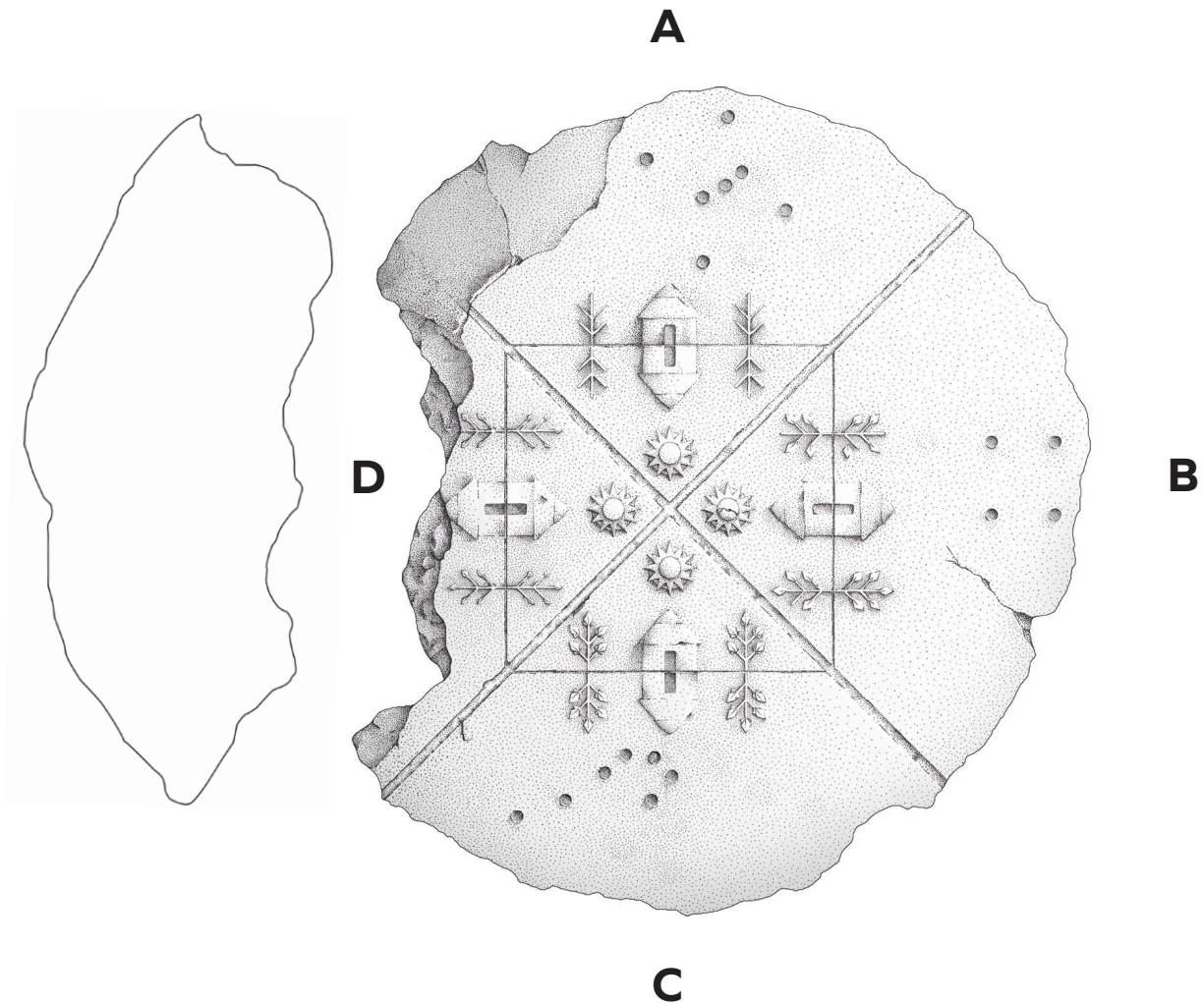
Name: _____ Date: _____

End-of-Unit Writing: Explaining the Artifact

Scientists discovered this while digging for ancient artifacts, but the artifact is missing part of section D.

Part 1: The Missing Piece

Draw what you think the missing piece would have looked like.

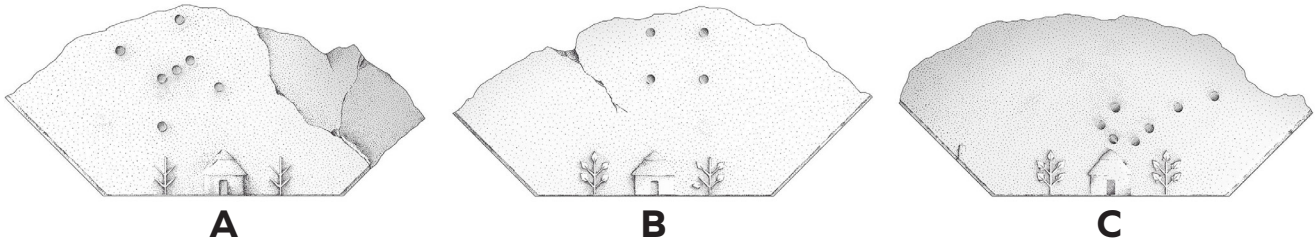


Name: _____ Date: _____

End-of-Unit Writing: Explaining the Artifact (continued)

Part 2: Scientific Explanation of the Nighttime Sky

Each section of the artifact shows a different constellation in the sky.



Question: Why does the sky look different in each nighttime section of the artifact?

The sky looks different in each nighttime section of the artifact because

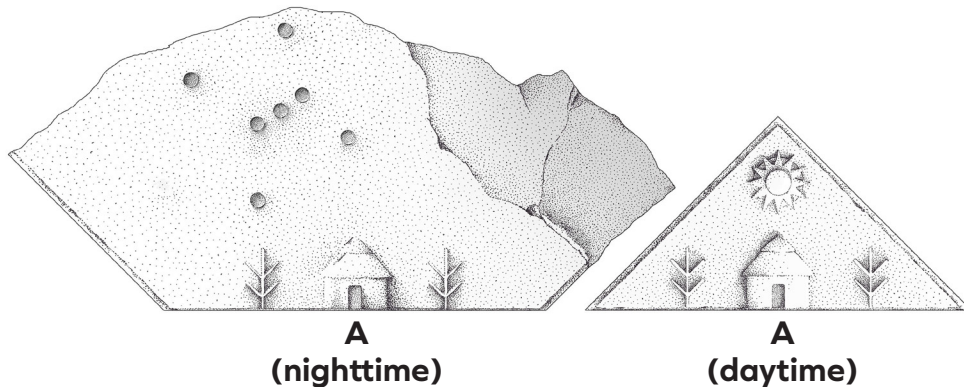
Different constellations are visible on different nights throughout the year because _____

This means that _____

End-of-Unit Writing: Explaining the Artifact (continued)

Part 3: The Sun and Other Stars in the Artifact

People have been asking many questions about the artifact. Share your answers to these frequently asked questions:



1. Why does the nighttime section of the artifact show other stars in the sky, but not the sun?

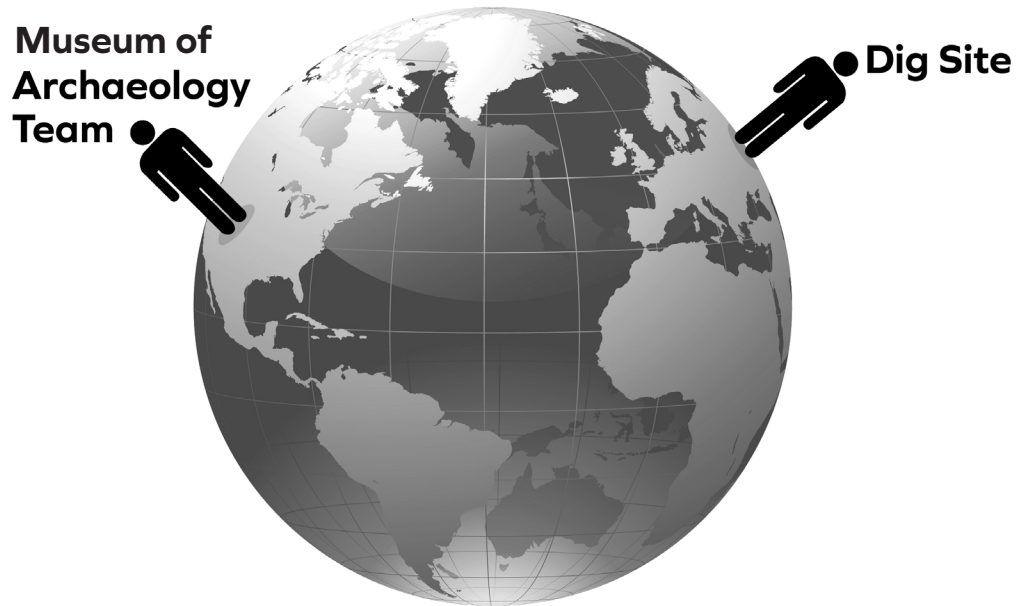
2. Why does the daytime section of the artifact show only the sun in the sky, but not other stars?

3. On Earth, why does the pattern of daytime and nighttime repeat every day?

End-of-Unit Writing: Explaining the Artifact (continued)

Part 4: Providing More Information About the Dig Site

This diagram shows a person standing near the Museum of Archaeology and another person standing near the dig site where the artifact was found.



1. Draw an arrow next to each person so it shows which direction is *up* for that person.
2. Why doesn't the person at the dig site fall off Earth?

Name: _____ Date: _____

Chapter 4 Home Investigation: Design an Artifact

1. With an adult, design an artifact that shows your ideas about the stars we can see from Earth. Work together to come up with an artifact that is unique.
2. Choose the stars or constellations you would like to include by referring to reference books or reliable sites on the Internet.
3. Draw your ideas.

