



Earth's Features:

Mystery in Desert Rocks Canyon



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Safety Guidelines for Science Investigations

- 1. Follow instructions.** Listen carefully to your teacher's instructions. Ask questions if you don't know what to do.
- 2. Don't taste things.** No tasting anything or putting it near your mouth unless your teacher says it is safe to do so.
- 3. Smell substances like a chemist.** When you smell a substance, don't put your nose near it. Instead, gently move the air from above the substance to your nose. This is how chemists smell substances.
- 4. Protect your eyes.** Wear safety goggles if something wet could splash into your eyes, if powder or dust might get in your eyes, or if something sharp could fly into your eyes.
- 5. Protect your hands.** Wear gloves if you are working with materials or chemicals that could irritate your skin.
- 6. Keep your hands away from your face.** Do not touch your face, mouth, ears, eyes, or nose while working with chemicals, plants, or animals.
- 7. Tell your teacher if you have allergies.** This will keep you safe and comfortable during science class.
- 8. Be calm and careful.** Move carefully and slowly around the classroom. Save your outdoor behavior for recess.
- 9. Report all spills, accidents, and injuries to your teacher.** Tell your teacher if something spills, if there is an accident, or if someone gets injured.
- 10. Avoid anything that could cause a burn.** Allow your teacher to work with hot water or hot equipment.
- 11. Wash your hands after class.** Make sure to wash your hands thoroughly with soap and water after handling plants, animals, or science materials.

What Is a Scientific Argument?

1. It answers a question with a claim about the natural world.
2. It includes evidence to support the claim. Evidence can be data and ideas.
3. It connects the evidence to the claim by linking different pieces of evidence together to show how they support the claim.
4. It uses scientific language.
5. It is written for an audience.

Name: _____ Date: _____

Exploring the *Earth's Features* Simulation

1. With your partner, explore the *Earth's Features* Simulation. Observe carefully how the rock layers in the Sim can change.
2. Talk about the discussion questions with your partner as you explore the Sim.
3. After you have finished exploring the Sim, record your response to the question on the lines below.

Discussion Questions

- What happens when you move time forward?
- How are the three locations different from one another?
- When you change the sea level, what do you observe happening?

What new questions or ideas do you have about rocks and fossils?

Getting Ready to Read: *Clues from the Past*

1. Before reading *Clues from the Past*, read the sentences below.
2. If you agree with the sentence, write an "A" on the line before the sentence.
3. If you disagree with the sentence, write a "D" on the line before the sentence.
4. After you read the book, see if your ideas have changed. Be ready to explain your thinking.

_____ Only the bones of animals can become fossils.

_____ Geologists study fossils to learn about the past.

_____ Almost all of the fossils that geologists find are from dinosaurs.

_____ It is impossible to know what Earth was like millions of years ago.

_____ Geologists are still finding new types of animals that lived in the past.

Name: _____ Date: _____

Reading About the Work of a Geologist: *Clues from the Past*

1. Reread each page from *Clues from the Past* listed in the table below.
2. For each page, record an observation that Dr. Coria made of *Argentinosaurus*.
3. For each observation, record the inference that he made.
4. In the last row, choose another observation and inference from the book to record. Be sure to record the page number in the first column.

Observations of <i>Argentinosaurus</i>	Inferences about <i>Argentinosaurus</i>
Page 11:	
Page 12:	
Page 13:	

Name: _____ Date: _____

Reading Reflection: *Clues from the Past*

Choose an image from *Clues from the Past*.

Page number _____

What do you observe in this image?

What did you learn about *Argentinosaurus* from your observations?

Name: _____ Date: _____

Reading Reflection: *Clues from the Past* (continued)

Find part of the text that describes something geologists do in their work.

Page number _____

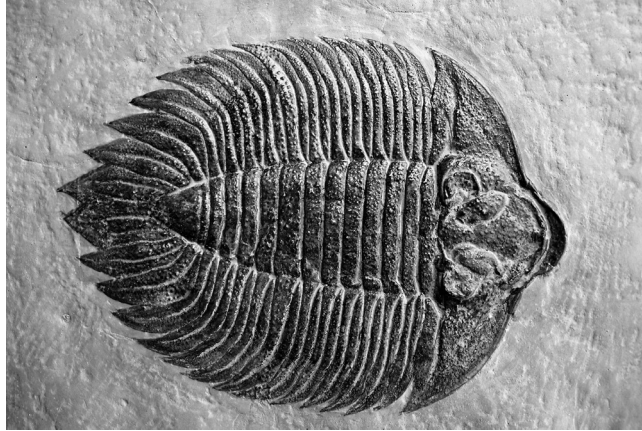
What did you learn about what geologists do?

What questions do you have about what geologists do?

Name: _____ Date: _____

Daily Written Reflection

This is a fossil of a trilobite, an insect-like organism that lived a long time ago. How do you think this fossil formed?



Make a drawing if it helps you explain your thinking. Label your drawing.

Name: _____ Date: _____

How a Fossil Forms

1. Using the *Earth's Features* Simulation, work with your partner to observe how a fossil forms.
2. Press ADD ORGANISMS.
3. Move time forward until a fossil forms.
4. Answer the questions below based on what you observed in the Sim.

How do you think fossils form?

Can you find an environment in the Sim where a fossil does not form? What did you observe about that environment?

Reflective Writing: Fossils

Record a response to the question below. Think about the information you gathered from the Sim and *Clues from the Past* to help you answer the question.



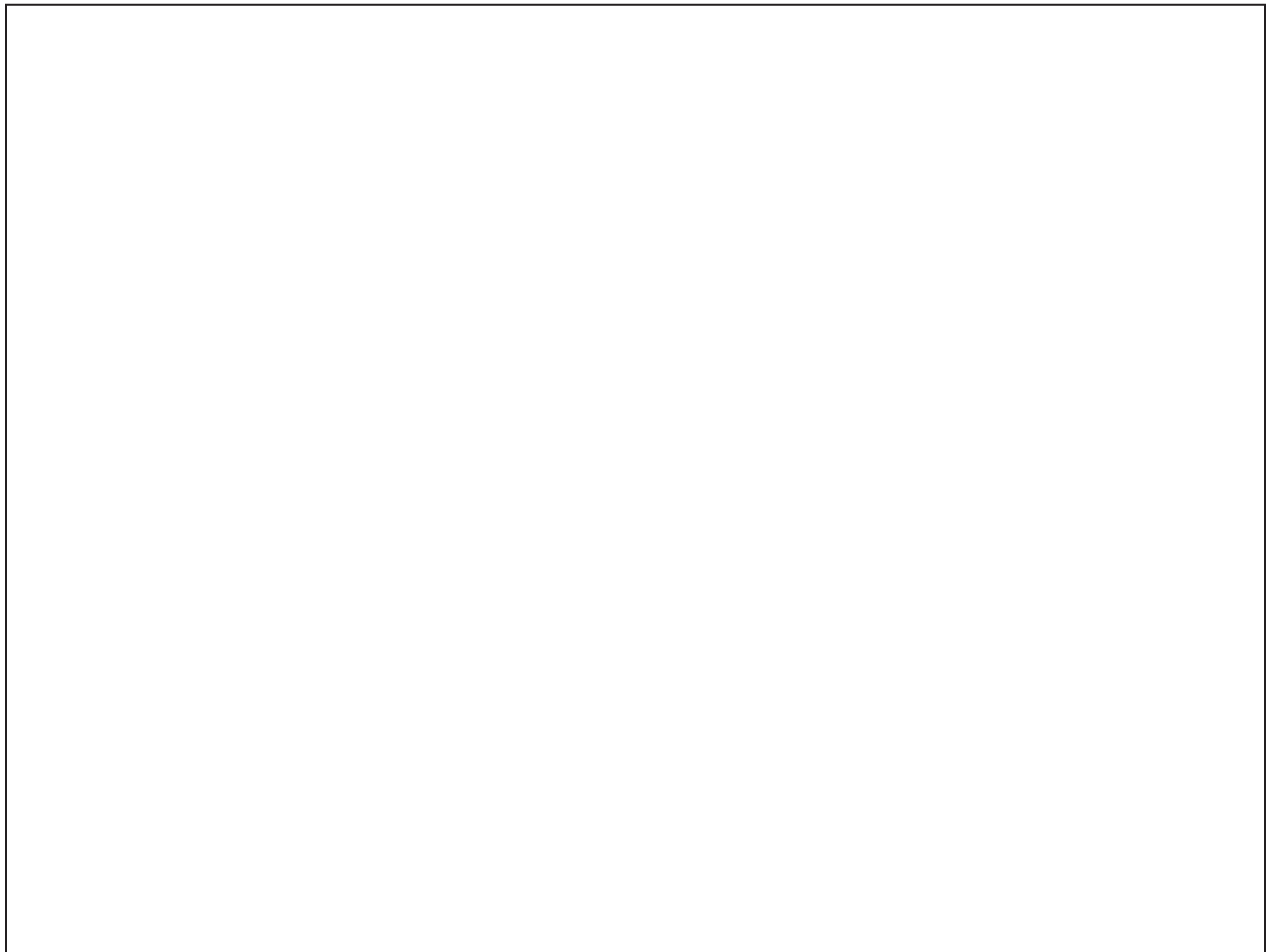
How do you think this fossil formed?

Name: _____ Date: _____

Daily Written Reflection

What do you think rocks are made of?

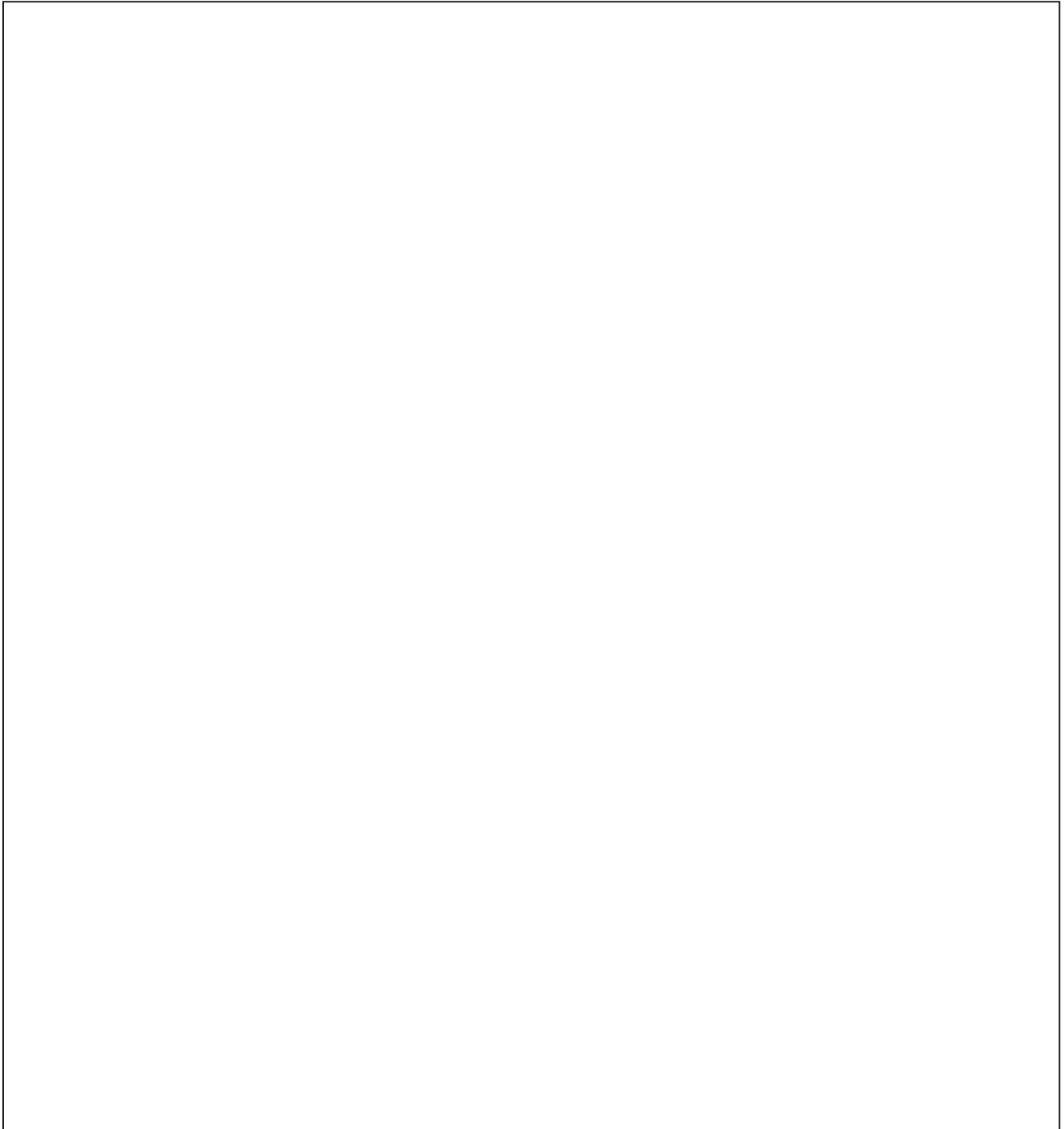
Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

Rock Observations

1. With a partner, observe your rock sample.
2. Draw your rock sample and label the details you observe.



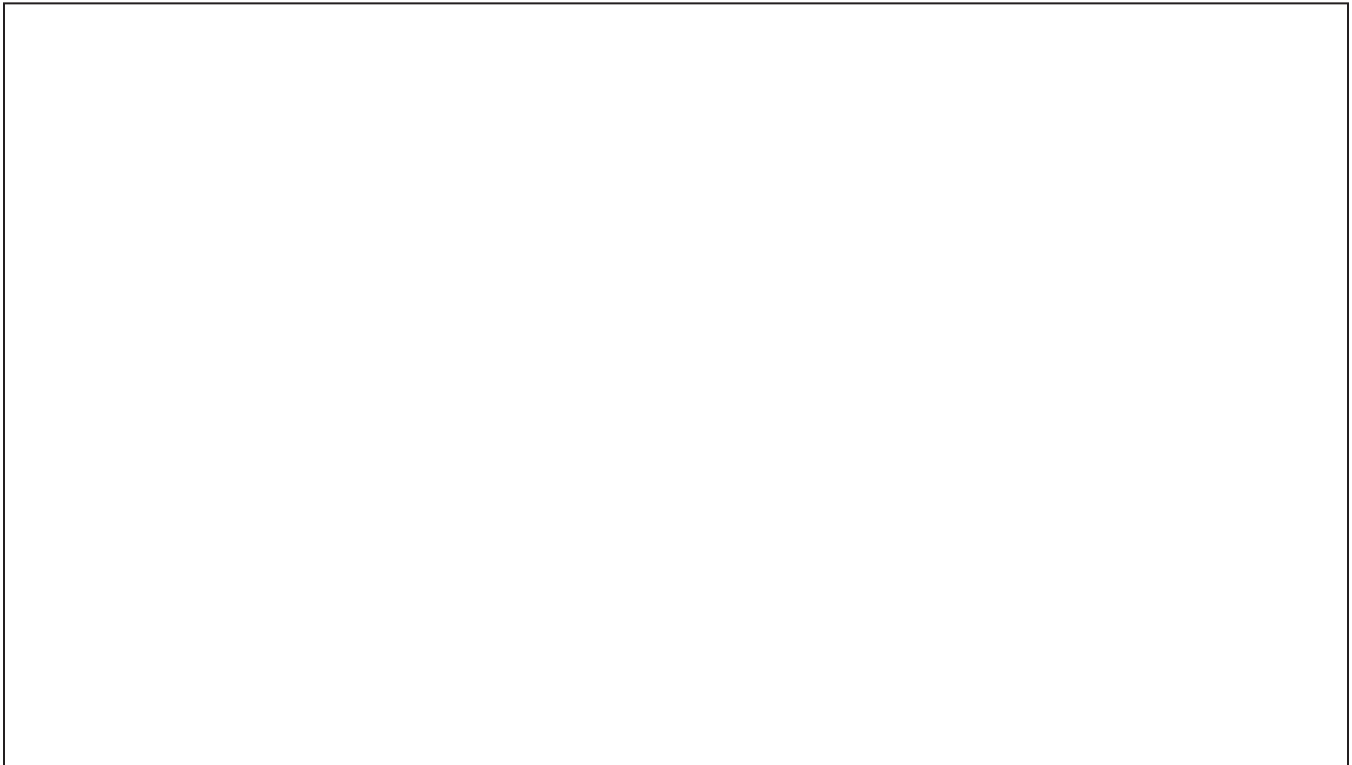
Name: _____ Date: _____

Rock Formation in the Simulation

1. Use the *Earth's Features* Sim to observe how rocks form.
2. Without changing the sea level, move time forward to observe rock forming and how it forms.
3. Record your observations about how rocks form.

Observations of the Sim:

Make a drawing and label it if it helps you explain your thinking.



Name: _____ Date: _____

Making Inferences About How Rocks Form

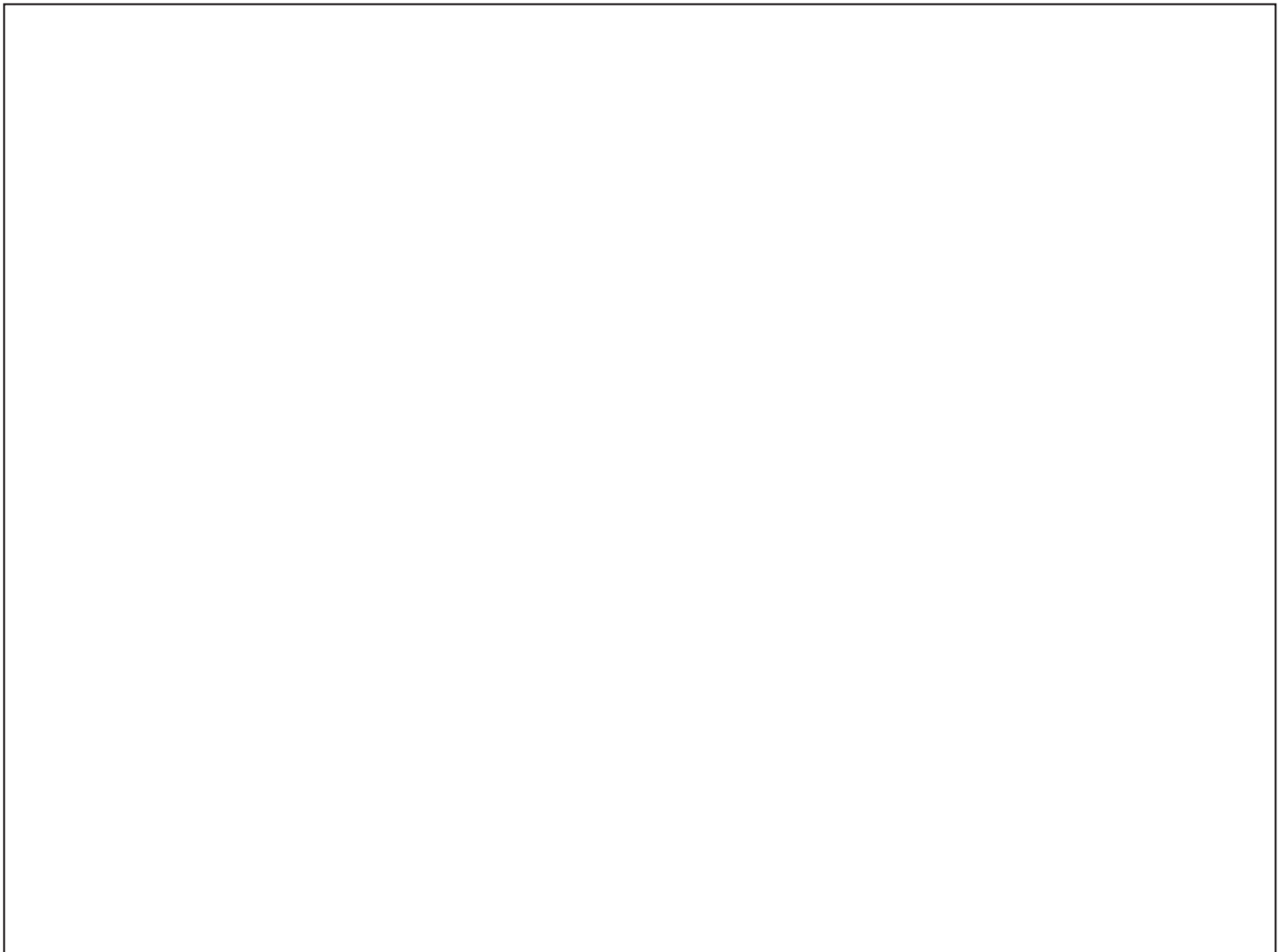
1. Think back to the rock sample you observed at the beginning of class.
2. Connect your observations of the rock sample with what you learned from the Sim.
3. Use your observations and what you learned to make an inference about how the rock could have formed.
4. Write your inference on the lines below.

Name: _____ Date: _____

Daily Written Reflection

Where do you think sedimentary rock forms? Why do you think so?

Make a drawing if it helps you explain your thinking. Label your drawing.



How Does Sedimentary Rock Form?

1. Reread page 7 of *Clues from the Past*. In the first column of the table below, record how sedimentary rock forms.
2. In the second column, record ideas for how you could show this step in a model using the materials provided.

Steps for how sedimentary rock forms	How to use materials to make a model of each step
1.	
2.	
3.	
4.	
5.	
6.	

Name: _____ Date: _____

Daily Written Reflection

If you were looking for fossils, where would you look? Why?

Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

Fossil in the Rocky Outcrop Model

Describe what is happening at all three times in your model to explain how the fossil got into the rocky outcrop.

Time 1

Time 2

Time 3

Name: _____ Date: _____

Evidence Circles: Desert Rocks National Park Environment

1. Read the question and the claim below.
2. Read each Evidence Card carefully. (You may want to take turns reading the cards aloud with your group.) Make notes below if you want to.
3. Talk about the evidence that supports the claim. Try to connect related data and ideas together.
4. See if all group members can come to agreement on whether the claim is supported by the evidence.
5. If there is no agreement, discuss the reasons your group still disagrees.

Question: What was the environment of Desert Rocks National Park like in the past?

Claim: Desert Rocks National Park used to be underwater.

Notes:

Name: _____ Date: _____

Scientific Language for Evidence Circles

Ways to share ideas:

- I think _____ because _____.
- The evidence shows that _____.
- This idea is important because _____.

Ways to respond to others:

- I agree because _____.
- I disagree because _____.

Questions to ask during the discussion:

- What evidence supports the claim?
- Can you say more about why the evidence you shared supports the claim?

Name: _____ Date: _____

Chapter 1: Check Your Understanding

This is a chance for you to reflect on your learning so far. This is not a test. Be open and truthful when you respond.

Scientists investigate in order to explain how or why something happens. Am I getting closer to figuring out how rocks and fossils can tell us about what Desert Rocks National Park was like in the past?

I understand how the fossil in the rocky outcrop formed. Yes Not yet

I understand how the rock layers in the rocky outcrop formed. Yes Not yet

I understand what makes the rocks in the layers different from one another. Yes Not yet

I understand how a rock layer in the rocky outcrop can help me figure out what Desert Rocks National Park was like in the past. Yes Not yet

I understand how to figure out the order of past environments in Desert Rocks National Park. Yes Not yet

I understand that science is both what we know about the world and how we learn about the world. Yes Not yet

What are you still wondering about rocks, fossils, and past environments?

Name: _____ Date: _____

Daily Written Reflection

What do you know about the word *environment*?

Make a drawing if it helps you explain your thinking. Label your drawing.



Getting Ready to Read: *Through the Eyes of a Geologist*

1. Before reading *Through the Eyes of a Geologist*, read the sentences below.
2. If you agree with the sentence, write an "A" on the line before it.
3. If you disagree with the sentence, write a "D" on the line before it.
4. After you read the book, see if your ideas have changed. Be ready to explain your thinking.

_____ The environment of a place changes over time.

_____ Some areas that are now desert used to be covered by an ocean.

_____ Geologists can use fossils to figure out what a place was like in the past, but rocks do not tell them much.

_____ Geologists can make inferences about the past environment of a place just by looking at it.

_____ Knowing scientific ideas about rocks and fossils helps geologists to figure out what a place was like in the past.

Inferences in *Through the Eyes of a Geologist*

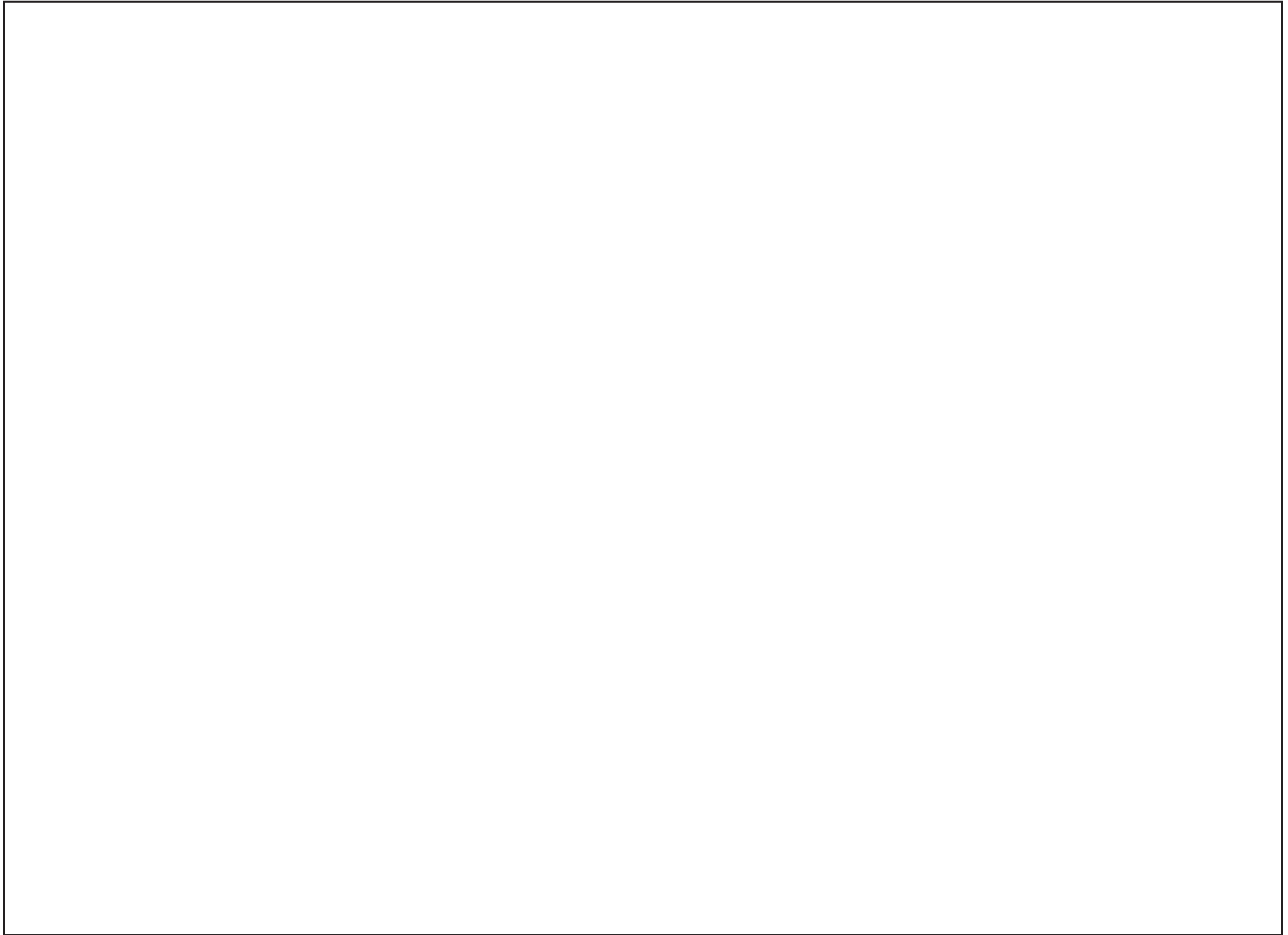
1. After reading *Through the Eyes of a Geologist*, complete the table below.
2. The place and the data from geologists' observations for each place is done for you.
3. Record the idea that helped the geologists make the inference in the third column.
4. Record the inference that the geologists made about the past environment in the fourth column.

Place	Geologists' observations	Scientific ideas	Inferences about past environment
Burgess Shale Formation (pages 6–9)	Geologists observed fossilized algae.		
John Day Fossil Beds (pages 10–13)	Geologists find a lot of conglomerate rock here.		
Capitol Reef National Park: Chinle Formation (pages 14–17)	This area of Capitol Reef has a lot of siltstone.		

Name: _____ Date: _____

Reading Reflection: *Through the Eyes of a Geologist*

1. Make a drawing of what you infer Mammoth Cave National Park was like in the past if it helps you explain your thinking.
2. Label your drawing.

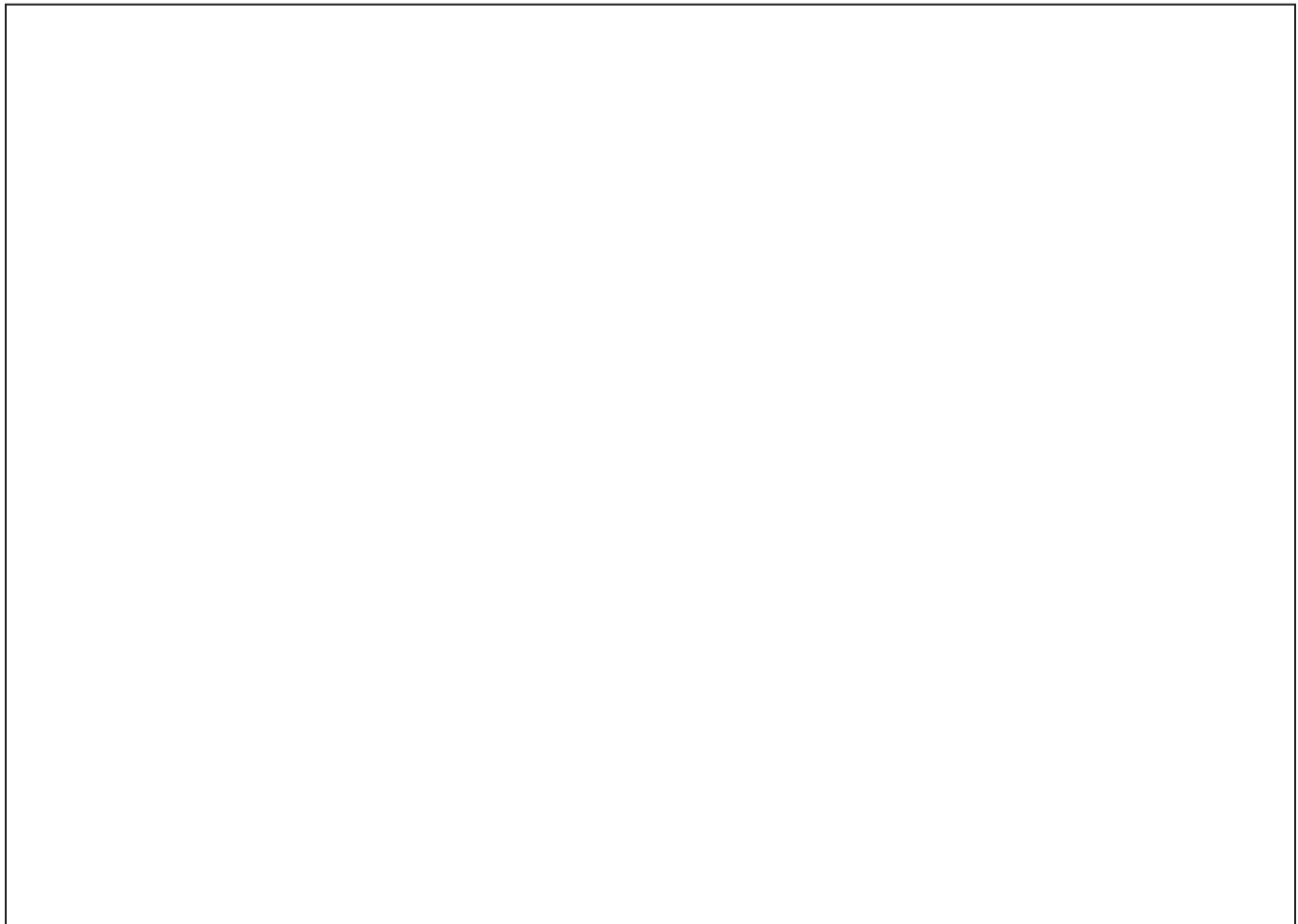


Name: _____ Date: _____

Daily Written Reflection

Think about different rocks that you've seen outside or read about. What was different about them?

Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

Sedimentary Rock Observations

1. Work with a partner to observe the rock samples.
2. Observe things such as color, texture, shine, and how hard or soft each rock is.
3. Discuss what you observe with your partner.
4. Record your observations in the data table below.

Data Table

Observations of Rock Sample 1	Observations of Rock Sample 2

Name: _____ Date: _____

Reading About Sedimentary Rocks

Read the sections on sandstone and conglomerate in *Fossils Hunter's Handbook* and answer the questions below.

1. What are the differences between sandstone and conglomerate?

2. What environments do sandstone and conglomerate form in?

Investigating Rock and Environments in the Simulation

1. Load Mode 2 using the menu in the upper left-hand corner of the Sim.
2. Without changing the sea level, move time forward at least three times. Watch carefully to see what happens in each environment.
3. Observe the sediment that builds up and what type of rock is formed in each environment.
4. Record your observations in the table below.
5. Answer the questions at the bottom of the page.

Environment	Sediment that builds up	Rock that forms
beach		
deep ocean		
shallow ocean		

What do you notice about the sediment that builds up in different environments?

What do you notice about the rocks that form in different environments?

Name: _____ Date: _____

Daily Written Reflection

Why do you think geologists use models?

Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

Reading About Rocks and Sediment

Using *Fossil Hunter's Handbook*, read about why different sediment builds up in different environments. Record the information you find in the table below.

Rock	Sediment	Size of sediment	How is the sediment carried?
conglomerate Page:			
mudstone Page:			
sandstone Page:			

How are sediments different from one another?

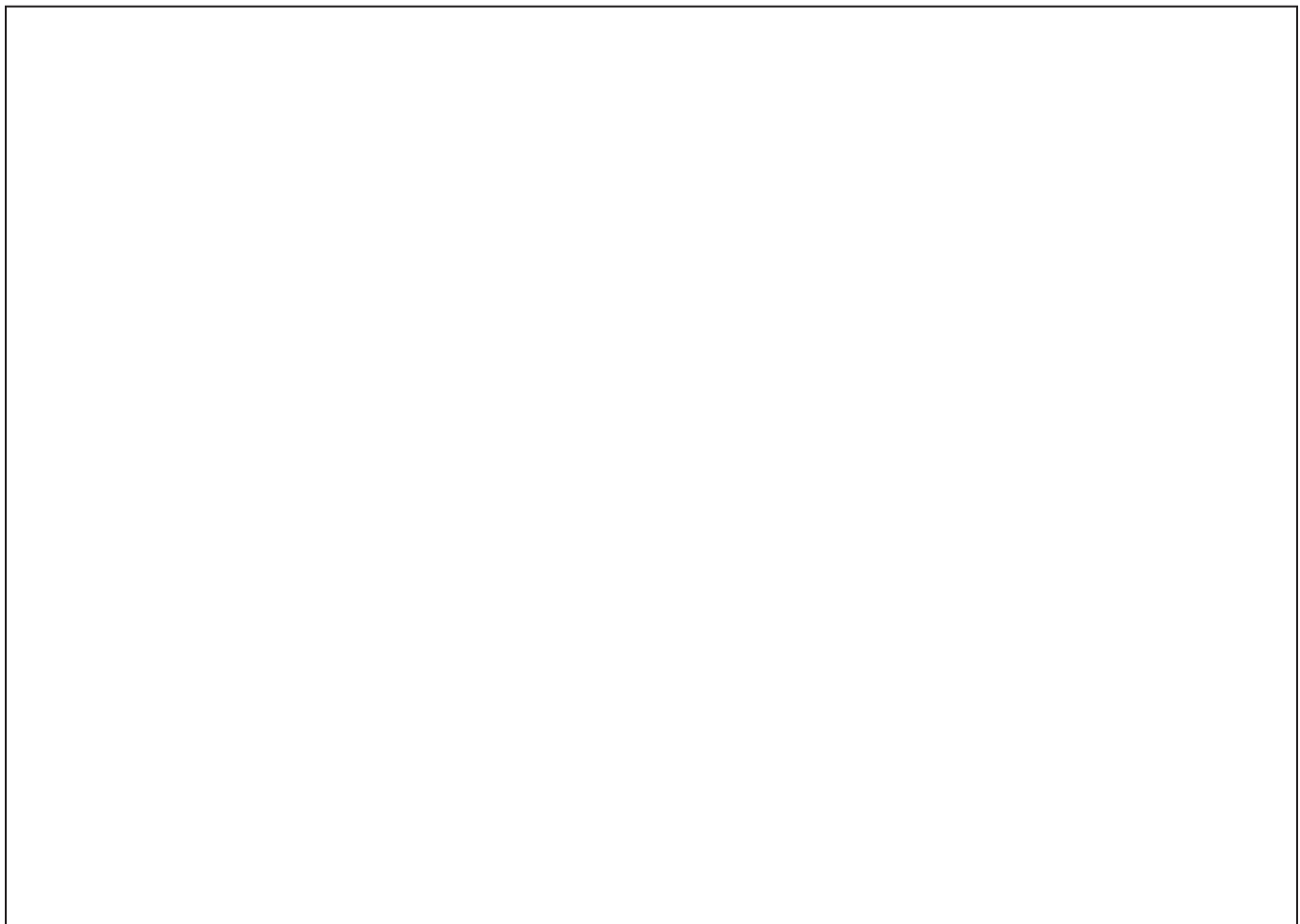
Why does different sediment build up in different environments?

Name: _____ Date: _____

Daily Written Reflection

How do you think it is possible for two different sedimentary rock layers to form in the same place?

Make a drawing if it helps you explain your thinking. Label your drawing.



Rock Layers in the Simulation

1. Load Mode 2 using the menu in the upper left-hand corner of the Sim.
2. One partner completes Investigation 1.
3. Press RESET.
4. The other partner completes Investigation 2.
5. Talk with your partner about the questions at the bottom of the page.
Then, record your responses.

Investigation 1: Pick location 2 or 3. In that location, make a very thick rock layer with all the same kind of rock.

Investigation 2: In the same location, make as many layers of different kinds of rock as you can.

What did you do differently in the two investigations?




If you see different kinds of rock layers in one location, what can you infer about what has happened in that location over time?

Name: _____ Date: _____

You can use this page to record notes or create drawings.

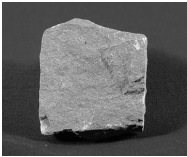

Upper Layer: Data and Ideas

1. Use what you read in *Fossil Hunter's Handbook* to gather ideas about each rock and fossil shown in the first column of the table below.
2. In the first row, record ideas about the environment in which the rock formed.
3. In the second row, identify the fossil using *Fossil Hunter's Handbook*. Then, record ideas about the organism that the fossil is from.
4. In the third row, record ideas about the organism the fossil is from.
5. Make inferences by putting the data and ideas together. Record your inferences in the last row.

Data	Ideas
 The rock is mudstone.	
 The fossil is a	
 The fossil is a <i>Mosasaurus</i> .	
Inferences:	

Lower Layer: Data and Ideas

1. Use what you read in *Fossil Hunter's Handbook* to gather ideas about each rock and fossil shown in the first column of the table below.
2. In the first row, record ideas about the environment in which the rock formed.
3. In the second row, identify the fossil using *Fossil Hunter's Handbook*. Then, record ideas about the organism the fossil is from.
4. Make inferences by putting the data and ideas together. Record your inferences in the last row.

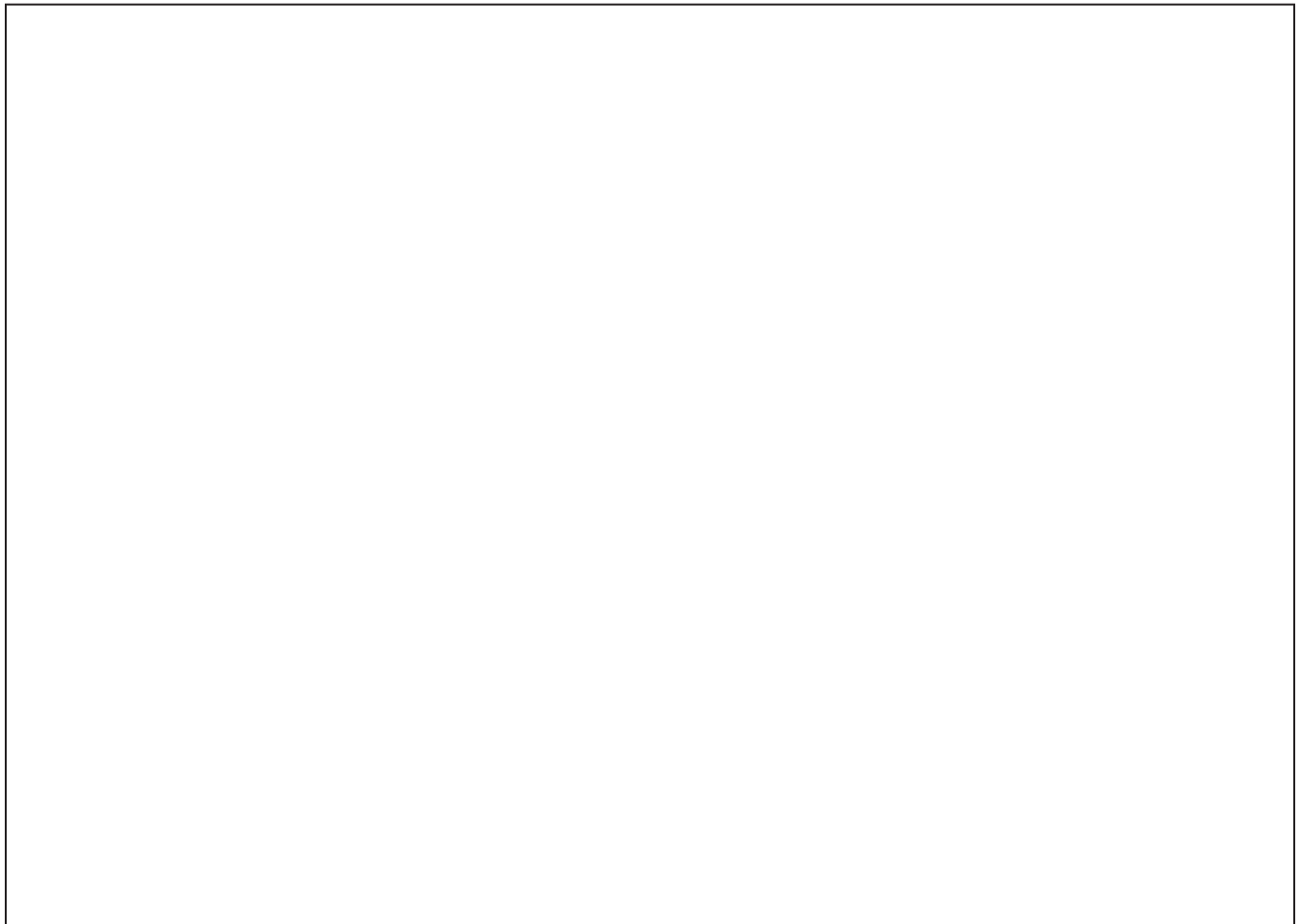
Data	Ideas
<div style="text-align: center;">  </div> <p>The rock is siltstone.</p>	
<div style="text-align: center;">  </div> <p>The fossil is a</p>	
<p>Inferences:</p>	

Name: _____ Date: _____

Daily Written Reflection

If you found a rocky outcrop with a lot of different sedimentary rock layers, what inferences could you make?

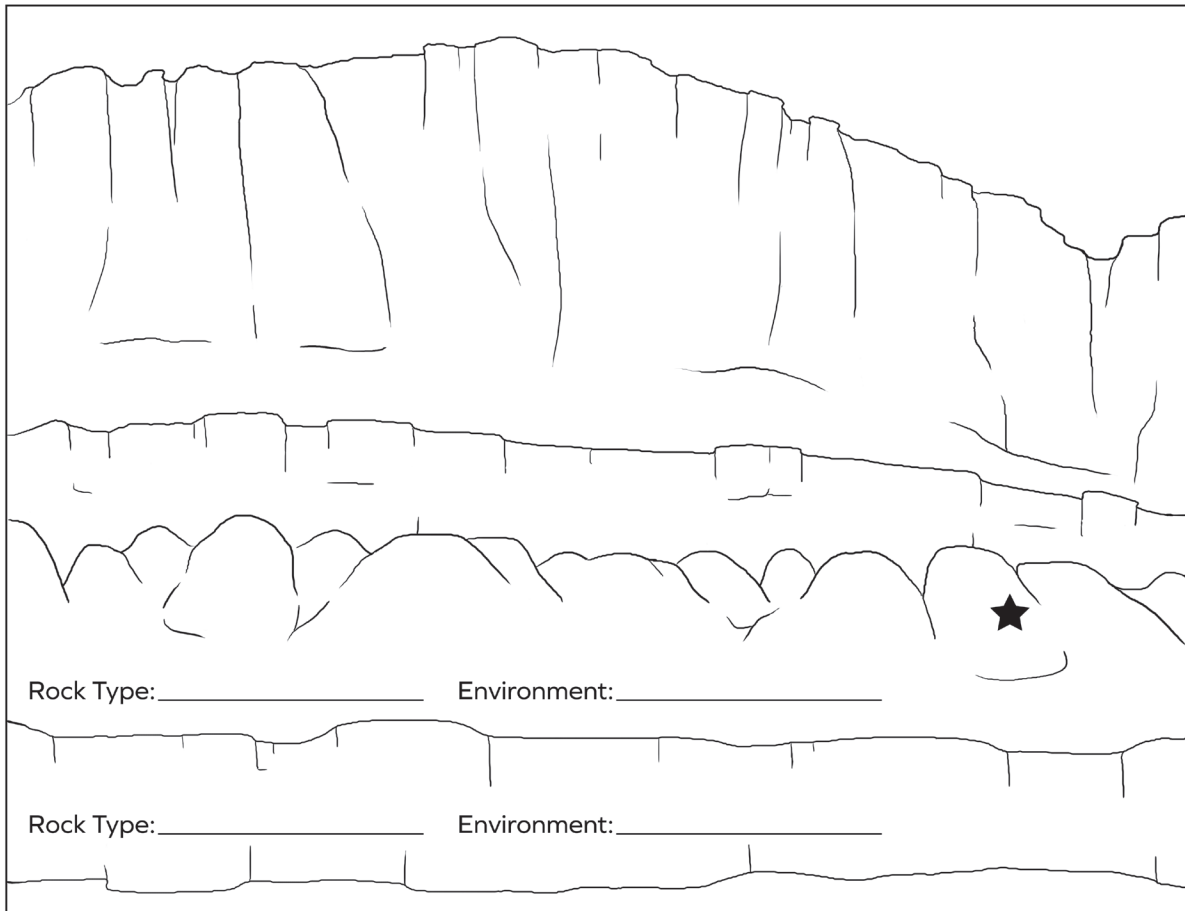
Make a drawing if it helps you explain your thinking. Label your drawing.



Rocky Outcrop Diagram

Show the locations of fossils and rock layers on the diagram below:

1. Label the rock type that you know.
2. Label the environments that you know.
3. Add symbols to show where the fossils have been found. The *Mosasaurus* fossil is already shown.



Key

★ *Mosasaurus*

● *Mortoniceras*

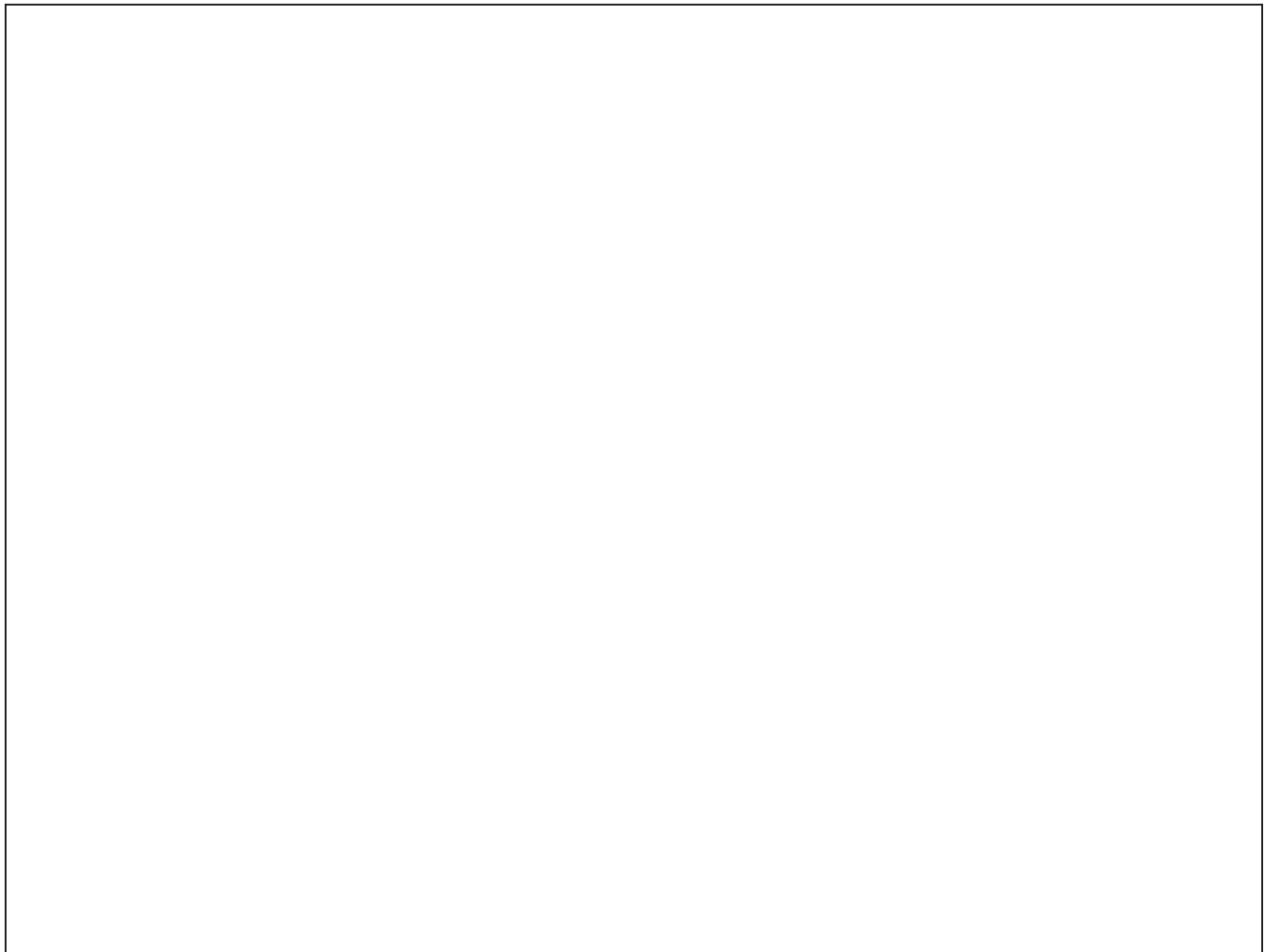
▲ *Lepidodendron*

Name: _____ Date: _____

Daily Written Reflection

What does it mean to argue in science?

Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

You can use this page to record notes or create drawings.

Name: _____ Date: _____

Evidence Circles: Rocky Outcrop Upper Layer

1. Read the question below. Use page 36 of your notebook to help you discuss the question.
2. Share the inference you made about the upper layer.
3. With your group, discuss a claim that answers the question. Use your inferences to help you.
4. As you discuss the claim, share evidence about the upper layer.
5. Once your group has decided on a claim and discussed how the evidence supports the claim, write the claim on the lines below.

Question: What was the environment of Desert Rocks National Park like when the upper rock layer formed?

Claim:

Name: _____ Date: _____

Scientific Language for Evidence Circles

Ways to share ideas:

- I think _____ because _____.
- The evidence shows that _____.
- This idea is important because _____.

Ways to respond to others:

- I agree because _____.
- I disagree because _____.

Questions to ask during the discussion:

- What evidence supports the claim?
- Can you say more about why the evidence you shared supports the claim?

Chapter 2: Check Your Understanding

This is a chance for you to reflect on your learning so far. This is not a test. Be open and truthful when you respond.

Scientists investigate in order to explain how or why something happens. Am I getting closer to figuring out how rocks and fossils can tell us about what Desert Rocks National Park was like in the past?

I understand how the fossil in the rocky outcrop formed. Yes Not yet

I understand how the rock layers in the rocky outcrop formed. Yes Not yet

I understand what makes the rocks in the layers different from one another. Yes Not yet

I understand how a rock layer in the rocky outcrop can help me figure out what Desert Rocks National Park was like in the past. Yes Not yet

I understand how to figure out the order of past environments in Desert Rocks National Park. Yes Not yet

I understand that science is both what we know about the world and how we learn about the world. Yes Not yet

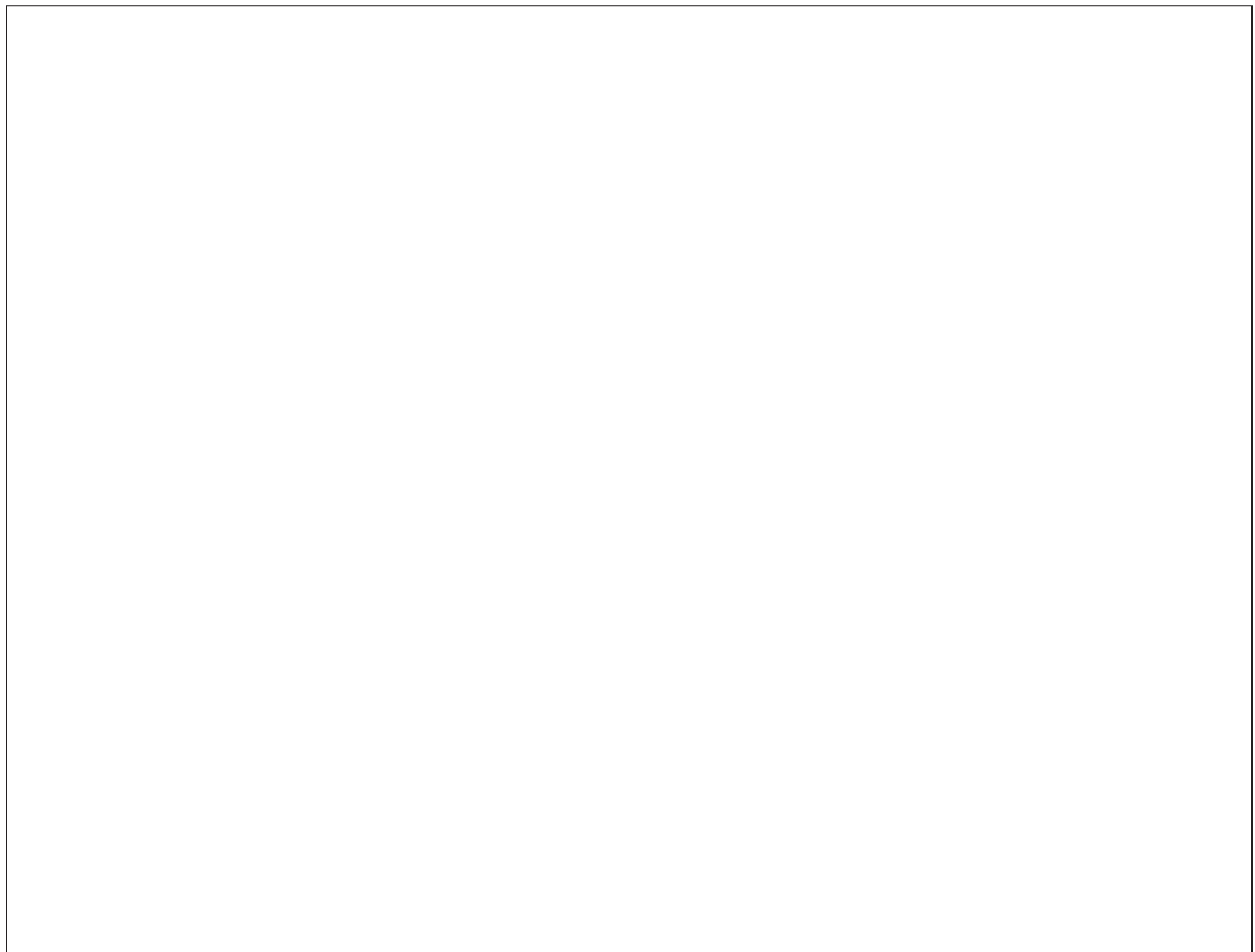
What are you still wondering about rocks, fossils, and past environments?

Name: _____ Date: _____

Daily Written Reflection

Why do you think a geologist might want to know how old rock is?

Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

Paper Pile Model

1. In List A, record the rock layers in the order they formed.
2. In List B, record the rock layers in the order you see them in the Paper Pile Model.
3. Draw lines to connect the rock layer in List A to the same kind of rock in List B.
4. Label the oldest and youngest layers in List B.
5. Answer the question at the bottom of the page.

List A

Order the Rock Layers
Formed In

1st _____

2nd _____

3rd _____

4th _____

5th _____

List B

Order We See the
Rock Layers

Top _____

Bottom _____

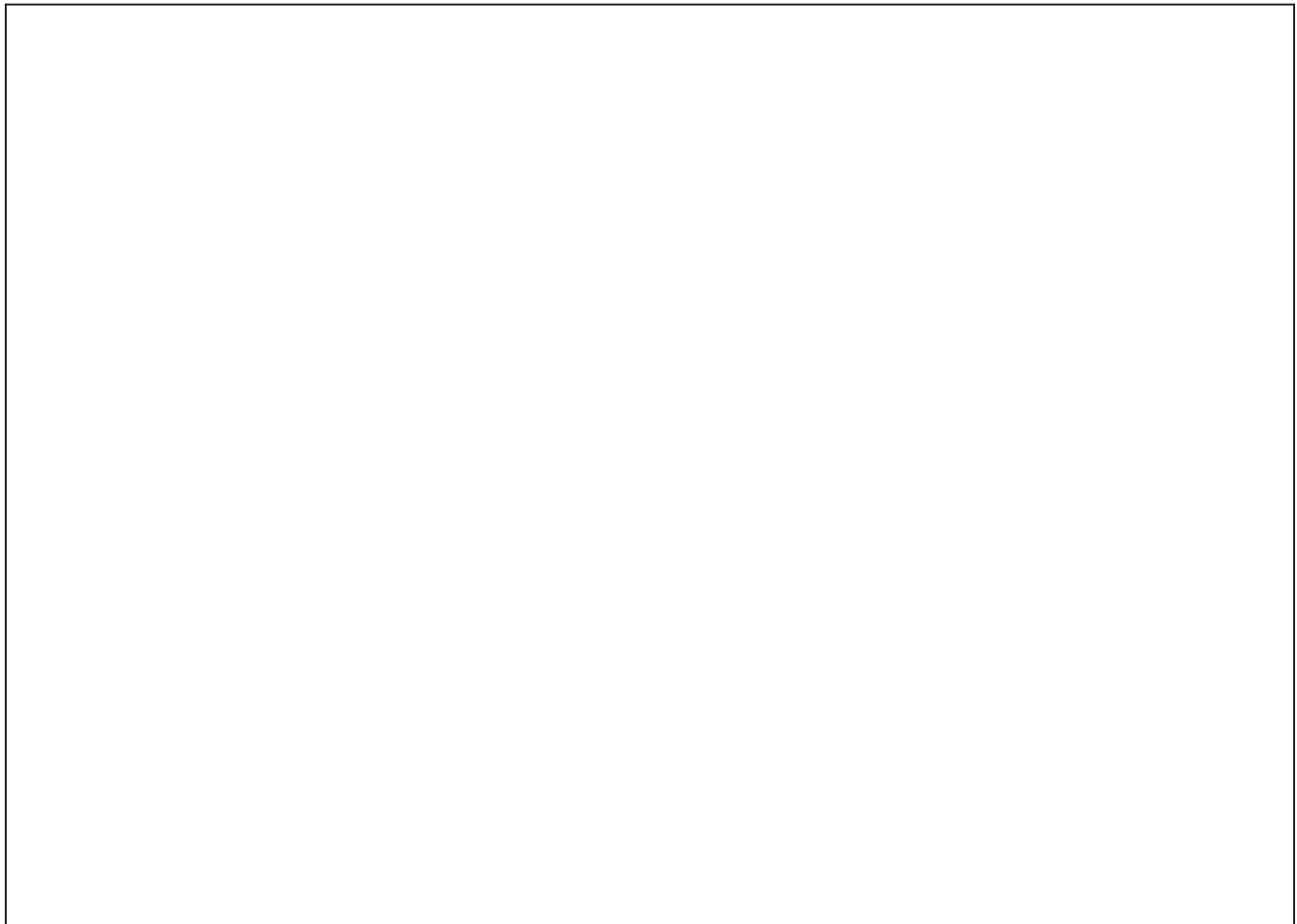
What do you notice about the order of the layers in the paper pile?

Name: _____ Date: _____

Daily Written Reflection

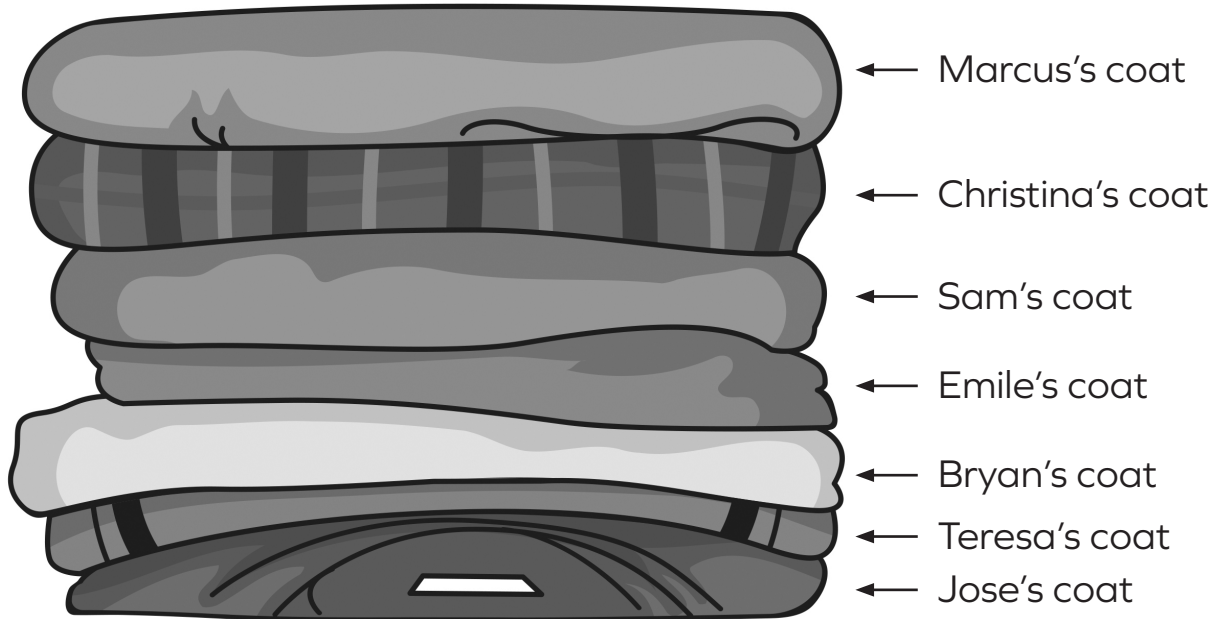
You find two fossils in two different rock layers. As a geologist, how could you infer which fossil is older?

Make a drawing if it helps you explain your thinking. Label your drawing.



Who Arrived First?

Andre had a party. When guests arrived, they stacked their coats on the floor by the door. Below is a drawing of the coat pile.





Who arrived at the party first, and why do you think so?

How is the stack of coats like a rocky outcrop?

Evidence About Rock Layers

In the table below, if you have evidence to support the claim, record it in the second column. Your evidence can come from models and the *Fossil Hunter's Handbook*.

Question: Which rock layer is older?

Claim	Evidence
<div style="text-align: center;">  </div> <p style="margin-top: 10px;">The upper rock layer is older.</p>	
<div style="text-align: center;">  </div> <p style="margin-top: 10px;">The lower rock layer is older.</p>	

Modeling Rock Layers

1. Read the scenarios below.
2. Using the Modeling Tool, take turns creating a model of what the rocky outcrop would look like for each scenario.
3. After you create all of the models, complete the sentences at the bottom of the page.

Scenario 1: First, limestone formed in this place. Next, siltstone formed. Then, sandstone formed. Finally, mudstone formed.

Scenario 2: First, mudstone formed in this place. Next, siltstone formed. Then sandstone formed. Finally, limestone formed.

Scenario 3: First, siltstone formed in this place. Next, more siltstone formed. Then, sandstone formed. Finally, siltstone formed.

Scenario 4: First, sandstone formed in this place. Next, limestone formed. Then sandstone formed. Finally, mudstone formed.

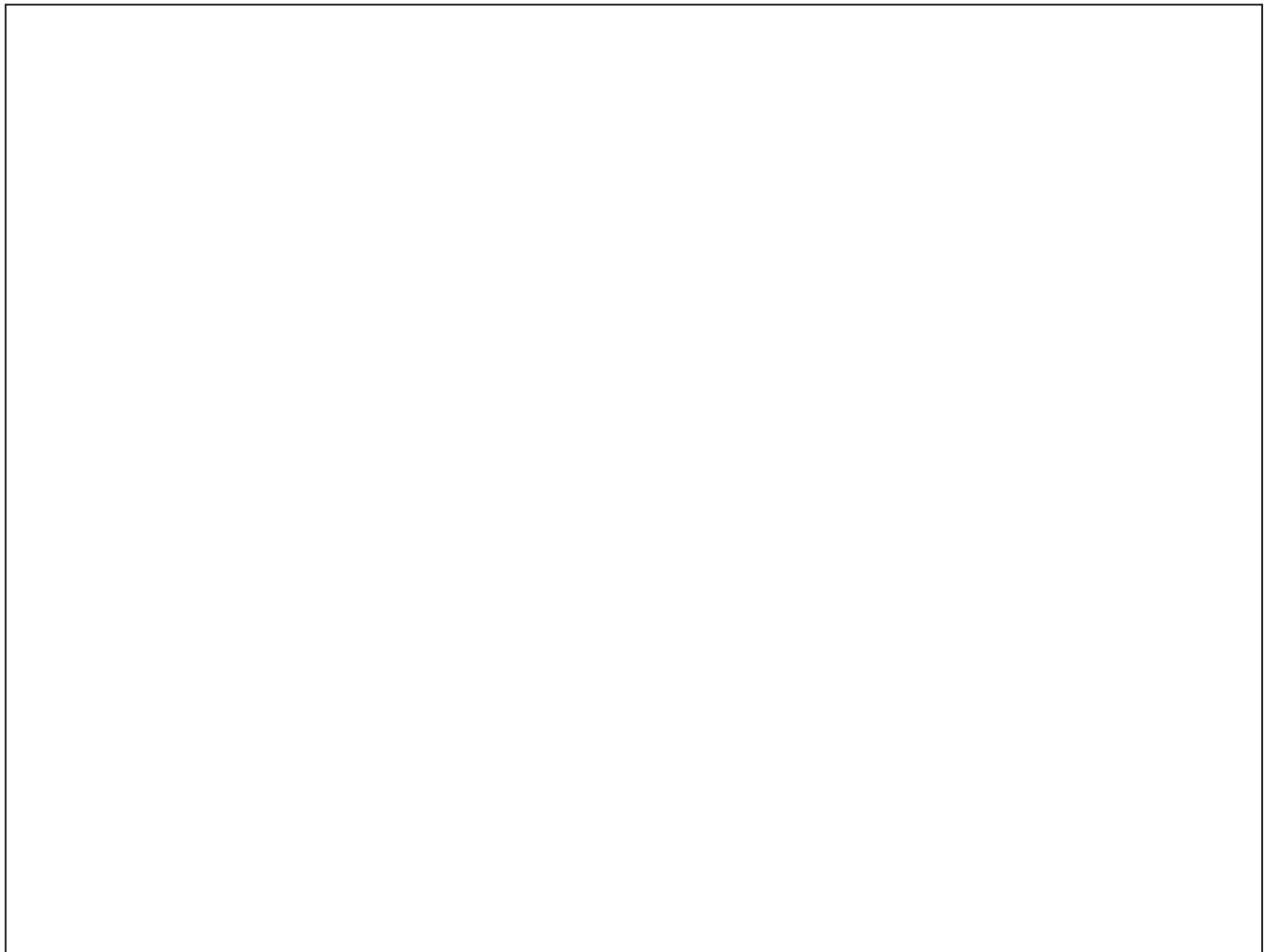
_____ rock layers formed first and younger rock layers formed _____ them. Lower rock layers are _____ than the layers above them.

Name: _____ Date: _____

Daily Written Reflection

Explain why the lowest rock layer in a rocky outcrop is the oldest.

Make a drawing if it helps you explain your thinking. Label your drawing.



Getting Ready to Read: *Arguing to Solve a Mystery*

1. Before reading the book *Arguing to Solve a Mystery*, read the sentences below.
2. If you agree with the sentence, write an “A” on the line before the sentence.
3. If you disagree with the sentence, write a “D” on the line before the sentence.
4. After you read the book, see if your ideas have changed. Be ready to explain your thinking.

_____ Scientists rarely argue because they usually have similar ideas.

_____ Scientists try to convince others that their claim is best by using evidence.

_____ Scientists have already solved the mystery of dinosaur extinction.

_____ All scientists agree that volcanic eruptions killed off the dinosaurs.

_____ Observations of rocks and fossils help geologists solve mysteries.

Name: _____ Date: _____

Making Inferences While Reading ***Arguing to Solve a Mystery***

1. As you read *Arguing to Solve a Mystery*, put what you read together with what you know to make inferences.
2. Record the page number on which you made an inference and what you read (in your own words) in the left-hand column.
3. Record the inference you made in the right-hand column.

What I read	My inference
Page	
Page	
Page	

Name: _____ Date: _____

Reading Reflection: *Arguing to Solve a Mystery*

1. Read each question below.
2. Use what you read in *Arguing to Solve a Mystery* to help you answer each question.
3. Use evidence from the text to support your thinking.

How did Walter Alvarez use evidence from rock layers to support his claim?

What evidence did Courtney Sprain use to support her claim?

Why do you think it is important for scientists to support their claims with evidence?

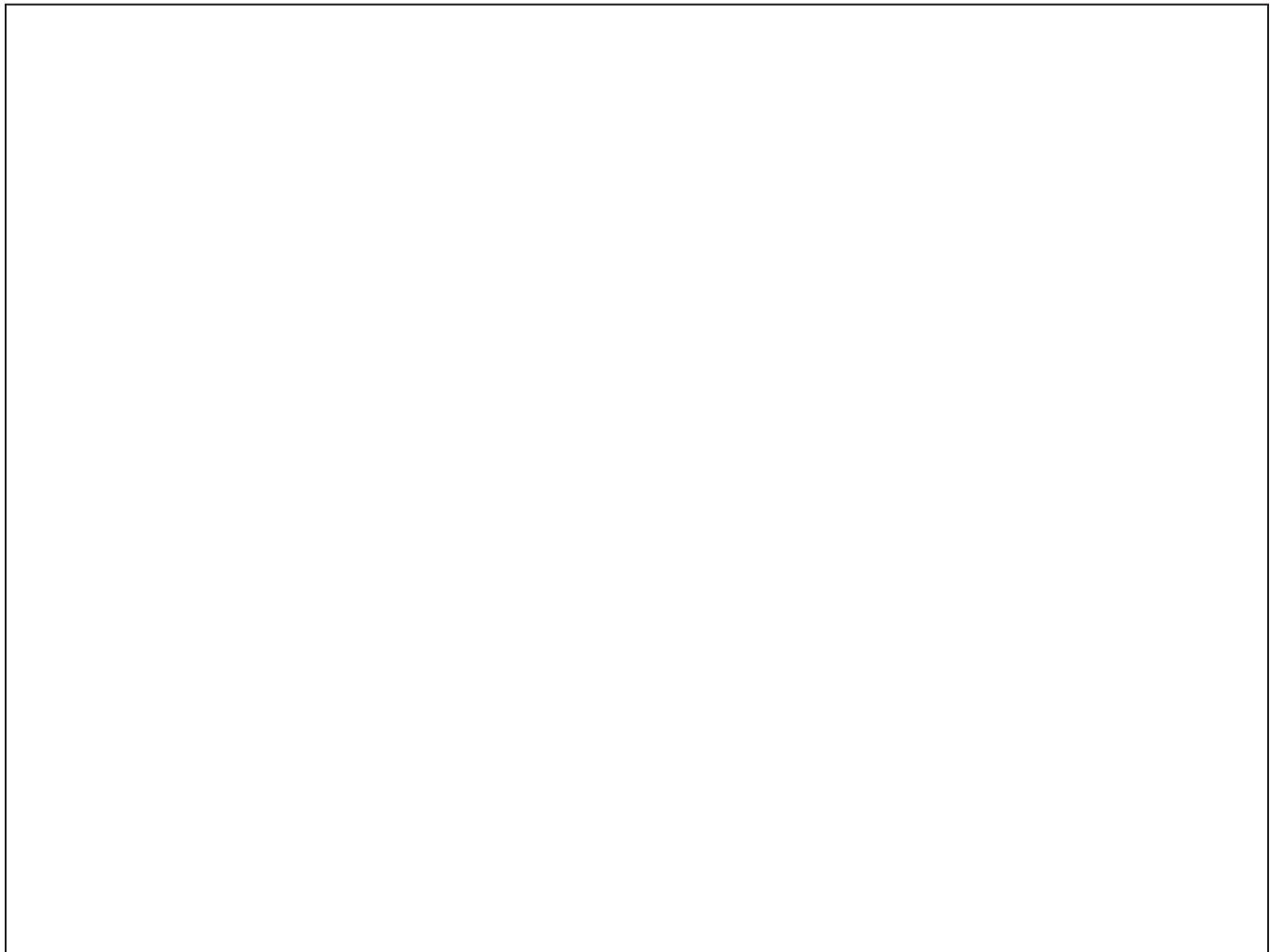
What do you think is the strongest argument for why the dinosaurs went extinct? Why do you think so?

Name: _____ Date: _____

Daily Written Reflection

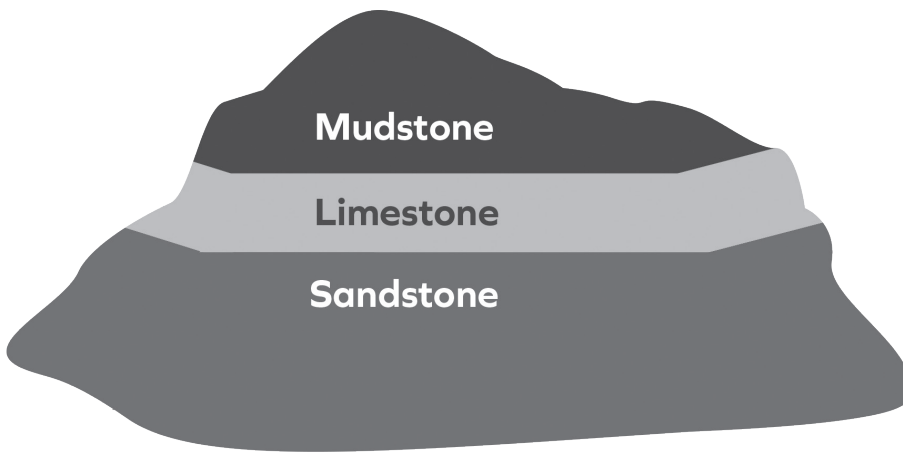
What is one new thing you learned from *Arguing to Solve a Mystery*?

Make a drawing if it helps you explain your thinking. Label your drawing.



Investigating the Order of Rock Layers in the Simulation

1. Look at the diagram of the rocky outcrop below.
2. Read the claim about the rocky outcrop.
3. Load Sim Mode 2 using the menu in the upper left-hand corner of the Sim.
4. Use location 3 in the Sim to test the claim. Observe how the rock layers form.
5. Answer the question at the bottom of the page.



Claim: First, this location was a deep ocean for 10,000 years. Then, it was shallow ocean for 10,000 years. Finally, it was a beach for 20,000 years.

Question: Do you agree or disagree with this claim? Why? What is your evidence?

Name: _____ Date: _____

You can use this page to record notes or create drawings.

Name: _____ Date: _____

Environments Over Time

Use the environments in the box below to complete the description of how your place changed over time.

Environments			
beach	deep ocean	floodplain	shallow ocean

First, this place was a _____.

Then, the environment changed and became a _____.

Next, it became a _____.

Finally, it changed one last time to become a _____.

Environments Over Time (continued)

1. Draw a diagram of a rocky outcrop that matches your description on the previous page.
2. Use the Rock and Fossil Information Sheet to:
 - draw and label rock layers that match each environment.
 - draw and label fossils that match each environment.
3. Show your diagram to your partner.
4. Have your partner use the Rock and Fossil Information Sheet and your diagram to figure out what your description says. Don't let your partner see your description!



Name: _____ Date: _____

Daily Written Reflection

Why do scientists collect data?

Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

You can use this page to record notes or create drawings.

Name: _____ Date: _____

Evidence Circles: Rocky Outcrop Unknown Layer

1. Read the question below.
2. Read each Evidence Card carefully. (You may want to take turns reading the cards aloud with your group.)
3. Talk about the evidence. Try to connect related data and ideas together.
4. With your group, make a claim that is supported by the evidence. Record the claim below.
5. If there is no agreement about a claim, discuss reasons your group still disagrees.

Question: What was the environment like when the unknown rock layer formed?

Claim:

Name: _____ Date: _____

Scientific Language for Evidence Circles

Ways to share ideas:

- I think _____ because _____.
- The evidence shows that _____.
- This idea is important because _____.

Ways to respond to others:

- I agree because _____.
- I disagree because _____.

Questions to ask during the discussion:

- What evidence supports the claim?
- Can you say more about why the evidence you shared supports the claim?

Name: _____ Date: _____

Chapter 3: Check Your Understanding

This is a chance for you to reflect on your learning so far. This is not a test. Be open and truthful when you respond.

Scientists investigate in order to explain how or why something happens. Am I getting closer to figuring out how rocks and fossils can tell us about what Desert Rocks National Park was like in the past?

I understand how the fossil in the rocky outcrop formed. Yes Not yet

I understand how the rock layers in the rocky outcrop formed. Yes Not yet

I understand what makes the rocks in the layers different from one another. Yes Not yet

I understand how a rock layer in the rocky outcrop can help me figure out what Desert Rocks National Park was like in the past. Yes Not yet

I understand how to figure out the order of past environments in Desert Rocks National Park. Yes Not yet

I understand that science is both what we know about the world and how we learn about the world. Yes Not yet

What are you still wondering about rocks, fossils, and past environments?

Name: _____ Date: _____

Daily Written Reflection

Can rocks change over time? Why or why not?

Make a drawing if it helps you explain your thinking. Label your drawing.



Getting Ready to Read: *Rocky Wonders*

1. Before reading *Rocky Wonders*, read the sentences below.
2. If you agree with the sentence, write an "A" on the line before the sentence.
3. If you disagree with the sentence, write a "D" on the line before the sentence.
4. After you read the book, see if your ideas have changed. Be ready to explain your thinking.

_____ Rocky outcrops hardly ever change over time.

_____ Deserts are the main places where scientists find interesting rocky outcrops.

_____ Water causes rock to be exposed over time.

_____ A tree can cause a rock to break in half.

_____ Scientists and hikers need to be careful of natural hazards when they explore rocky outcrops.

Making Inferences in *Rocky Wonders*

1. After you read *Rocky Wonders*, reread the sections of the book listed in the table below.
2. Think about an inference you can make based on the text and information you already know.
3. Write what you read (in your own words) in the second column of the table.
4. Write your inference in the third column of the table.
5. In the last row of the table, choose one of the remaining rocky wonders from the book. Complete this row on your own.

Rocky wonder	What I read	My inference
White Desert, Egypt (pages 6–8)		
Bryce Canyon, USA (pages 9–12)		
Rock-Breaking Cherry Tree, Japan (pages 13–14)		

Name: _____ Date: _____

Reading Reflection: *Rocky Wonders*

Use what you read in *Rocky Wonders* to help you answer each question.

Choose one of the images on pages 4-5. Describe the Rocky Wonder you chose.

What do you think caused the rock to look that way?

What evidence from the text supports your inference?

Name: _____ Date: _____

Reading Reflection: *Rocky Wonders* (continued)

Choose another image from pages 4–5. Describe the Rocky Wonder.

What do you think caused the rock to look that way?

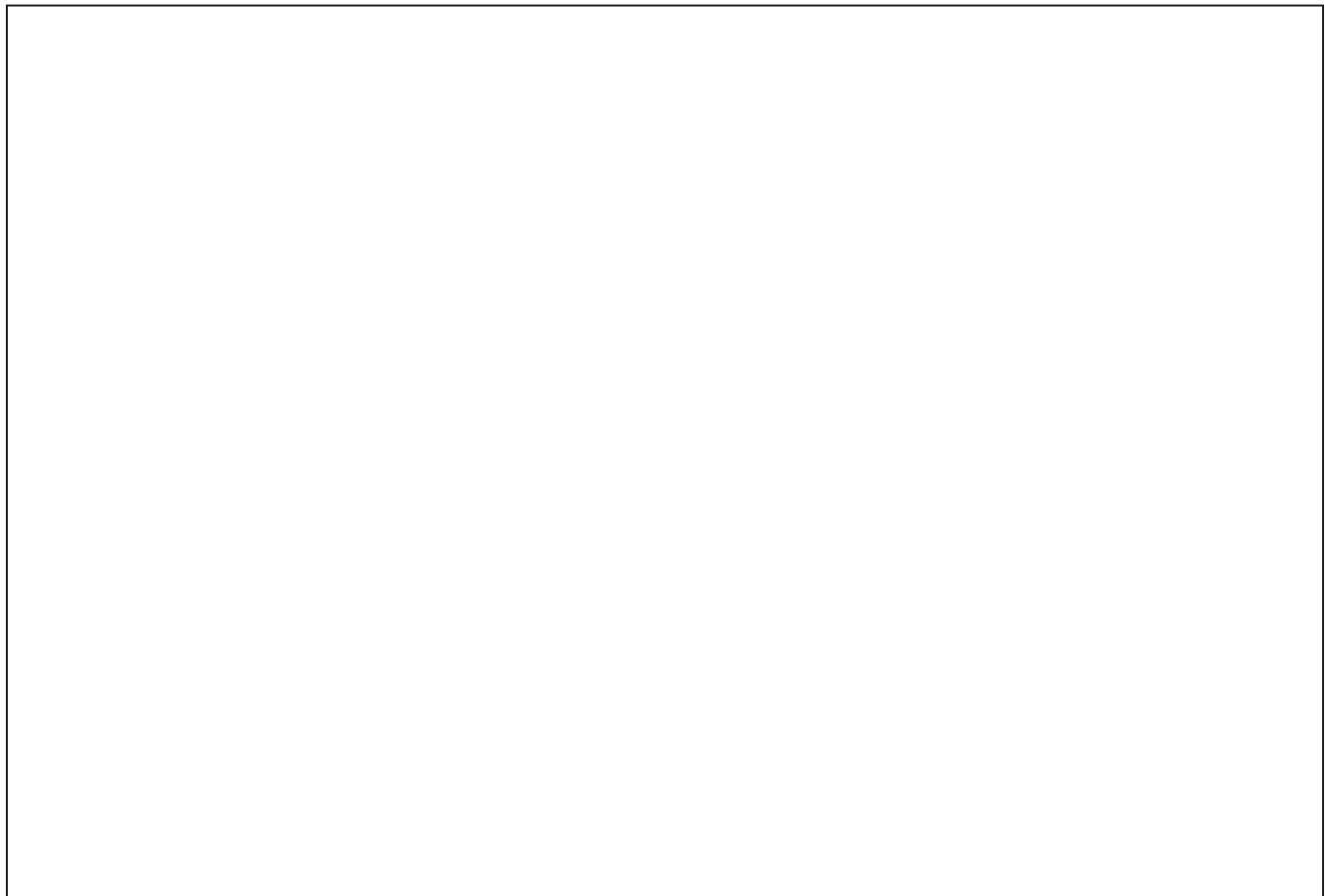
What evidence from the text supports your inference?

Name: _____ Date: _____

Daily Written Reflection

Think about a rocky outcrop that you've seen before (either one you've seen in person or in a picture). What did it look like? How do you think that rock got exposed?

Make a drawing if it helps you explain your thinking. Label your drawing.



Eroding Rock in the Simulation

1. Read the information in the table below.
2. Predict what you think will happen by answering Questions 1 and 2.
3. Do each test in the Sim with your partner. After each test, press ANALYZE LAYERS and record the canyon depth in the table below.
4. Press RESET before starting a new test.
5. When you finish the tests, answer Question 3.

	River speed	Time	Canyon depth
Test 1	slow	20,000 years	
Test 2	slow	40,000 years	
Test 3	fast	20,000 years	
Test 4	fast	40,000 years	

Question 1: Which test do you think will erode the most rock and make the deepest canyon? _____

Question 2: Which test do you think will erode the least rock? _____

Question 3: Which test made the deepest canyon? Describe what happened.

Name: _____ Date: _____

Daily Written Reflection

What's one interesting thing you learned from reading *Rocky Wonders*?

Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

Natural Hazards

1. Reread the "Hazard Warning!" sections in *Rocky Wonders*.
2. Answer Questions 1 and 2.
3. Think about the Erosion Model and answer Question 3.

Question 1: What are some natural hazards caused by water?

Question 2: Choose one hazard caused by water that you read about. How does it happen?

Question 3: What natural hazards do you think could happen near a river? What could people near a river do to stay safe?

Name: _____ Date: _____

Observing the Erosion Model, Part 1

1. When the Erosion Model is finished, make a drawing of each river to record your observations.
2. Answer the question at the bottom of the page.

Longer time	Shorter time

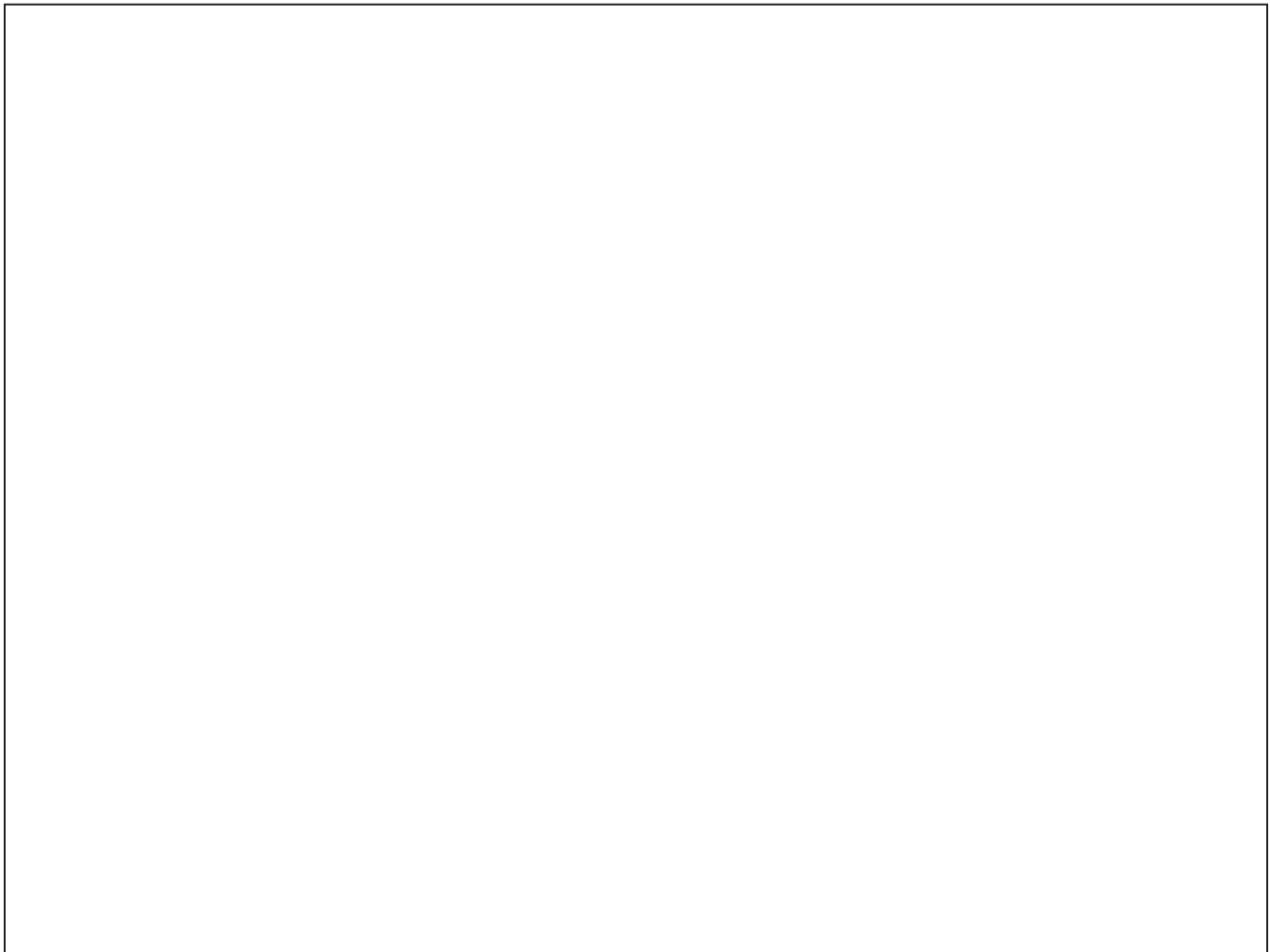
In which river did more erosion happen? What is your evidence?

Name: _____ Date: _____

Daily Written Reflection

What was surprising or interesting about the Erosion Model investigation?

Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

Observing the Erosion Model, Part 2

1. Predict in which river more erosion will happen. Record your prediction below.
2. When the Erosion Model is finished, make a drawing of each river to record your observations.
3. Answer the question at the bottom of the page.

Prediction:

In which river do you predict more erosion will happen? _____

Faster	Slower

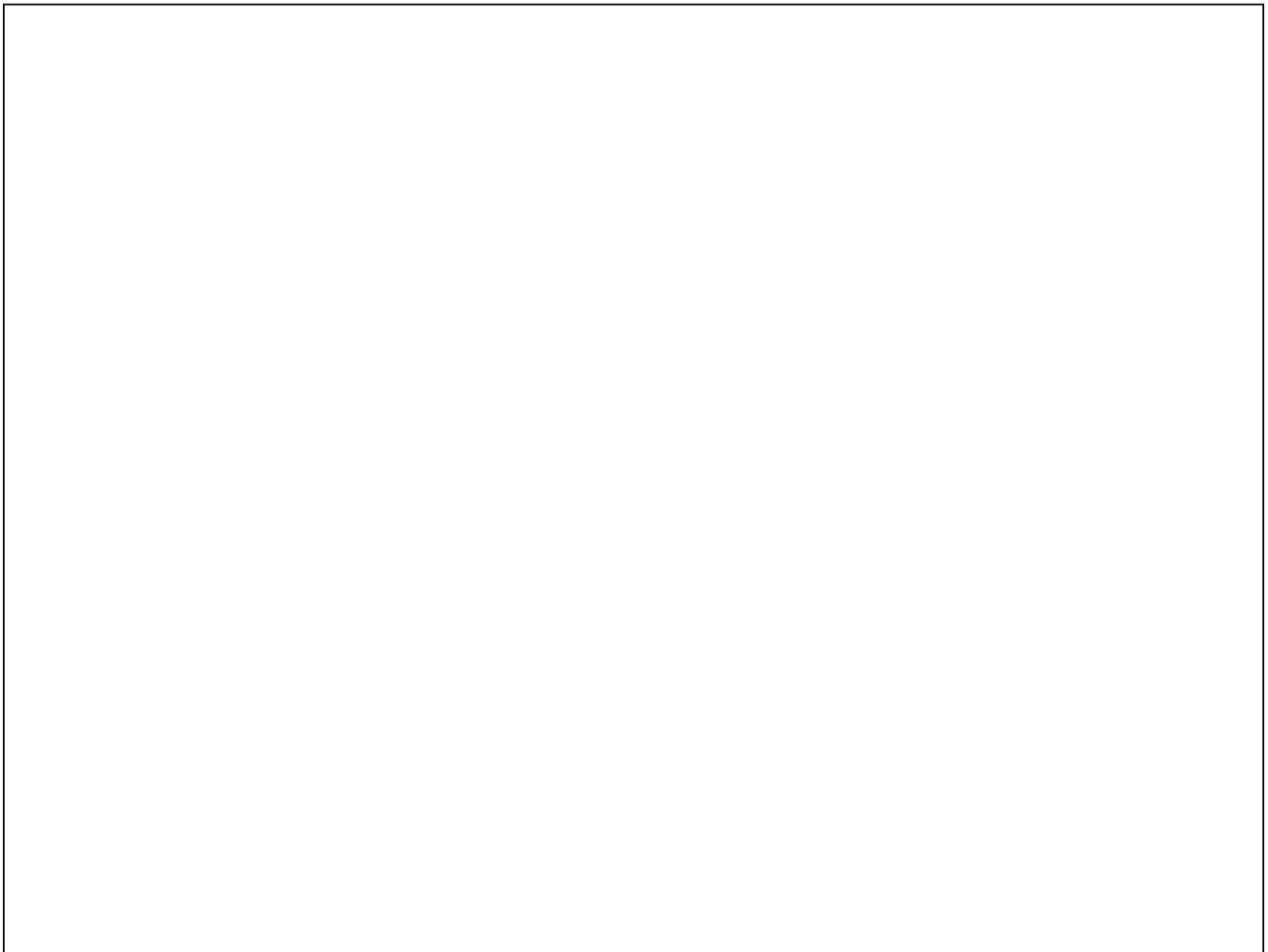
In which river did more erosion happen? What is your evidence?

Name: _____ Date: _____

Daily Written Reflection

How do rocks and fossils tell us about the way Earth changes over time?

Make a drawing if it helps you explain your thinking. Label your drawing.



Name: _____ Date: _____

Evidence Circles: Desert Rocks Canyon and Keller’s Canyon

1. Read the question below.
2. Read each Evidence Card carefully. (You may want to take turns reading the cards aloud with your group.)
3. Talk about the evidence. Try to connect related data and ideas together.
4. With your group, make a claim that is supported by the evidence. Record the claim below.
5. If there is no agreement on a claim, discuss reasons your group still disagrees.

Question: Why did more rock layers get exposed in Desert Rocks Canyon than in Keller’s Canyon?

Claim:

Name: _____ Date: _____

Scientific Language for Evidence Circles

Ways to share ideas:

- I think _____ because _____.
- The evidence shows that _____.
- This idea is important because _____.

Ways to respond to others:

- I agree because _____.
- I disagree because _____.

Questions to ask during the discussion:

- What evidence supports the claim?
- Can you say more about why the evidence you shared supports the claim?

Name: _____ Date: _____

Chapter 4: Check Your Understanding

This is a chance for you to reflect on your learning so far. This is not a test. Be open and truthful when you respond.

Scientists investigate in order to explain how or why something happens. Am I getting closer to figuring out why Desert Rocks Canyon and Keller’s Canyon are so different?

I understand how the rock layers in the canyons were exposed. _____ Yes _____ Not yet

I understand two things that could explain why Desert Canyon has more rock layers exposed than Keller’s Canyon. _____ Yes _____ Not yet

I understand that science is both what we know about the world and how we learn about the world. _____ Yes _____ Not yet

What are you still wondering about erosion?

Glossary

argument: the use of evidence to say why one idea is the best

argumento: el uso de evidencia para decir por qué una idea es la mejor

cement: to stick together in the process of forming rock

cementar: pegarse en el proceso de formar roca

claim: a proposed answer to a question

afirmación: una respuesta propuesta para una pregunta

compact: to press together

compactar: comprimir

data: observations or measurements recorded in an investigation

datos: observaciones o mediciones apuntadas en una investigación

environment: all the living and nonliving things in an area

ambiente: todo (viviente y no viviente) lo que hay en un área

erosion: when rock, soil, or sand is worn down and moved from one place to another by water, wind, or ice

erosión: cuando la roca, el suelo o la arena son desgastados y movidos de un lugar a otro por el agua, el viento o el hielo

evidence: information that supports an answer to a question

evidencia: información que respalda una respuesta a una pregunta

fossil: a clue about life from the past that is preserved in rock

fósil: una pista acerca de la vida del pasado que se preserva en la roca

geologist: a scientist who studies the processes and materials that form the solid part of Earth

geólogo/a: un/a científico/a que estudia los procesos y materiales que forman la parte sólida de la Tierra

Glossary (continued)

inference: something you figure out based on observations and what you already know

inferencia: algo que puedes resolver basándote en observaciones y lo que ya conoces

model: something scientists make to answer questions about the real world

modelo: algo que los científicos crean para responder preguntas sobre el mundo real

observation: something you notice using any of the five senses

observación: algo que notas usando cualquiera de los cinco sentidos

pattern: something we observe to be similar over and over again

patrón: algo que observamos que sea similar una y otra vez

rock layer: a thick sheet of rock formed from the same material

capa de roca: una lámina gruesa de roca formada del mismo material

sediment: small pieces of rock, such as silt or sand

sedimento: piezas pequeñas de roca, como cieno o arena

sedimentary rock: a type of rock formed from sediment that compacts and cements over time

roca sedimentaria: un tipo de roca formada de sedimento que se compacta y se cementa con el tiempo

stable: staying mostly the same

estable: que permanece más o menos igual

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Your Investigation Notebook

Scientists use notebooks to keep track of their investigations. They record things they learn from other scientists. Sometimes they draw or make diagrams. They record ideas and information they want to remember.

Your Investigation Notebook is a place for you to keep track of:

- investigations you do in class.
- what you learn from reading science books.
- your questions, predictions, and observations.
- your explanations and the evidence you find to support those explanations.
- your ideas!



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