Earth History Course, 1.2: Grand Canyon Rocks
Study the poster

• Look at this poster of the Grand Canyon, and imagine you are a geologist. What would you be thinking? What questions would you ask?
“Scale Model”
Turn to “Grand Canyon Map” on page 137.
The Grand Canyon

Teacher master C, Grand Canyon Map

Earth History Course, 1.2: Grand Canyon Rocks
Step 3
FOSS Science Resources

Turn to “Grand Canyon Views” on page 138.
Generate questions

On a new page in your notebook, record five questions you have about the Grand Canyon.

Divide your page into two columns. The first column is for the question. When you find information that relates to that question, record in the second column.

Earth History Course, 1.2: Grand Canyon Rocks
Step 4
View video

Grand Canyon Flyover
Focus question

- Why do there appear to be stripes on the walls of the Grand Canyon?
Focus question

Write your ideas about this question on an index card.
Focus question

Trace an outline around the card below the focus question. This is where you affix the card at the end of this investigation.
Focus question

Talk in your group and share your ideas. Make a list of everyone's ideas.
Turn to “Human History in the Grand Canyon” on page 142.
Turn to “Powell’s Grand Canyon Expedition, 1869” on page 7.
Turn to “The Powell Expedition Map” on page 143.
The Grand Canyon

Teacher master C, *Grand Canyon Map*

*Earth History Course, 1.2: Grand Canyon Rocks*

*Step 12*
Turn to “Mile 20” and “Mile 52” on pages 144–145.

- How far is it from Mile 20 and Mile 52?
Discuss elevation

- What information can you obtain about the river from comparing these two photographs?

The elevation on each photograph is for the elevation of the surface of the river at that point.
Discuss elevation

1. At which location is the river at a higher elevation?
2. What would the river look like from the side?
3. At Mile 20, which way is the Colorado River flowing, toward Lees Ferry or toward Mile 52?
Homework

Read “Getting to Know the Grand Canyon” on page 129 of FOSS Science Resources.
Collecting technique

Teacher master D, *Powell’s Technique*
Introduce the notebook sketches

Notebook sheets 4–5, *Mile 20 Sketch*
and *Mile 52 Sketch*
FOSS Science Resources

Turn to “Grand Canyon Rocks” on page 146.
Organize observations

Notebook sheets 6–7, Mile 20 Rock Observations and Mile 52 Rock Observations

Compare your sketch to the image in FOSS Science Resources.
Organize observations

Affix the site sketch to the left-hand page. Affix data table to the right-hand page.
Affix the site sketch to the left-hand page. Create a data table on the right-hand page to record your observations.

• What rock properties should you observe and record?
<table>
<thead>
<tr>
<th>Rock number</th>
<th>Color</th>
<th>Texture</th>
<th>Observations from</th>
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</tbody>
</table>
Rock observations

Pick up for your group:
1 Mile 20 rock box
1 Mile 52 rock box
2 hand lenses

Make observations and sketches of the rocks. Be careful not to mix the samples between the two boxes.
Discuss observations

Return the rocks and hand lenses.

Compare your observations with the other pair in your group.

Write a summary of the observations.
Discuss observations

Consider these question in your summary.

1. What are some of the rock properties you have observed and recorded?
2. How are the rocks alike and different?
Sort rocks

a. Sort the rocks from Mile 20 into groups;
b. Sort the rocks from Mile 52 into groups; and
c. Make up a descriptive name for each group of rocks.

Be careful not to mix the samples between the boxes.
Acid test

a. Place the rock on a paper towel, number side down. Write the number on the towel.

b. Squeeze one drop of acid from the bottle onto the rock. Only one drop is needed per rock.
Acid test

c. Observe what happens. You might want to use the hand lens for a better view.

d. Record your observation in your notebook. You can use the “Other” column in your data table and label it “Acid Test.”

e. Use the paper towel to dry the rock.
Sort rocks

Resort the rocks using the results from the acid test.
Discuss rock groups

1. How did the appearance of the rock change after you applied the acid?
2. Into how many groups did you sort the rocks from Mile 20?
3. Into how many groups did you sort the rocks from Mile 52?
4. Which properties did you use to sort the rocks?
Rocks that fizz

1. Which of the rocks in both sets fizzed when you placed acid on them?
2. Did these rocks share any other properties?
Rocks that fizz

Calcite is a common mineral composed of calcium, carbon, and oxygen. Calcite’s chemical formula is $\text{CaCO}_3$. 
Introduce limestone

Rocks containing calcite are called limestone.

The rocks that fizzed are all samples of limestone.
Discuss sandy rocks

• What rock was similar to rock 8?
Discuss sandy rocks

1. Which properties do these two rock samples share?
2. Did either of them fizz when you dropped acid on them?
3. What do you observe if you gently rub these two samples together?
Introduce sandstone

Rocks that are made out of sand sized particles cemented together is sandstone.

Rocks 6 and 8 are both samples of sandstone.
Identify shale

1. Did rock 7 fizz when you placed acid on it?
2. What type of texture does 7 have?
3. What other properties does 7 have?
**Identify shale**

Rock 7 is called **shale**.

A smooth-textured rock that doesn’t fizz with acid.
Record rock names

Identify the rock samples with the rock names.

Add any additional information.
Review vocabulary

Spend a few minutes reviewing the vocabulary for this part. Update the vocabulary index and table of contents in your notebook.

- calcite
- elevation
- limestone
- sandstone
- shale
Why would a geologist consider a bottle of hydrochloric acid and a hand lens two of his or her most important tools in the field?
Homework

View the slide show *Powell’s River Trip*. Summarize what you learned about Powell.