

Grand Canyon Self-Guided Activity

SECTION 1: GRAND CANYON GEOLOGY

Complete this section at Yavapai Point Museum

Detective Duty: Studying Grand Canyon’s geology is a lot like solving a detective story. These worksheets will guide you through the great mystery of the Grand Canyon: *who is the culprit who created this enormous formation?*

Crime Scene #1: Inside the West Door

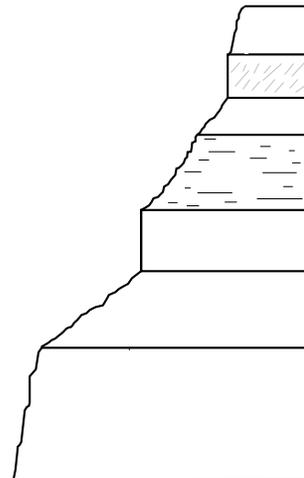
Read “The Way the Canyon Crumbles” in the “Forces of Change” exhibit.

1. The mystery: Which layers do you think become steep cliffs, soft layers or hard layers? (If you need help figuring this out, look at the “Canyon in a Canyon” exhibit behind you.)

The verdict (circle one): soft layers hard layers

Now use your sleuthing skills to find the 3-D exhibit that looks like the diagram on the right.

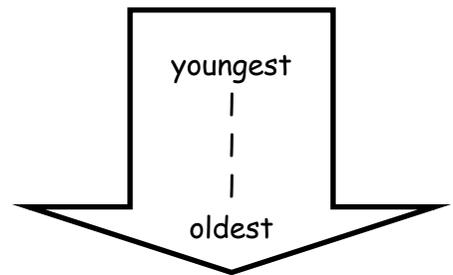
2. Looking at the shape of the cliffs, which layers do you think are the **hardest rock layers** in the canyon?



Assess the scene: Look out the glass windows. Can you find these three rock layers in the canyon?

3. Cipher puzzle: Come back to the 3D exhibit. By looking at the order of the rock layers, you can put these rock layers in order of youngest to oldest:

- | | |
|--------------------|-------|
| Bright Angel Shale | _____ |
| Hermit Formation | _____ |
| Basement Rocks | _____ |
| Muav Limestone | _____ |
| Redwall Limestone | _____ |

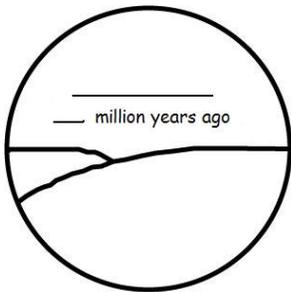


4. Unscramble the clue: p t s o i n i d o e

When layers of rock and soil are piled up on the earth, we call it _____.

Crime Scene #2: Back exhibit room under "Basement Rocks"

5. Find the symbols below and fill in the names and ages you see.

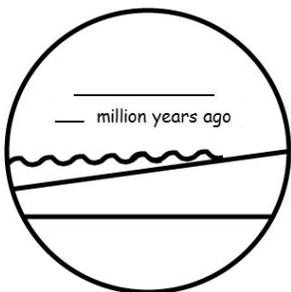


The crime: Two culprits changed the Vishnu Schist you see here.

Name the main suspects: _____ and _____

The verdict: This is metamorphic rock.

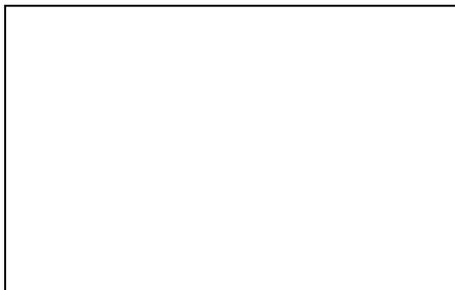
6. **The crime:** Plants and animals were fossilized into the layers of the canyon.



Suspect a: Trilobites
Draw the crime scene where a trilobite would have lived.



Suspect b: Club moss
Make a rubbing of the moss fossil exhibit.

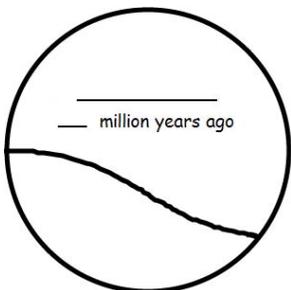


Suspect c: You can "track" this animal's identity in the Coconino Sandstone exhibit.

Sketch what the suspect might have looked like.



7.



Unscramble the clue: i p t l u f

After all of the rocks were laid down, plates collided, causing _____.

Crime Scene #3: 3D Map of the Grand Canyon

8. Assess the scene: Can you find where you are on the map?

9. The crime: A powerful force has been carving the canyon for the past 5-6 million years.

Name the main suspect: The _____ River

10. Which rim is closer to the river?

(circle one) North Rim South Rim

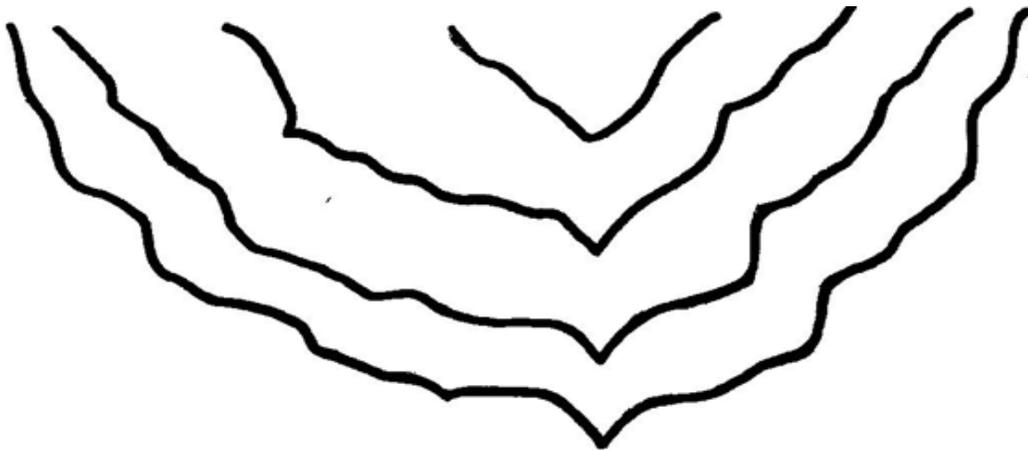
11. Crime scene statistics:

a. How wide is Grand Canyon? _____ Mile(s)

b. How deep is Grand Canyon? _____ Mile(s)

c. How long is Grand Canyon? _____ Mile(s)

12. Suspect profile: Using the “Canyon in a Canyon” exhibit next to the 3D map, draw how wide the river is in each of the stages of the Grand Canyon’s growth.



13. Question for the jury: Was the river guilty of being any wider 5 million years ago?

Circle one: Guilty Not Guilty

14. Unscramble the clue: t o c d g i w t n u

When a river carves downward into rock, we call it _____ .

Crime Scene #4: Glass Windows Overlooking Canyon

15. Assess the scene: Look closely at the rock layers in Grand Canyon for several minutes. What colors of rock do you see?

16. Use the “Looking Back at You” display to locate these Grand Canyon hotspots:

Plateau Point

Phantom Ranch

The Colorado River

Composite sketch: Draw a picture of something you noticed during your close observation of Grand Canyon that you did not notice at first glance.

17. Now find the “Too Thick to Drink, Too Thin to Plow” display.

The crime: A giant structure has changed the color of the Colorado River.

a. **Name the culprit:** _____

b. What color is the river today? _____

18. Unscramble the clue: o r e s n i o

When the walls of the canyon crack and crumble, we call it _____.

19. Crack the Case: Now you are ready to solve the great mystery: *who is the culprit who created this enormous canyon?*

Arrange your worksheets in order 1-4. Look at the “**unscramble the clue**” question on each page. Write the first letter of each unscrambled word in the spaces below, in order 1-4:

_ 1 _ 2 _ 3 _ 4 !

Excellent work, gumshoe! That’s what we call the culprit. You solved the mystery of the Grand Canyon!

SECTION 2: GRAND CANYON ECOLOGY

Complete this section along the Rim Trail from Park Headquarters to Grand Canyon Village.

Introduction

There are many plants and animals that call Grand Canyon home. Some live in the forest and others at or below the rim. Plants and animals need each other to survive; many animals eat plants, and many plants rely on animals to spread their seeds. These interrelationships are part of Grand Canyon ecology. Non-living things, such as rocks, are also part of the ecology. Rocks are the foundation of life; they determine the soil quality and how much water soaks into the ground, which determines the types of plants that can grow in a certain area.

Many animals live at Grand Canyon. Some, like deer, elk and squirrels, can only be seen in the cooler climate of the forest on the rim. Others, such as scorpions, rattlesnakes and desert tortoises, aren't found on the rim because they love the hotter weather near the bottom of the canyon (on average, it is 20° F warmer at the bottom than on the rim).

One of the rarest birds in the world, the California Condor, can be seen soaring the skies above and below the rim; look for a large black bird with distinct white patches on the underside of its wings, and a white numbered tag on each wing.

1. Look for signs of wildlife. Look closely, some creatures are camouflaged, others spend time in trees, others in burrows, some move very fast. Keep in mind that many only come out at night. Tracks, nests, holes, scat (poop), chewed pinecones, feathers, and other signs indicate that animals have been active. These observations can be done as you complete the rest of the questions in this section.



Rock squirrel



Ringtail (nocturnal)

Wildlife Sightings

Animal: _____

Animal: _____

Where sighted: _____

Where sighted: _____

Time of day/night: _____

Time of day/night: _____

Animal behavior: _____

Animal behavior: _____

Animal: _____

Animal: _____

Where sighted: _____

Where sighted: _____

Time of day/night: _____

Time of day/night: _____

Animal behavior: _____

Animal behavior: _____

Evidence of Wildlife

Evidence: _____

Where found: _____

Draw or write about what the evidence looked like

What animal do you think this is evidence of? _____

Evidence: _____

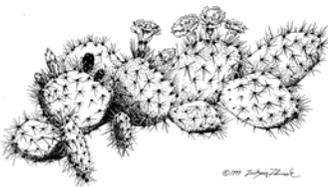
Where found: _____

Draw or write about what the evidence looked like

What animal do you think this is evidence of? _____

2. Now focus on the plants around you. Choose two plants, one smaller and one bigger than you, and draw them.

3. Can you think of two reasons why it is important to animals to have different types and sizes of plants?



4. Along the trail you will see some dead trees. Though no longer living, they provide important habitat for many forest creatures.

a) Can you name two animals that you think use dead trees?



b) Why are dead trees important to these two animals?

5. **For this question, walk a short ways down the spur trail to park headquarters** (see map of trail). Three trees dominate the forest on the canyon rim; two of them are fairly small trees, up to about 40 feet tall, and the third grows up to 150 feet tall (Be aware that this tree is also small when young).

a) Use the following information to find and identify the three trees.

Needles scale-like: Utah juniper.

Needles 1"-2" long, and in bundles of two: Pinyon pine.

Needles 5"-8" long, and in bundles of three: Ponderosa pine (this tree can only be seen along the spur trail to park headquarters).

Draw the needles below the tree names:

Utah juniper

Pinyon pine

Ponderosa pine

b) Can you figure out which tree has:
Small bluish or brownish berries?

Cones 1"-2" long?

Cones about 3"-5" long?

Add the berries and cones to the appropriate drawing above.



c) After identifying the three trees, get with a partner or with your group. Have all but one person close their eyes while that one person chooses needles or a cone from the ground. Have that person pass the item around to see if the others can guess the type of tree the item came from.



d) Find a large ponderosa pine with yellowish-orange bark. Have someone smell the ponderosa pine and describe its scent.

e) List two reasons why it is important to animals to have the different types and sizes of trees in their habitat.

6. The plants here at Grand Canyon are adapted to the different environments they live in.

a) How are the plants here at the Grand Canyon different or the same from where you live? (If different, can you name or describe two plants that grow where you live?)

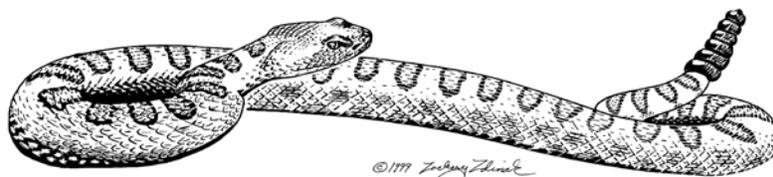
b) Why are the animals different or the same?



N
Narrow-leaf yucca

7. WHAT MAKES GRAND CANYON GRAND?

You've learned a lot about the plants and animals of Grand Canyon. Find a place to sit quietly by yourself where you have a view of the canyon. Try sitting without saying *anything* for 10 minutes and record what makes the Grand Canyon "grand" to you. What do you hear and see? You may draw a picture or write a short story or poem that records your experience.



Grand Canyon pink rattlesnake



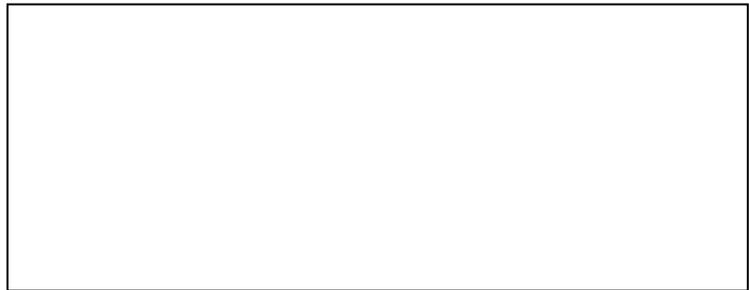
SECTION 3:

PEOPLE AT GRAND CANYON

Complete this section in historic Grand Canyon Village. Start near Verkamps Visitor Center and walk west to the head of the Bright Angel Trail.

Pay attention to the signs and buildings along the way. Imagine the sights, sounds, and smells of long ago. Those with accessibility concerns may wish to skip questions 5, 9, and 10.

1. What is the name of the store that started out in a tent? _____
2. Draw a picture of the Hopi style building in the village.



3.



Between 1905 and 1935, a female architect designed several buildings in Grand Canyon. She was a pioneer, succeeding in a man's field when professional women were not widely accepted.

What is her name? _____

4. If you had visited Grand Canyon before 1905, you would have stayed in tent cabins and used pit toilets. That changed when a luxurious hotel was built.

a) What is the name of that hotel? _____

b) Name two things that made it so luxurious at the time.



Early accommodations at Grand Canyon

5. From the front entrance of El Tovar, walk south and go down the stairs to the train depot. Be careful crossing the road near the depot.



- a) The first train arrived at Grand Canyon in 1901. How did people get to Grand Canyon before that?

- b) Write two reasons why trains were a better method of travel allowing many more people to come to Grand Canyon.

6. Go back up the stairs and past El Tovar. Walk west along the Rim Trail until you see Bright Angel Lodge. Look for the first sign about the lodge.

A photo shows what this place looked like in 1932. Write down three things that are different from what you see today.

7. Go inside the lodge and find the Bright Angel History Room to answer these questions.

- a) Fred Harvey built restaurants and hotels along the Santa Fe Railroad. What were the young women who worked there called?

- b) What is unusual about the big stone fireplace in the History Room? _____



- c) Draw the fireplace.



8. From the Bright Angel Lodge, walk west on the Rim Trail. Find Lookout Studio.

You have now seen three buildings that were designed by Mary Colter: Hopi House, Bright Angel Lodge, and Lookout Studio. Which one is your favorite? _____

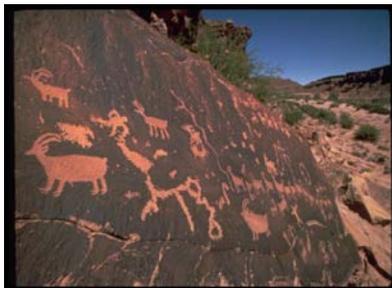
9. Continue west along the Rim Trail and go up the stairs near the entrance of Kolb Studio. Continue west to the sign just past the mule corral.

a) The Bright Angel Trail is the best known trail in Grand Canyon. Why was the trail built here?

b) Who were the first people to use this route into the canyon?

c) A mule is a cross between what two animals?

d) Why use mules instead of horses in Grand Canyon?



10. Hike a few minutes down the Bright Angel trail until you come to a tunnel. After you go through the tunnel, look up to your left. You should see some red pictures painted on the rock walls.

These paintings are called pictographs. They were painted by Native Americans hundreds of years ago. Rock art like this helps us learn about people who lived here long ago.

a) What images do you see? _____

b) What do you think was the purpose for these rock paintings?

c) Is there a difference between rock art and graffiti? _____

d) Is it okay to write on or carve into rocks in a National Park? Explain your answer.

