

# Outreach Education

## Colorado National Monument

National Park Service  
U.S. Department of the Interior



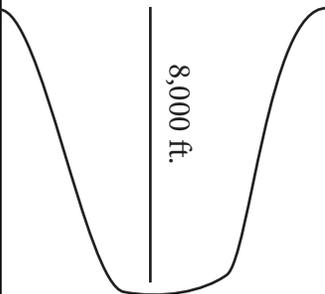
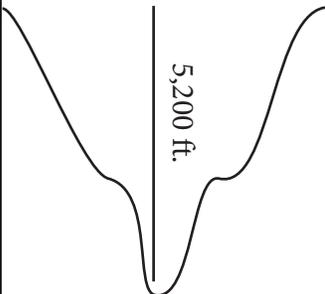
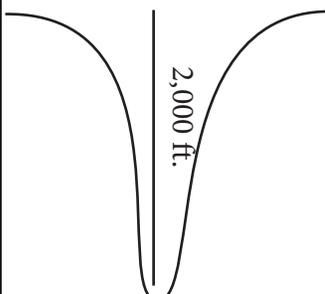
Constructive & Destructive Forces  
(6th Grade Constructive & Destructive Forces)

Name \_\_\_\_\_

## Canyon Profiles

The shape and size of canyons depends on the rocks they are made of and the forces that created them.

Study the canyon profiles in the left column below. Research what types of rock the canyons are made of and how these canyons formed and write a brief summary in the middle columns. In the box on the right compare and contrast the shapes of the canyons in relation to the rock types and how they formed. *For example; Glenwood canyon is narrow because it is made of hard rock and was carved by a fast moving river. Read more at [www.nps.gov/seki/natureandscience](http://www.nps.gov/seki/natureandscience)*

Canyon Profile	Rock Type(s)	How it formed	Compare/Contrast
 <p>Kings Canyon (CA)</p>			
 <p>Grand Canyon (AZ)</p>			
 <p>Black Canyon (CO)</p>			

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Constructive and Destructive Forces: Pre-Field Trip Activity  
(6th Grade Constructive and Destructive Forces)

Name \_\_\_\_\_

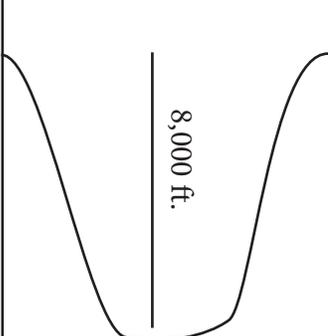
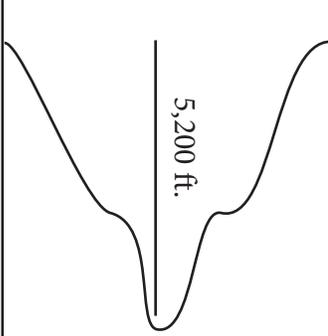
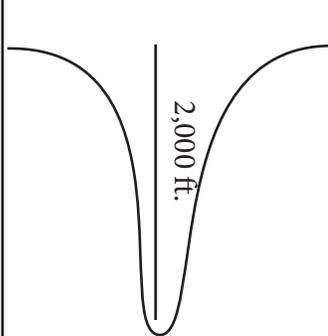
## Canyon Profiles

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**Answer Key**  
*Answers will vary, this is a general idea of what they should contain.*

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Canyon Profile	Rock Type(s)	How it formed	Compare/Contrast
 Kings Canyon (CA)	Strong igneous rocks, mostly granite	Formed by large glaciers scooping out the U-shaped canyon.	Kings Canyon is a wide, U-shaped canyon because it was carved by glaciers slowly gouging out the rocks. It is made of strong igneous rocks so it has sheer walls. Glaciers are efficient agents of erosion and carved deep into the granite and create U-shaped instead of V-shaped canyons. In comparison, the Grand Canyon was carved by the Colorado River. The upper layers of the canyon are made of softer sedimentary rocks and the walls are wide there, as the river cut down it hit harder metamorphic and igneous rocks that are harder to carve into, so the walls are narrow towards the bottom. The canyon is V-shaped because it was carved by a river. The Black canyon is all strong metamorphic and igneous rocks and so it is narrow for its entire depth. It was also carved by a river, so it has a V-shaped profile.
 Grand Canyon (AZ)	Made of sedimentary rocks near the top and ancient metamorphic and igneous rocks at the bottom.	Formed by the down-cutting of the Colorado River.	
 Black Canyon (CO)	Made of metamorphic and igneous rocks.	Rapid erosion by the Gunnison River.	

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Constructive and Destructive Forces: Post-Field Trip Activity  
(6th Grade Constructive and Destructive Forces)

Name \_\_\_\_\_

## No Thoroughfare Canyon Hike

During your hike into No Thoroughfare Canyon, you saw many examples of constructive and destructive forces. Discuss the hike with a classmate before you complete the activity below.

**Forces in the Canyon** - Complete the table below to review what you saw/learned on the hike in No Thoroughfare Canyon. In the first box write one constructive/destructive force, in the middle box sketch a picture of evidence you saw on the hike/during the activities of this force, and in the third box write a brief explanation of how that force created the evidence.

Constructive/Destructive Force	Sketch of Evidence	Explanation

**Masters of Models** - Write a comparison of two forces of erosion that you modeled during the erosion modeling activity on your field trip. *(use the back of page if you need more room)*

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Constructive and Destructive Forces: Post-Field Trip Activity  
(6th Grade Constructive and Destructive Forces)

Name \_\_\_\_\_

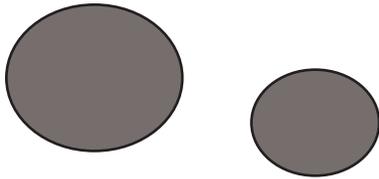
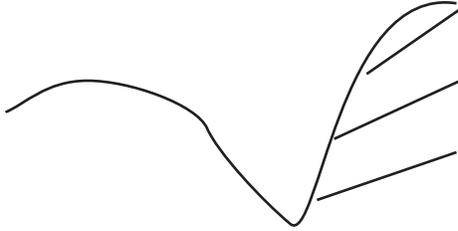
## Answer Key

*Answers will vary, this is a general idea of what they should contain.*

### No Thoroughfare Canyon

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Constructive/Destructive Force	Sketch of Evidence	Explanation
Flash Floods - destructive		Flash floods have the power to move huge boulders along the wash, knock down plants, leave high piles of debris (branches, sand, etc.) in trees...
Ice - destructive		Ice wedging creates large cracks in the canyon walls. As the water freezes in the rocks it expands and cracks the rocks.
Fault - constructive		Along the fault line, the rock layers are tilted. The redlands fault, uplifted the land the Monument is on during a period of mountain building.

**Masters of Models** - Write a comparison of two forces of erosion that you modeled during the erosion modeling activity on your field trip. *(use the back of page if you need more room)*

Flash floods vs. Glaciers - In the modeling I created a flash flood using the cup filled with water and the canyon it carved was deep and narrow. The flash floods modeling moved "large rocks" in my model. The glacier also moved large rocks, but when it went through it left a U-shaped, wide valley behind.