

# **Rocky Trails**

**3<sup>rd</sup> Grade Field Trip**

**Red Rock Canyon National Conservation Area**

**Las Vegas, Nevada**

# Rocky Trails

## Overview:

Students will compare and contrast sedimentary deposits at Red Rock Canyon National Conservation Area. They will also analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

## Duration:

25-minute session for pre-activity

1 day for field trip and reflection

60-minute session for post-activity

**Grade:** Third

## Next Generation Science Standards:

3-LS4-1 Biological Evolution: Unity and Diversity		
<p>Students who demonstrate understanding can:</p> <p><b>3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.</b> [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]</p>		
The performance expectation above was developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i> :		
<p><b>Science and Engineering Practices</b></p> <p><b>Analyzing and Interpreting Data</b> Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.</p> <ul style="list-style-type: none"> <li>Analyze and interpret data to make sense of phenomena using logical reasoning.</li> </ul>	<p><b>Disciplinary Core Ideas</b></p> <p><b>LS4.A: Evidence of Common Ancestry and Diversity</b></p> <ul style="list-style-type: none"> <li>Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (<i>Note: moved from K-2</i>)</li> <li>Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.</li> </ul>	<p><b>Crosscutting Concepts</b></p> <p><b>Scale, Proportion, and Quantity</b></p> <ul style="list-style-type: none"> <li>Observable phenomena exist from very short to very long time periods.</li> </ul> <p>-----</p> <p><b>Connections to Nature of Science</b></p> <p><b>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</b></p> <ul style="list-style-type: none"> <li>Science assumes consistent patterns in natural systems.</li> </ul>

## Field Trip Theme:

Red Rock Canyon National Conservation Area offers a great opportunity to see geology in action. Powerful forces and dynamic processes have been working to shape and sculpt this unique landscape. During this field trip, students will explore the striking landscape composed of diverse types of rocks.

**Objectives:**

Students will:

- identify and describe three rocks (i.e. limestone, gypsum, conglomerate, sandstone, and shale) found at Red Rock Canyon National Conservation Area.
- explain that rocks are composed of different combinations of minerals.
- investigate and describe how the Red Rock/Earth is composed of different kinds of materials (rocks, soils, water, and air).
- recognize that fossils are evidence of past life.

**Background Information:**

The Earth is made of rock, from the tallest mountains to the floor of the deepest ocean. Thousands of different types of rocks and minerals have been found on Earth. Most rocks at the Earth's surface are formed from only eight elements (oxygen, silicon, aluminum, iron, magnesium, calcium, potassium and sodium), but these elements are combined in a number of easy ways to make rocks that are very different. By studying how rocks form and change, geologists have built a solid understanding of the Earth and its long history.

Rocks are aggregates of minerals, crystals, fossils and other rocks. There are three main classes of rocks: igneous, sedimentary and metamorphic. Each is classified according to the distinctive geological processes by which they formed. Igneous rocks form from molten rock or magma. Sedimentary rocks form either from particles that settle out of wind, water, or ice and are compacted and cemented to form rock. Metamorphic rocks form when pre-existing igneous metamorphic or sedimentary rocks are changed due to heat and/or pressure.

**Vocabulary:**

*It is not necessary for students to know these definitions. This serves as a resource to support student understanding as it comes up in discussion or activities.*

- Calcite: most common mineral form of the compound calcium carbonate, found in limestone, chalk, and marble; also common rock cement.
- Cement: chemically precipitated, finely crystalline material that fills the spaces among the casts of a sedimentary rock, binding them together.
- Chert: a hard and compact sedimentary rock, consisting dominantly of very small quartz crystals. It is a common rock type which occurs mostly in carbonate rocks either in nodular form or in layers (bedded chert). (Found on the fossil ridge area)
- Conglomerate: a type of sedimentary rock composed of rounded pebbles, cobbles, or boulders cemented together.

- Cross-bedding: layers of sediment deposited at an angle to a horizontal bedding plane.
- Deposition: laying down of any rock-forming material primarily by wind or water.
- Erosion: wearing a way of rock by the action of water, wind, and ice.
- Fossil: piece, impression, or trace of an organism of past geologic ages that has been preserved in rock; the remains of, or an impression made by, a once-living animal or plant.
- Geology: the science that examines Earth, its form and composition, and the changes it undergoes.
- Gypsum: a colorless mineral that consists of calcium sulfate occurring in crystals or masses and that is used especially as a soil improver and in making plaster-of-Paris
- Igneous rock: a rock cooled from a molten or liquid form (magma); rock solidified from magma; type of rock that was once magma.
- Limestone: a sedimentary rock made of the mineral calcite
- Magma: molten rock material generated within the earth; solidifies to form igneous rock.
- Metamorphic rock: a rock changed from its original form by heat, pressure or chemical action; rock that has undergone a change in composition or texture effected primarily by pressure and heat; rocks that have been produced from other rocks by high temperatures and/or pressures.
- Mineral: a natural, non-living solid made up of elements like silicon, oxygen, carbon and iron; naturally occurring inorganic element or compound (neither animal nor plant) having an orderly internal structure and characteristic chemical composition, crystal form, and physical properties.
- Petrified wood: wood that has been turned to stone by replacement of the original structure with silica.
- Rock: a mass composed of one or more minerals.
- Sandstone: a sedimentary rock made up of pieces of older rocks, parts of plants and animals.
- Sediment: solid material that has been transported and deposited by wind, water, or ice.
- Sedimentary rock: rock formed from any sediment that is deposited by wind, water, or precipitation and then cemented or compacted together; a rock formed by the settling or deposition of sediment; rock formed from sediment (sand, mud, animal remains, etc.) on the surface of the earth.
- Shale: a sedimentary rock made of clay.
- Weathering: the breakdown of rocks at the surface of the earth by rain, wind, frost, etc.

**Materials:**

- Teacher resource pages (project these images from your computer or transfer them into a PowerPoint presentation to retain the colored graphics)
- Student field experience journal copied for each student
- Fossil cards for small groups (print from teacher resources pages)

**Suggested Pre-Activity:**

1. Introduce the field trip to Red Rock Canyon National Conservation Area by showing the pictures in teacher resource pages. You may insert the pages into a PowerPoint or project the pages from this document. Then, have students write their beginning thoughts on fossils on their student handout. Students will revisit these thoughts after the field trip.

**Field Trip Summary:**

Geology plays an important role at Red Rock Canyon. During this field trip, students will:

- receive a brief introduction to the way Red Rock Canyon has changed over time
- observe and analyze different types of rocks
- identify examples of living fossils, non-living fossils, rock marble, and rock art
- take a nature walk to find evidence of fossils and to find evidence of past weather conditions

After coming back from the field trip, have students fill out the reflection sheet from the Student Field Experience Journal.

**Suggested Post-Activity:**

1. Review the types of fossils that were shown during the field trip.
2. Have students analyze the fossil cards in small groups, record the information in the chart, and describe the type of environment these plants or animals lived in long ago in the Student Field Experience Journal
3. Have students analyze the map that shows where the fossils were found and draw a picture of what Red Rock Canyon used to look like long ago.

# Teacher Resources

Pictures of living fossils, non-living fossils, rock marble, rock art, and rocks they may find in the wash.

Examples of living fossils:

Dragonfly



Desert Tortoise

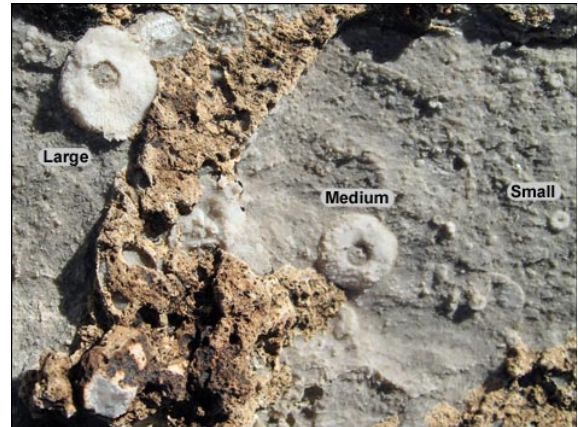


Examples of non-living fossils:

Sponge



Crinoid Stems



Examples of Native American Rock Art:

Petroglyphs at Willow Springs



Pictographs at Brownstone Canyon

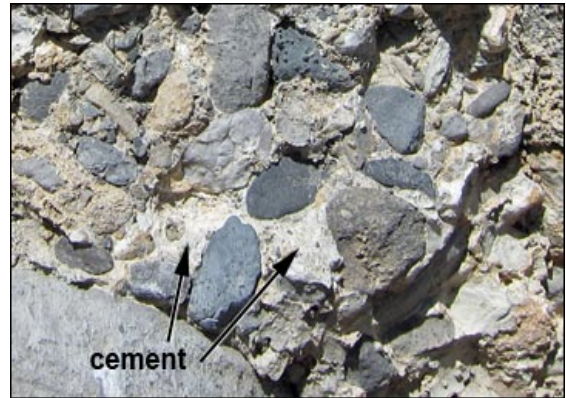




Examples of rocks you may find:  
Rock/Moqui Marbles



Conglomerate



Limestone- Gray rock, older



Sandstone-Red or Tan rock, younger



## Fossil Cards

<p>Fossil:</p>  <p>Picture:</p>    <p>Plant or Animal?</p> <p>Type 1 or 2:</p> <p>Where it was found:</p>  <p>Modern Counterpart:</p>	<p>Fossil:</p>  <p>Picture:</p>    <p>Plant or Animal?</p> <p>Type 1 or 2:</p> <p>Where it was found:</p>  <p>Modern Counterpart:</p>
<p>Fossil:</p>  <p>Picture:</p>    <p>Plant or Animal?</p> <p>Type 1 or 2:</p> <p>Where it was found:</p>  <p>Modern Counterpart:</p>	<p>Fossil:</p>  <p>Picture:</p>    <p>Plant or Animal?</p> <p>Type 1 or 2:</p> <p>Where it was found:</p>  <p>Modern Counterpart:</p>



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Name: \_\_\_\_\_

# What I Know About Fossils

What do you know about fossils?

Which of following are pictures of fossils? Circle all that apply.

Dragonfly



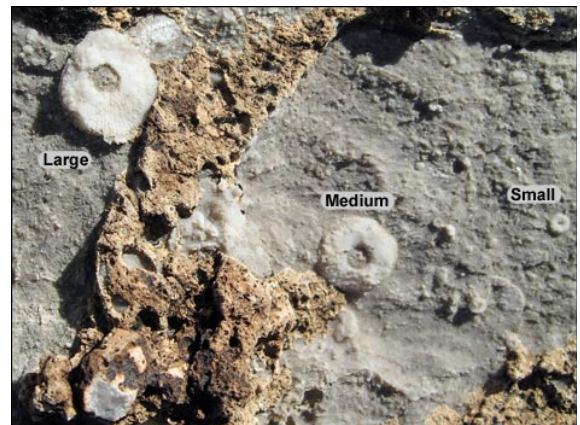
Desert Tortoise



Sponge



Crinoid Stems





Petroglyphs at Willow Springs



Pictographs at Brownstone Canyon



Rock/Moqui Marbles



Conglomerate



Limestone- Gray rock, older



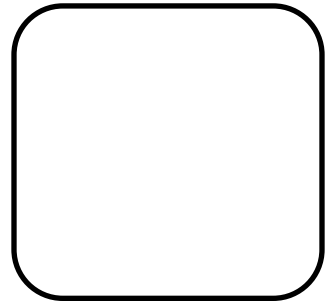
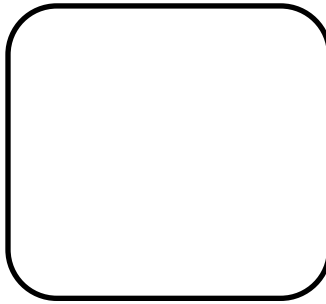
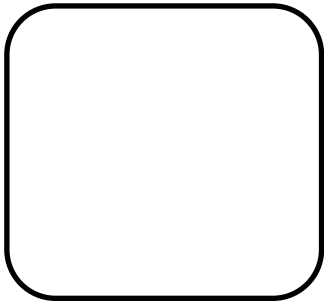
Sandstone-Red or Tan, younger



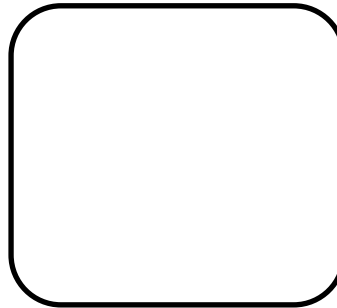
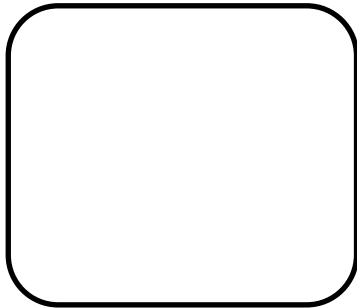
# Field Trip Reflection

I took a field trip to \_\_\_\_\_  
on \_\_\_\_\_.

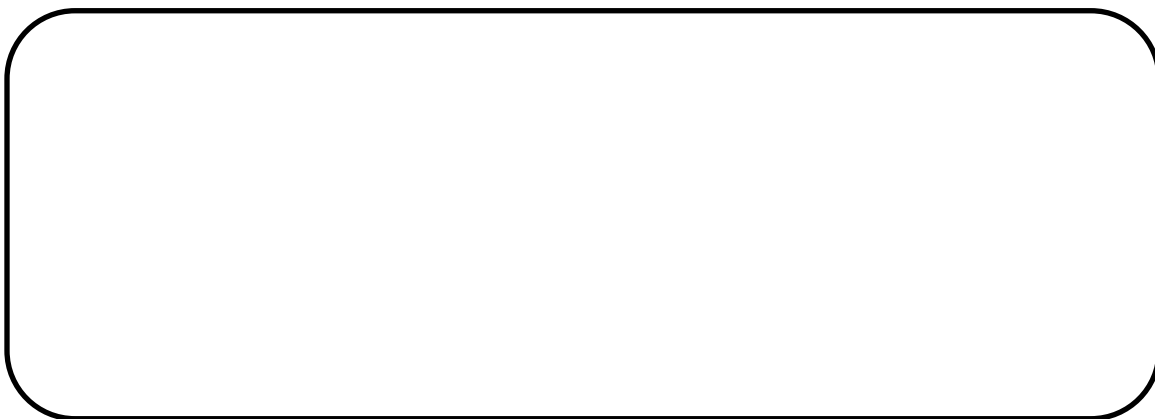
Here are three things I saw:



Here are two things I learned:



The best part of the day was:



Go back to the “What I Know About Fossils...” page. Use a colored pencil to add to or change what you know about fossils.

# Analyzing Fossils

Analyze the fossil cards and record the information into the chart below.

Fossil (plant or animal)	Type	Size	Type of land it was found	Modern counterpart

Describe the type of environment these plants or animals lived in long ago. Use evidence from the fossil cards and chart to support your reasoning.

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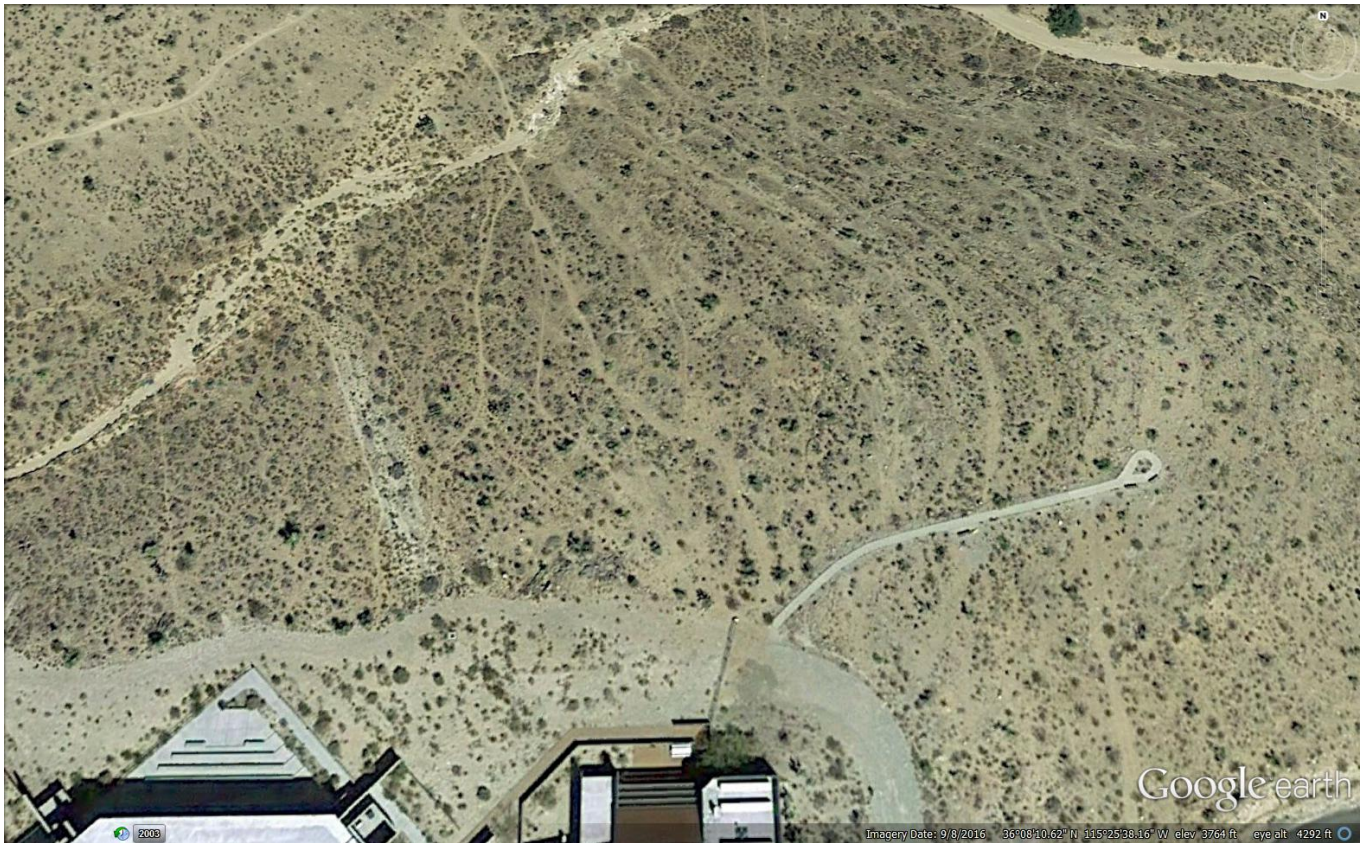
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Current map of where particular fossils were found near the Red Rock Canyon Visitor Center



Fossils are evidence of life in the past. Examine the map of where these fossils were found. Draw a picture of what Red Rock Canyon used to look like long ago.

