GASP! At Home

Week 4: Geology

Hello all!

While our Girls Advancing Scientific Progress (GASP!) program is, the Environmental Learning Center would still like to provide families with environmentally themed activities that they can do at home! Below are a variety of activities ranging from quick, 10-minute activities to more in-depth, 45-minute activities that all explore the topic of **geology**!

At the Environmental Learning Center, our mission is to connect people to nature. We want to encourage families to get outside, here's some tips to do it safely:

Please visit this website for the most up to date information on COVID-19 (coronavirus) in Larimer County. Larimer County is currently under a stay at home order; read more about the stay at home order here. This order currently allows outdoor recreation, as long as physical distance guidelines are adhered to.

- When you go outside, always **maintain at least 6 feet of physical distance** with people who do not live in your household.
- New guidance has come out about the use of facemasks, click the link to see the guidance from Larimer County: https://www.larimer.org/health/communicable-disease/coronavirus-covid-19/fabric-face-coverings
- **Be mindful of signs** posted in outdoor areas you visit. In most parks the playgrounds, picnic areas and bathrooms are closed.
- **Stay home** if you or your child feel sick.

Please practice everyday actions to prevent the spread of disease:

- **Frequently and thoroughly wash your hands** with soap and water for at least 20 seconds, especially after coming in from outside.
- If soap and water are not available, **use hand sanitizer** with at least 60% alcohol.
- **Avoid touching your eyes, nose, and mouth** with unwashed hands.

Scientist of the Week!

Do you like to learn about rocks and volcanoes? Did you know there are scientists who specialize in studying volcanoes? Watch this video about volcanologist Dr Heather Handley as she explains how she studies volcanoes and describes her favorite volcano to study:

https://www.youtube.com/watch?v=yEoPMhf99hg

Pre-Discussion Questions

Watch this video about the different rock types:
https://www.youtube.com/watch?v=tNs1gqkYerg

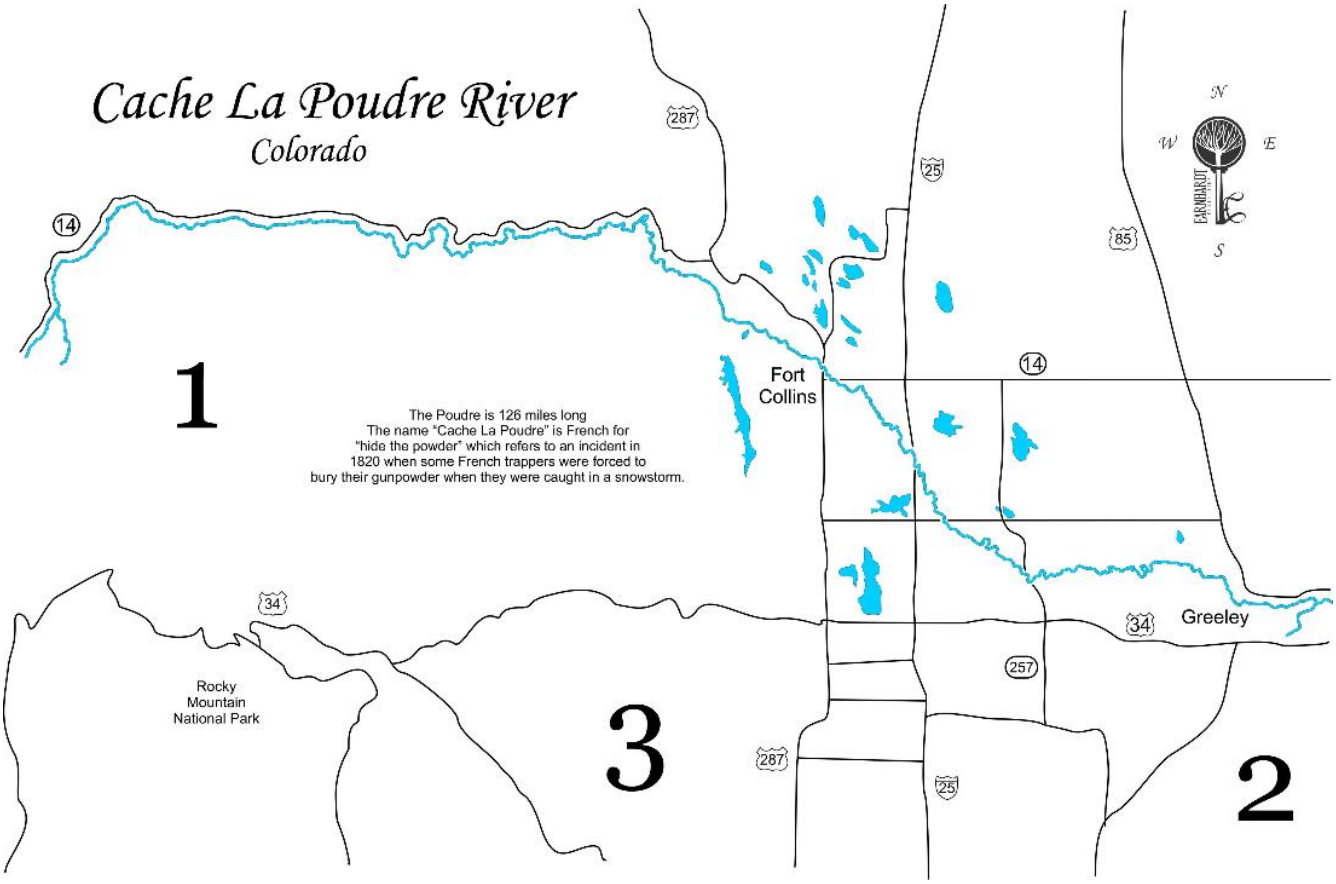
Then Discuss:

- What type of rocks do you think you'll find outside your home?

- Where can you find sediments in Fort Collins?

The Cache la Poudre River!

- Look at the map below and follow the Poudre river west from Fort Collins. Where do you think the sediments in Fort Collins originally started?



Activity 1: Types of Rocks

10 minutes

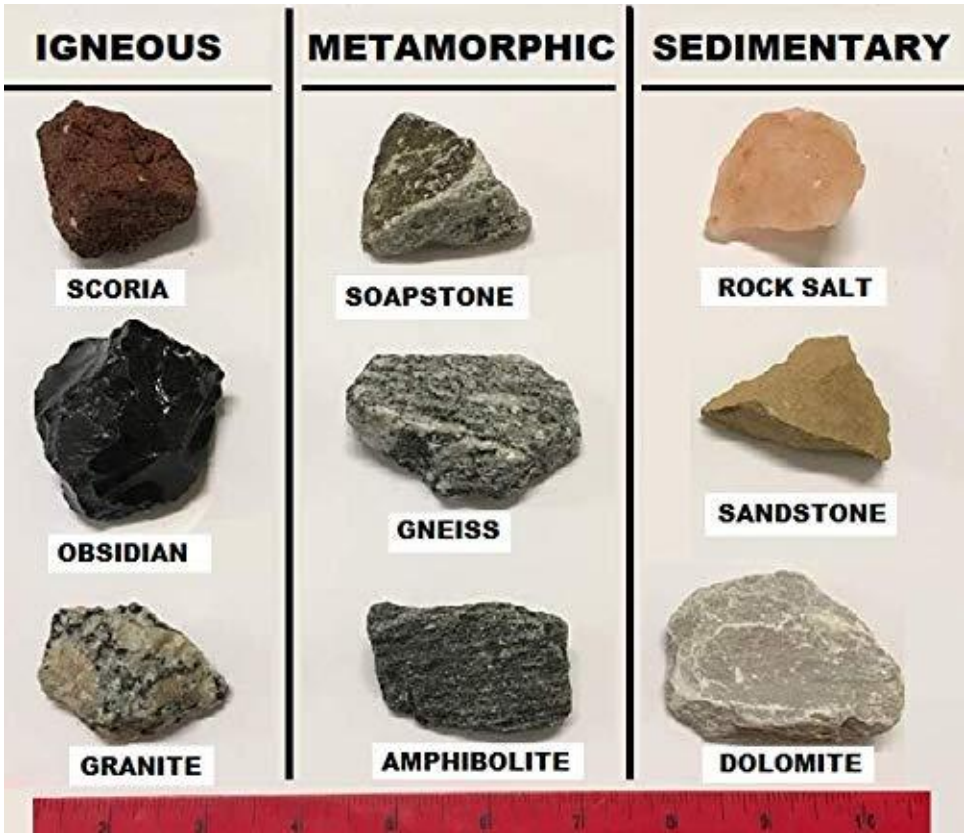
Materials: at least two people to play a game

Objectives:

- Identify and write the different types of rocks
- Play a game that explains how different types of rocks form

Introduction

1. There are 3 different types of rocks:
    a. Igneous – this rock is formed through **extreme heat** that **melts rocks** into a liquid. Most of these rocks are found in volcanoes!
    b. Metamorphic – this rock is formed with a combination of **heat and pressure** that changes a sedimentary or igneous rock
    c. Sedimentary – this rock is formed when layers of **sediment** stack on top of each other and pressure forces them into a single rock



Rockity, Rock, Rock Game

1. For this game, you will need a space to move around freely. There are three motions that are related to the three types of rocks:
    a. **Igneous** – make a "roof" shape over your head, like a volcano, and pretend to erupt from it

    b. Metamorphic – hold your arms close to your body or hug yourself and sway side to side while chanting "heat and pressure – heat – heat – and pressure"

c. **Sedimentary** - take your arms and place them over each other and wiggle your fingers and say “layers, layers, layers”

2. Practice these motions. When you feel comfortable with how to say the types of rocks and the motions that go with them, play Rockity, Rock, Rock. At least two people are needed to play this game, you can play with a sibling, parent, or any family member.
    a. First, decide who will be Player 1 and who will be Player 2.
    b. Player 1 says one of the types of rocks (igneous, metamorphic or sedimentary). Then Player 1 starts doing 5 jumping jacks. Player 2 has to do the motion for that rock type (see above) before Player 1 finishes their jumping jacks.
    c. If Player 2 does the wrong action or doesn’t complete the action before Player 1 finishes their jumping jacks, then Player 1 and Player 2 switch roles.
    d. Continue playing as many rounds as you want!
    e. If you have more than 2 Players, then Player 1 names the rock types and does jumping jacks while all the other Players do the rock motions.

Activity 2 Rock Scavenger Hunt

25 minutes

Materials: scientific journal, pencil, scavenger hunt list (see below)

Objectives:

- Identify and observe different geological features
- Use observation skills to describe or draw the differences between rocks

Scavenger Hunt!

1. Start by making a scientific journal to record and draw pictures of your found objects.
    a. This can be using scrap paper or an old journal/notebook.
2. Either copy down the scavenger hunt below into your journal or print this activity.
3. Now we challenge you to go outside and find some rocks! For each item listed below, draw what you find.

A Rock with Interesting Colors	**Deposition of sediments (lots of little rocks))**	**A Black Rock**
A Rock of Two or More Colors	**A Rough Rock**	**A Shiny Rock**
A Rock Smaller than your Pinky	**Soil or Sand**	**A Rock Shaped Like Something Else**
A Smooth Rock	**A Rock Bigger than Your Hand**	**A Rock with Layers**

Activity 3

45 minutes

Materials: scientific journal (scrap paper or old journal), pencil, camera/phone (optional), rock from the outdoors, “common objects” on the Mohs Hardness Scale chart (see below), magnet

Objectives:

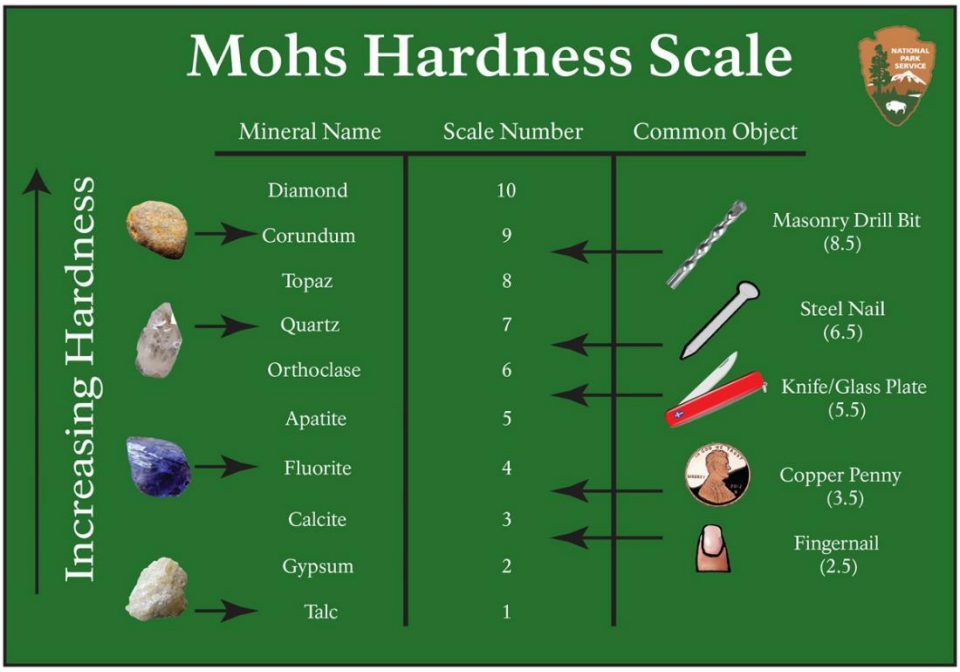
- Record observations about rocks you find outside
- Perform mineral tests that a geologist would perform
- Use the results of the mineral tests to try to identify your rock/mineral

Finding A Rock

1. Make a scientific journal to record your observations using scrap paper or an old journal/notebook.
2. Go outside and look for rocks. When you find a rock, make as many observations about your rock as you can.
    a. Where did you find this rock? What color is it? Does it have stripes or layers? Does it have holes in it?
    b. Draw a picture of your rock or take a picture on a phone or camera.
3. Try to find 3-5 rocks and record observations about each rock
4. Bring back one of the rocks that you found to do a couple of tests at home

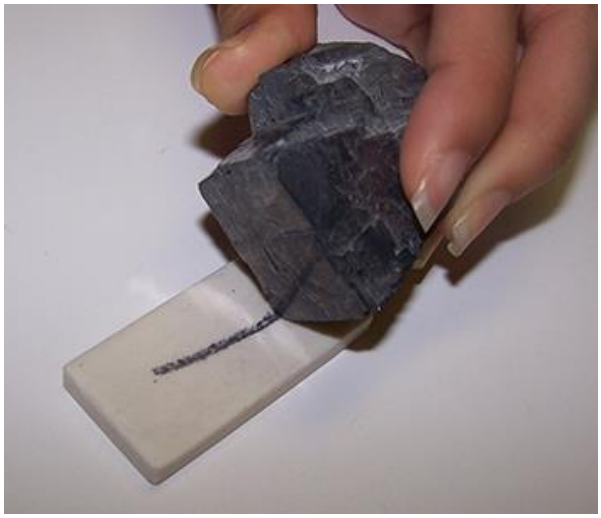
Mineral Tests with Rock (Adult supervision is required for all mineral tests)

1. With the rock you chose, find a place that you don’t mind getting messy and conduct the following tests.
2. **Hardness test:**
    a. Rocks and minerals all have different levels of **hardness** or how strong they are.
    b. Using whatever "common object” you have at home that match the chart below, see where on the scale your rock lies.
    c. Start at the bottom of the chart. Scratch the rock with the “common object.” If your rock makes a scratch on the “common object”, it is harder than that object and you can go up the chart to the next object to see if it can make a scratch on it. If the “common object” makes a scratch on your rock, your rock is softer than the object and you go down the chart until you find where your rock is on the scale.



Source: https://www.nps.gov/articles/mohs-hardness-scale.htm

3. **Streak test**
    - **a.** Find some concrete that you don't mind making scratches on and use your rock to make a streak on the concrete to see the actual color of your rock.
    - **b.** Record the color that you see on the concrete when you perform this **streak test.**
    - **c.** Geologists would usually use porcelain plates for this test, but since we don't have those materials, we will use what we have!



4. **Luster/Magnetic Test**
    a. Look at your rock and record whichever word best describes your rock:
        i. Glassy/vitreous (your rock shines like glass)
        ii. Earthy/chalky (dull/not shiny)
        iii. Metallic (looks like metal)
    b. If you have a magnet at home, for example a fridge magnet, you can test to see if your rock is magnetic.
        i. Magnetite and maghemite are minerals in rocks that make them magnetic
    c. Record your observations in your journal.
5. Now that you've performed the main mineral tests that geologists do, try to identify your rock/mineral from the following common minerals in Colorado:

Mineral Guide

Mineral Name	Color	Magnetism	Luster	Streak	Hardness
1. **Chromite** (*kroh' – mite)*	Black	no	non-metallic	Brown	5 ½
2. **Graphite** (*graf' – ite)*	Grey to black	no	non-metallic	Grey to black	<2 ½
3. **Pyrite** (*pie' – rite)*	Brassy yellow	no	metallic	Greenish-black	>5 ½
4. **Talc**	Powdery white	no	non-metallic	White	1
5. **Magnetite** (*mag' – ne- tite)*	Black	yes	non-metallic	Black	4 - 5 ½
6. **Hematite** (*hee' – mah- tite)*	Brownish-red	no	non-metallic	Reddish-brown	>5 ½
7. **Limonite** *(lie' – moh- nite)*	Brownish-yellow	no	non-metallic	Yellowish-brown	2 – 5 ½
8. **Galena** (*gah – lee' –nah)*	Lead-grey, silvery	no	metallic	Grey	2 ½
9. **Quartz** (*kwarts)*	Colorless, white	no	glassy	None	>5 ½
10. **Calcite** (*kal' – site)*	Colorless, white	no	glassy	Powdery white	3

Source: "Colorado Geology" activity from the Black Canyon of the Gunnison National Park's Outreach Education Department