Gunnison Gorge NCA Junior Ranger Program

Use this printable guide to take notes while you're out exploring! Then, submit your answers online.

Instructions

Materials:

- Writing utensil
- Colored pens/pencils or crayons
- Phone/camera

To get a badge: The number of questions you will need to complete depends on how old you are. For anyone under 10 years old, that number is your age. For example, if you are 8 years old, you will need to answer 8 questions. If you are 10 or over, you must complete 10 questions total. There are 7 questions which can be completed anywhere within GGNCA. There are also suggested trails and recreation sites, which each have 3-4 questions specific to that location. You can decide which locations look best for you!

Since you might not have service in some of these locations, you can use this document to see all the questions and for taking notes. When you have your answers ready, you can enter them on the Google Form. You should plan to submit your answers in **one sitting** so that nothing gets lost!

Once you submit the form, you will receive a **certificate** by email. You can bring this certificate to the Public Lands Center visitor center in Montrose or the Delta Public Library to get a **badge**.

➔ **FILL THIS IN:** I am _____ years old, so I need to complete _____ questions.

Other Resources

Point your smartphone camera at these QR codes. A link will appear at the top of your screen

COTREX

This is a great tool to use for navigating the NCAs. This free state-run website and app takes data straight from land managers to give people the most accurate maps and information. The mobile app shows your location on a trail even without cell service, and you can download maps ahead of time for even more information. All suggested trails in this program will include links to trailheads/trail segments on COTREX (web).

Avenza

This is another navigation app that can be useful when you lose cell service. Download geo-referenced maps ahead of time to have an accurate navigational tool while you're out exploring. The app also lets you drop pins and take notes and photos.

iNaturalist

Use this website/app to learn more about the plants and animals you see and hear while you're out on the land. When you upload photos and audio files, an Artificial Intelligence (AI) system can suggest identifications based on what's visually similar and found in the area. Once you share your observations and identifications, other users can give feedback to either confirm your identification or suggest something else.

1. Create an account
2. Select the "Observe" camera icon, bottom middle
3. Search through your camera roll or take a photo right then
4. You can add more photos to an observation, but the first photo will be the one iNaturalist analyzes for recommendations
5. Click "what did you see?" to view recommended identifications.
6. When recommendations pop up, click the information icon on the right to view species information

7. If uploading from your phone, it should already have information about when and where the photo was taken. If you're on your computer, try to add that information so that other users have key details to help with identification.
8. Click done in the upper right corner to share your observation!

Merlin

This app allows you to identify birds, although you'll need to have cell service to get real-time identifications. First, you'll need to set up an account and download a Bird Pack; the app will recommend packs based on your location, but the general North America pack should be sufficient. The app will walk you through a series of questions about the location and physical characteristics of the bird you saw. Once you have a list of possibilities, you can listen to audio clips of the birds' calls to confirm what you saw!

Rock'd

If you're curious about the geology around you, Rock'd is a great resource! The app shows geologic maps for your location. Click on the different colored sections to learn more about the age and type of rock in each formation and the environments that created them.

General Questions

These can be completed from anywhere inside the NCA.

1. The study of an area's plants and their traditional uses is known as **ethnobotany**. The following plants can be found in many locations throughout the NCA and have been important to people living in the area for food, medicine, or spiritual purposes. The information about these plants comes from the Ute Indian Museum in Montrose. Many of these practices are still alive and well today.

   Find one of the following plants and take a picture of it!

   Big Sagebrush: The leaves are used in a variety of spiritual ceremonies, often burned as an incense to purify the air. People used the leaves medicinally for stomach problems and to treat or prevent infection.

General Questions

Banana Yucca: The fruit, flowers, and stalks are edible. People also made twine by braiding fibers stripped from the leaves.

Utah Juniper: Every part of this common tree has a use. The bark is good for sandals, thatching (roof covering), woven bags, and rope. The leaves and berries contain vitamin C, which helps keep your immune system healthy for fighting off disease.

General Questions

Pinyon Pine: People collect pine nuts for food and the sticky sap is used for waterproofing the inside and outside of water baskets. Ute wickiup shelters are made with pine branches.


Coyote Willow: These are widespread along the banks of the Gunnison River- look for thin red branches when they don't have leaves. Dried outer bark and young spring shoots are both used for weaving. Willows also contain salicylic acid, the main ingredient in aspirin. Before aspirin was even invented, Ute people could make willow bark tea for headaches, fever, pain, and inflammation.


General Questions

Mormon Tea: Native people use this plant medicinally as a tea to treat a cold or cough. There is also a chemical in the plant, ephedrine, which is a stronger stimulant than caffeine. Mormon settlers learned how to make this tea from native people.

2. The Gunnison Gorge is famous for its **geology**. Along some parts of the river, there are big cliffs made up of rock that formed almost **2 billion** years ago! Ancient mountains formed on top of those rocks, but only small parts of them remain. Layers of sandstone lie on top of everything, formed by ancient sand dunes. The three main processes that created the current landscape over time are **weathering, erosion, and deposition.**

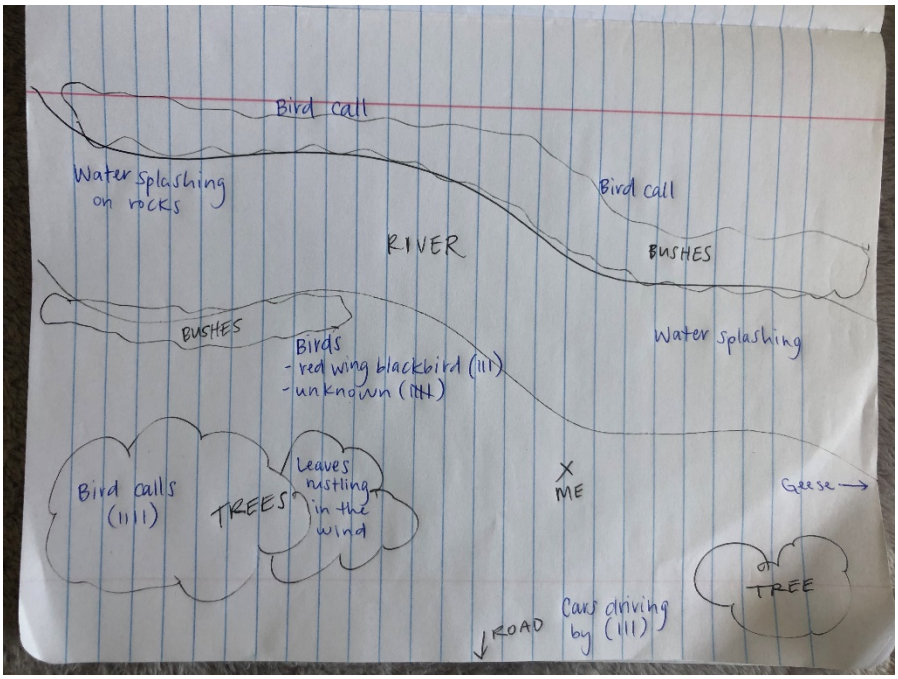
   Read the description of each process and choose which scenario it matches.

Process	Scenario
1) Weathering: The process of rock breaking down into smaller pieces.	A) A volcano erupts and creates a new lava field.
2) Erosion: The movement of sediment (soil, rock particles) from broken rock.	B) Water inside a huge crack in a boulder freezes overnight, expanding the crack and breaking off a few small pieces of rock.
3) Deposition: When material is dropped in a new place.	C) A huge thunderstorm carries tons of soil into the Gunnison River.

General Questions

3. **Soundscape mapping** is a fun way to notice more about your surroundings. You will need to find a comfortable place to sit for several minutes, as well as paper and a writing utensil. First, sketch out the area around you with general landmarks. Time to begin! Make a list of everything you hear for the next 5 minutes (or more!). As best you can, also mark down where the sounds came from on the sketch you made. This could be a good opportunity to use Merlin (see page 3) if you're interested in identifying the bird calls you hear, although you'll need to catch a glimpse of the birds themselves.

Create a soundscape map and photograph it. Use this example for reference if you have trouble with yours! Do you notice any patterns?



General Questions

4. *You will need to go to a location away from a river. **Biological soil crust** is a collection of living organisms that work together to keep soil in place and hold onto extra moisture. Cyanobacteria, very small organisms that can use light from the sun to make energy (**photosynthesis**), create the beginning structure of biological soil crust. The bacteria create a small network of threads, called filaments, in the soil that hold everything together and can form little towers or pinnacles. Cyanobacteria darken with age, so the darker the soil crust the older or more developed it is. Next, other organisms like lichen and moss can start to grow within the cyanobacteria structures. All of these organisms working together help keep soil in place and prevent erosion. **Erosion** happens when soil is carried away by wind or water. If too much soil is eroded away, plants can't grow! The organisms that make up the crust also help the plants around them by making nutrients more available.

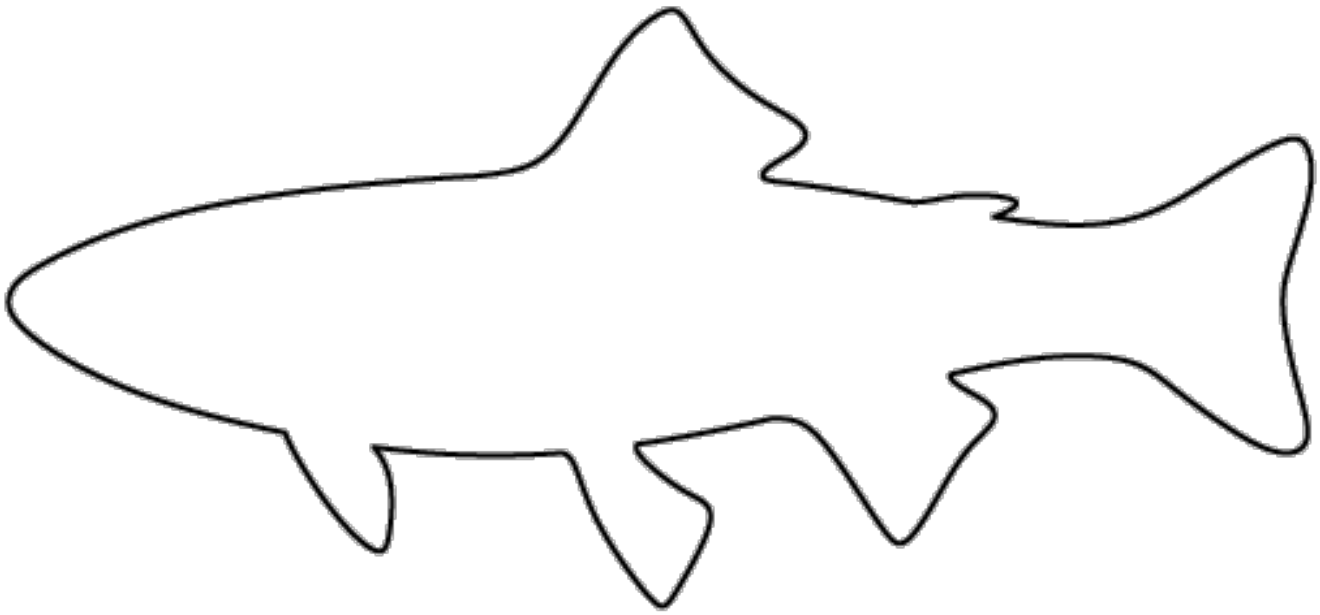
Find a patch of soil crust with moss (usually under plants) and pour a little bit of water onto it. What happens? Describe what you see.

(Moss like this is dried out and unhappy, so it might look like small black dots- this one is known as screw moss!)

General Questions

5. The Gunnison River is extremely important to wildlife living in this area, whether it's a source of food, water, or a place to live. The river has attracted people from around the world because its famous for its **rainbow trout** and brown trout fisheries. Unfortunately, rainbow trout in the Gunnison Gorge were almost wiped out by **whirling disease**. A parasite causes this infection, which leads to serious health problems for the affected fish including the behavior of swimming in circles- hence the name. In 2015, scientists found wild rainbow trout in the Gunnison River that were resistant to the disease, meaning they didn't get sick from it. Fish biologists from Colorado Parks and Wildlife capture eggs from these fish each spring, raise them until they are small fish, and release them into the Gorge early in the fall.

   Rainbow trout have a bright pinkish band running the length of their body from gills to tail. The area below the stripe is silver and fades to pearly white along the underside. Above the stripe, most fish are a silvery green-brown color. There are small black spots dotted around their back, fins, and tail. **Color in this healthy, whirling disease-resistant rainbow trout! Take a picture of your**



General Questions

6. Some insects make homes for themselves out of the materials around them. Bees create hives, ants dig nests, and tent caterpillars have their silk tents. But some insects go one step further to protect their offspring, and actually change the way plants grow to make a safe hideaway! These little homes are called galls. **Galls** are made by certain insects who lay their eggs into the leaves, buds, and stems of specific plants. When they lay their eggs, the insects pass along a chemical message (hormones) that hijacks the plant's growth to create these often quite bizarre-looking homes. Galls can also redirect nutrients and water into the gall tissue so that growing grubs have especially protective and nutritious surroundings! The relationship between the plant and the insect that made the gall is a type of **parasitism**. The insect gets the benefit of a nice safe place to live and food to eat, while the plant loses water and nutrients. Sometimes, if there are too many galls on one plant or if the galls are too big, the plant might not survive. The most common plants in Gunnison Gorge NCA to see galls on are willows, junipers, rabbitbrush, and sage.

   Find a gall and carefully dissect it (you should be able to use your fingernails). Describe what you found inside!

Top Left: Juniper Gall Midge
Top Right: Cotton Gall Midge, on Rabbitbrush
Bottom Left: Willow Cone Gall Midge (gall and larva)
Bottom Right: Medusa Bud Gall Midge (green) and Sponge Gall Midge (purple)

General Questions

7. Gunnison Gorge NCA is an example of **public land**. This means that although a government agency is responsible for managing the area, it is for everyone to enjoy. National Conservation Areas are a special type of public land that are protected for the plants and animals that live there, but also for human activities. Fishing, hiking, riding ATVs, camping, boating, and mountain biking are all ways that people can use this area. **Why are public lands important to you? What do you like to do on public lands?**

Site-Specific Questions

Some of these are recreation sites, where you can walk around and have a picnic. Others are trails that involve at least a little hiking. Each trail length is listed, though you may not need to hike the entire trail. Refer to the details provided under each bolded location.

Cottonwood Grove Campground

Recreation Site

1. **Beavers** live along the Gunnison River and like to find willows and cottonwoods to use for their dams and lodges. Beavers can chop down surprisingly large trees using their chisel-like front teeth. Beavers are rodents, which means their teeth never stop growing. Chewing helps wear down their teeth so that they don't have any problems! The bright orange color is caused by iron in their tooth **enamel**. This extra strong enamel is what causes the chisel shape of the teeth: it's easier to wear down the inner side, creating a sharp edge. While beavers are often a beneficial animal to have around, this area of the river is managed to be a good habitat for fish that like flowing water. To keep the beavers from bringing down too many trees, some of the cottonwoods in this area have metal **caging** around them. Beavers are quite determined though, so the caging doesn't always work!

   Take a picture of a chewed or caged tree!

   Hint: From the central parking area looking at the river, go towards the left, where there's a large cottonwood tree and a path leading towards the river. For beaver activity, look for broken branches with scrape marks made by beaver's sharp front teeth.

Cottonwood Grove Campground

2. This stretch of the Gunnison River has a **Gold Medal** designation from Colorado Parks and Wildlife, which means that it's an excellent place to fish for trout. Gold Medal waters are the highest quality cold water habitats! Gold Medal waters have to be able to produce a minimum of 12 trout that are at least 14 inches long per acre (an acre is a unit of area that's a little smaller than a football field). They also need to be able to produce 60 pounds of standing stock per acre. Standing stock includes all living organisms in the ecosystem, including fish, plant life, and small organisms like insect larvae. Also, the area needs to be accessible to the public.

   One of the rules anglers have to follow here is only using **artificial flies** or lures. Some people make these by wrapping a small fishing hook in feathers, thread, and thin wire to make it look like the insects that fish love to eat. For example, the dark flies on the left and the small ones in the bottom right corner of the blue tackle box look like the **aquatic larvae** of insects like stoneflies and mayflies. These insects are both very sensitive to pollution and need high levels of dissolved oxygen. Although good water quality doesn't always mean there will be big fish, it's an important part of keeping ecosystems healthy.

   How many people do you see out fishing? _____

Cottonwood Grove Campground

3. **Cottonwood** trees have been important to people in this area for a long time. Native people used cottonwoods as an essential part of daily life. Fallen branches, bark, and leaves are great for fires. In southeast Utah, people carved the soft wood into useful and strong dishes and containers. There is also a medicinal compound called **salacin** in the bark, buds, and leaves that can help with inflammation, fever, and pain. Pioneers new to this part of the country recognized cottonwoods as a sign that **water** was nearby, since these large trees need a lot of water to grow. Collect a few cottonwood twigs and look at the broken ends, or snap one open.

   What shape do you see in the middle? _____

Cool Rock Canyon Trail

2.4 miles one-way, but questions can be answered anywhere along the trail

1. Like the name suggests, this trail is known for its cool rocks! Hike in a little ways and you'll see cliffs up to either side of the canyon and big boulders closer to the trail. **Pick one rock/boulder along your walk to examine closely. Describe it with as many details as possible.** Think about things like texture, what it's made of, how big any grains inside of it are, and how it could have been shaped. Where do you think it came from?

Cool Rock Canyon Trail

2. Plants reproduce by a process called **pollination**, where pollen from the male part of a flower travels to the female part of a flower. Many plants depend on insects to transfer pollen- bees are famous for it! Yucca plants are special because each species of yucca is pollinated by just one species of moth. For banana yucca, it's the **nocturnal** (awake at night) pronuba moth. The moth and yucca each depend on each other and both benefit from their relationship, an example of **mutualism**. The moth pollinates the yucca when it climbs into the flowers to lay eggs, which then lets the plant make seeds. When those eggs hatch, the caterpillars have only one food source- the seeds! They eat just enough to survive and leave behind plenty. **Find a yucca plant**. Don't worry if it's the wrong time of year for flowers or seeds- even in the winter, the old seed pods are usually still attached!

   a. Is it currently flowering? If so, are there caterpillars inside the flowers?

   b. Does it have seed pods? They might already be open, but if the outside shells are there, it means this plant was pollinated!

Yucca plants

Yucca with new seed pods

Yucca with old, open seed pods

Cool Rock Canyon Trail

3. Many of the rocks along this trail are covered in **lichen**. Lichens are actually a combination of two different life forms, fungus and algae! The two work together to get water and make energy. This is an example of a **mutualistic** relationship, where two organisms work together and both benefit. By living together and cooperating, they both get something they need. **Commensalism** is a different type of relationship, where one organism benefits while the other isn't helped or hurt. **Parasitism** is when one organism gets a benefit, but only because the other organism is harmed by this relationship. These three close and long-term biological relationships between different organisms are all types of symbiosis. **Describe the most lichen-covered rock you can find. How many different types of lichen are on it? What color are they?**

Type of Symbiosis	Organism 1	Organism 2
Mutualism	Benefit	Benefit
Commensalism	Benefit	No Effect
Parasitism	Benefit	Harm

Gunnison Forks

Recreation Area

1. This is a popular spot for people floating the Gunnison River. Some people get on the water to reach more fishing spots, while others take out here after going through the challenging rapids upstream.

   How many boats and boaters do you see? Describe one of the boats!

2. It's always important to plan ahead and prepare before starting a river trip. One key factor boaters need to know is the current **flow rate**, which tells you how much water is in the river. If water levels are too low, you risk hitting rocks and other obstacles especially around the rapids. Too high, and there might be a dangerous amount of debris in the river. Go to https://waterdata.usgs.gov/co/nwis/uv/?site_no=09144250&PARAmeter_cd=00065,00060 and scroll down to the table to find the **Most Recent Instantaneous Value**. The unit will be in cfs, which stands for cubic feet per second. This tells you how much water is traveling through that spot along the river every second. One cubic foot is equal to about 7.5 gallons!

   What's the current flow rate? _____

Gunnison Forks

3. Gunnison Forks is at the **confluence** of the North Fork and the main stem of the Gunnison River. A confluence is where two streams come together and flow as one after that point. The Gunnison forms a "T" at this spot: The North Fork is coming from the east, the main stem is coming from the south, and the resulting river continues west below the confluence. The North Fork begins up in the mountains near the Paonia Reservoir at the confluence of Anthracite Creek and Muddy Creek. Muddy Creek adds a lot of **sediment** (soil, small bits of rock) into the North Fork during runoff season, when the snow in the mountains is melting. **Can you see any difference between the two forks of the river before they come together?**

Eagle Rock Shelter and Lawhead Gulch Trail

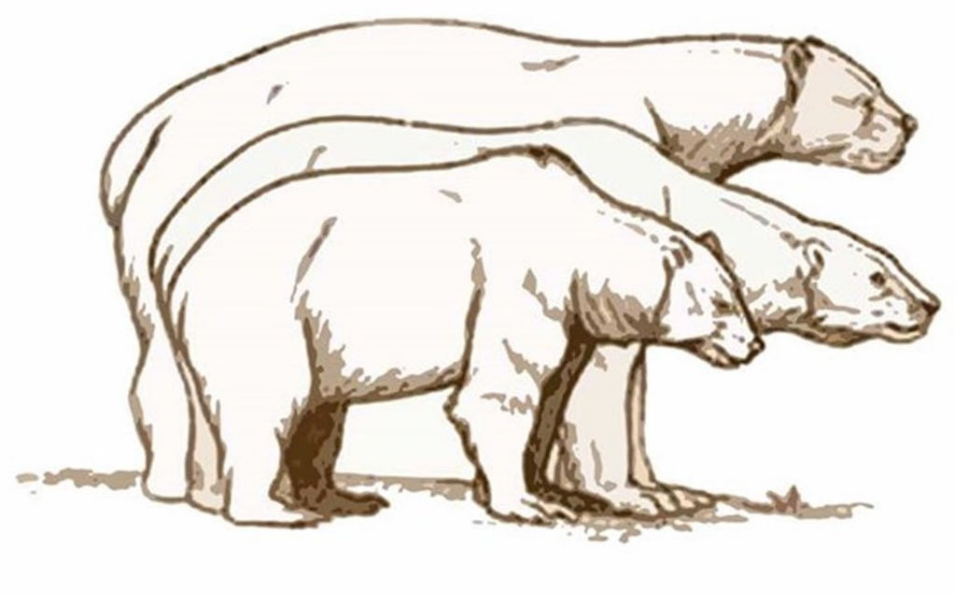
0.25 miles to shelter. Lawhead Gulch trailhead on COTREX is where the Eagle Rock Shelter Trail begins.

1. People lived at the Eagle Rock Shelter for almost 13,000 years, which makes it one of the oldest archaeological sites in North America. In 2007, archaeologists excavated the site, finding evidence that Native people had lived there for millenia. Why do you think people used it for so long? The key elements of a good place to live are food, water, and shelter. **What does this place offer in those three categories?**

2. One way we can tell that this location was important to people who used it is the **petroglyphs**, or images carved into stone. Archaeologists don't know exactly what these drawings mean to the people who made them; they might be maps, information about migration routes, or part of religious ceremonies. **What do you see in these panels- animals, people, objects?**

Eagle Rock Shelter

3. People first began living in the Eagle Rock Shelter about 13,000 years ago. The world looked very different back then! In 11,000 BCE, **megafauna** (giant mammals) like mastodons, mammoths, giant ground sloths, long-horned bison, North American horses, and the short-faced bear roamed this area. About a thousand years later, these megafauna species went **extinct**. This area would have had more trees, similar to what we see at higher elevations now: firs, ponderosa pines, transitioning to pinyon juniper woodlands. Since people didn't keep livestock yet, there was a larger variety of grasses in the meadows. The river was also wider! **Draw what you imagine this landscape looked like to the people who first lived here.**



Front: Grizzly bear

Middle: Polar bear (largest living bear species)

Back: Giant short-faced bear (extinct)

Eagle Valley Trail

1.25 miles, one-way

1. Early into your walk, you will come to a narrow **slot canyon** with layered walls on either side. This marks the boundary of different rock formations; Mancos Shale and two similar formations, the Dakota (or Naturita) Formation and Burro Canyon Formation. The area before the canyon is **Mancos Shale**, which is soft and easily erodes into rounded hills also known as badlands. This is what is left from the muddy floor of an ancient inland sea that was here 75 million years ago. It contains fossils like giant clam shells and shark teeth! The **Burro Canyon** deposits are from a river environment and its floodplain, while the **Dakota/Naturita Formation** was more of a swampy beach ecosystem. Look for bumps in the sandstone you're walking on- those were made by waves!

   Take a picture of the slot canyon but keep an ear out for mountain bikes and dirt bikes- this is a shared use trail.

2. On the left side of the trail soon after the slot canyon, you will see a dark black seam in the rock. This **coal** is a product of a coastal swamp here approximately 100 million years ago. Over time, the leftover organic material (from living things) was compressed into coal. From the small **adit**, or mine entrance, we can tell people once mined this coal. In other areas of the Gunnison Gorge NCA, people used to mine for mica and uranium. However, mining is no longer allowed inside the National Conservation Area. Please **do not** try to enter this adit; remember the phrase "stay out, stay alive!" Cave-ins, wild animals, old explosives, and poisonous air are all potential dangers in old mines.

   Take a picture of the adit!

3. This trail got its name from three eagle nests tucked away in the sandstone cliffs. Eagle nests, also called eyries, are usually found in tall trees or cliffs and are always near water. Bald eagles will reuse nests from year to year and keep adding to them. In the Gunnison Gorge, we have both bald and golden eagles.

   Take a picture of a bird's nest along the trail. If you can't find one, take a picture of a spot that you think would be a perfect nest location!

Eagle Valley Trail

4. At the end of the Eagle Valley Trail, it climbs to meet the Sunset Rocks Trail. Turn right on Sunset Rocks and follow it out to a point where you get a good view of the valley below. Looking straight out,

    - Montrose is southeast of you (a little to the left)
    - Dominguez-Escalante NCA and its canyons are northwest of you (a little to the right)
    - The Grand Mesa is to the north (right)

    What can you see to the south?