

GEORGIA DISCOVERY QUEST

Pre and Post Trip Manual



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Program Overview

This field trip through the Alice H. Richards Children's Garden invites students to discover and interact with the natural wonders of Georgia. All activities are aligned with the Georgia Standards of Excellence, STEAM and Habits of Mind for K-5. Students will discover the diversity of plants, animals, cities, river systems and natural wonders of Georgia as they walk across a fourteen foot map of Georgia made of Elberton granite. A bog area filled with carnivorous pitcher plants allows students to investigate these unique habitats that are found in Georgia. A replica of Sitton's Cave is integrated into their discovery of our rich geologic diversity. A fossil filled wall facilitates discussion and analysis of our geologic history. A large Dig and Grow area provides students with examples of sustainable growing practices. A root zone viewing area provides a visual glimpse into the wonders of underground plant ecosystems. This overview of Georgia promises to stimulate students to discover and learn more about our state.

Guidelines and Expectations

Prior to the field trip, please review the following guidelines with your students:

- When in the Visitor Center and gardens, do not pick a plant or flower without permission from your guide or teacher. This includes grabbing at leaves as you walk by them. If instructed, touch the plants gently to feel the texture or to smell scents.
- Stay on the pathways unless otherwise instructed by your guide or teacher. There are many tiny plants that are put on the edges so you can see them, but they can also be easily hurt by a misplaced shoe.
- Listen carefully to your guide's directions and information. There are several beautiful gardens to explore, but if you get lost it will be no fun for you, your teachers, or your classmates.

Resources

Bog facts for kids:

- <https://kids.kiddle.co/Bog>

Useful books for the classroom:

- 101 facts about rivers (101 Facts about Our World) by Barnes, Julia
- 24 hours in the wetlands (Day in an Ecosystem Set 1) by Schomp, Virginia
- All about forests (Little Pebble: Habitats) by Gardeski, Christina Mia
- All about forests by Mack
- All about forests by Santos, Penelope
- All about wetlands (Little Pebble: Habitats) by Gardeski, Christina
- At home in the wetlands (At Home in the Biome) by Spilsbury, Louise
- Pitcher plants eat meat! (World's Weirdest Plants) by Linde, Barbara M

YouTube resources for children:

- Water cycle--<https://youtu.be/y5gFl3pMvol>
- What is a watershed?--<https://youtu.be/QOrVotzBNto>
- Water cycle song--<https://youtu.be/TWb4KIM2vts>
- Soil (dirt)--<https://youtu.be/fqOYsSfTtbg> (Sid the Science Kid: 26 min)
- Rivers and watershed/basins resources--
<http://georgiainfo.galileo.usg.edu/topics/geography/article/georgia-rivers/oconee-river> and <https://garivers.org/other-georgia-rivers/oconee-river.html>
- Oconee river facts--<https://garivers.org/>
- GA River network, paddle GA, information, family events, conservation
- Okefenokee Swamp --<http://www.gpb.org/blogs/education-matters/2018/03/19/gpb-taking-students-on-live-virtual-exploration-of-the-okefenokee>

What is your Ecological Address?

<https://www.eenorthcarolina.org/resources/your-ecological-address>

Essential Questions

What are the different environmental factors that make up where we live/go to school?

Where do the resources we use every day come from?

Are there any impacts on the environment from our use of resources?

Background Information/Procedure

You know what street you live on, what town or county you live in, but do you know your ecological address? Your ecological address can tell you a lot about your place in the natural world.

Ecology is the branch of biology that deals with the relations of organisms to one another and to their physical surroundings. It involves the relationship between the abiotic (not living) and the biotic (living).

There are nine parts to your ecological address: Topography, Soil, River Basin, Groundwater, Wetlands, Biodiversity, Air, Climate, and Energy. Below are several questions for students to research relating to each part of their ecological address. These may be explored through class investigations, student projects, or however you see fit.

1. Topography

- Topography describes the terrain of the land. Terrain is a geographic area or a piece of land, including its physical features (examples: hilly, flat, mountains, valley, high, low, etc.)
- Georgia has five unique regions divided by their topography. Each of these regions has unique soils, geology, and plant and animal communities.
- Do you live in the Blue Ridge, Ridge and Valley, Cumberland Plateau, Piedmont, or Coastal Plain region of Georgia?

2. Soil

- Soil is the top layer of the earth's surface. It is made of weathered (chemically or physically broken down) rock and decayed organic (living or once living) matter.
- What kind of soil do you see where you live?

Georgia Standards of Excellence:

S2E3, SS2G1, S3L2, SS3G1 S3L1, S3L2, S4L1

Time: 60+ minutes
(can be divided into segments)

Objectives: students will...

- Research the different ecological factors unique to your school's location in Georgia
- Understand our connection to and impact on the environment and resources around us

Supplies:

- Maps of Georgia
- Access to local weather, energy, water use data
- Materials to record data on biodiversity walk around school (clipboards, paper, pencils, etc.)

- What color is your soil and what does that indicate about its nutrients, or substances that provide nourishment essential for growth and the maintenance of life?
- See *post-trip section for a classroom soil exploration activity.*

3. River Basin

- A river basin is the land that water flows across or under on its way to a river.
- Which river basin do you live in?
- Can you find out where your water comes from when you turn on the faucet?
- Where does your wastewater go?

4. Groundwater

- Groundwater is the water found in cracks and spaces between sand, gravel, and rocks below the ground surface.
- An aquifer is an underground layer of water-bearing rock. Water-bearing rocks are permeable, meaning that they have openings that liquids and gases can pass through.
- Groundwater can be pumped to the surface through a well and pump system. These wells can be for individual homes, communities, or towns and cities.
- Many people in Georgia and around the world get their drinking water from groundwater sources.
- Where does your drinking water come from?

5. Wetlands

- A wetland is an area where the level of the surface water is at, near, or above the ground surface for part of the year. Do you live near a wetland?
- Marshes, swamps, and bogs are examples of wetlands.
- Wetlands act like giant sponges. They soak up water when it rains which keeps places from flooding.
- Wetlands help clean pollutants out of water. Water pollution is any change in the physical, chemical, and biological properties of water that has a harmful effect on living things. It affects all the major water bodies of the world, such as lakes, rivers, oceans, and groundwater. Examples: chemical runoff from lawns and farms, oil films from roads and parking lots, animal waste from the land, soil erosion entering the water from logging/construction areas/mines, and industrial waste from manufacturing.

6. Biodiversity

- Biodiversity is the number of plants and animals in an area. (Bio- means life)
- Sometimes when one plant or animal becomes extinct, the whole ecosystem feels the effects.
- How many different plants and animals can you find in your schoolyard?
- Which plants and animals are native to Georgia and which were introduced from somewhere else?

- The generally accepted principle is that native plants are those plants which have inhabited a particular region for thousands of years. Arguably, plants that were present in a particular area prior to European settlement.
- Georgia's Native Plants: <https://gnps.org/georgias-native-plants/>

7. Air

- Air is mostly made up of nitrogen and oxygen gases, and it surrounds the earth and makes life possible.
- Like water, air can be polluted.
- What kinds of things might pollute the air around you? (Examples: exhaust from lawnmowers, blowers, weed eaters, cars, trucks, factories, four-wheelers, trains, power plants, animal waste, etc.)

8. Climate

- Climate refers to the average weather conditions in an area over a long period of time.
- How much rain or snow do you see in a year?
- How hot or cold does it get where you live and for how many days a year?

9. Energy

- Energy is the ability to do work. We need energy for everything we do.
- Our bodies get energy from food.
- We often use energy in the form of fossil fuels to light up our homes and travel in cars and buses.
- A fossil fuel is a fuel (such as coal, oil, or natural gas) formed in the earth from plant or animal remains over millions of years.
- Think about the energy that you use in a day. Where does your electricity come from? Does any come from renewable resources?
- How does your food get to your table? How far did it travel to get there? What resources were used to produce it?

Further Exploration: Ecological Footprint

- Every one of us leaves behind an ecological footprint. We all need and use natural resources to survive. Driving habits, eating habits, and household activities can affect the size of that footprint.
- How large is your footprint? Find out at <https://www.footprintnetwork.org/resources/footprint-calculator/> (requires email address)

Investigating Soil at School

Background Information:

Soil: the loose surface material of the earth in which plants grow

Rock: a solid made up of different minerals

Leaf litter: decomposing but recognizable leaves and other debris forming a layer on top of the soil, especially in forests

Mineral: Minerals make up Earth's rocks, sands, and soils. Minerals are found on Earth's surface as well as deep underground. Minerals are inorganic substances, meaning that they do not come from an animal or a plant.

Loam: a fertile soil of clay and sand containing humus

Humus: dark, organic material that forms in soil when plant and animal matter decays

Nutrients: a substance or ingredient that promotes growth, provides energy, and maintains life

Grain: a small hard particle (a grain of sand)

Texture: the structure, feel, and appearance of something

Soil fertility: rich, capable of producing life

Minerals make up Earth's rocks, sands, and soils on the surface and deep underground. Soils are formed over long periods from the weathering and breakdown of minerals and other natural materials such as rocks and plants. Minerals are inorganic substances, meaning that they do not come from an animal or a plant. They can be made from a single element (like gold or copper) or from a combination of elements. The Earth is made of thousands of different minerals.

Around 99% of the minerals in the Earth's crust are made up of eight elements; oxygen, silicon, aluminum, iron, calcium, sodium, potassium, and magnesium. Common minerals include quartz, feldspar, bauxite, cobalt, talc, and pyrite. Our bodies need certain minerals so we can grow healthy and strong.

Crops need nutrients just like people do. A fertile soil will contain all the major nutrients for basic plant nutrition (nitrogen, phosphorus, and potassium) as well as other nutrients needed in smaller quantities.

Georgia Standards of Excellence:

SKE2, S1L1, S3E1

Time: 40-60+ minutes

Supplies:

- Metal spoons/trowels
- Collection bags/containers
- Markers to record data on bags
- Thermometer
- Magnifying glasses (opt.)
- Paper for soil drawing
- Empty, clear jar
- Seeds for planting in soil samples (opt.)

Soil has been a defining component of cultures since the beginning of civilization. Some of the first written words were recorded on clay tablets and water was carried in clay pitchers. It provides the base for all buildings (although some may be able to support a skyscraper and some others may not be able to support your weight), it holds the clues of past cultures (to be revealed by archeologists or erosion), and it supports the web of life (providing materials to build houses, connecting all ecosystems).

When plants and animals die, they break down into nutrient rich compounds. These compounds keep the soil healthy and fertile. This natural process also ensures that the Earth does not become polluted with the remains of dead animals and plants. Healthy soil has a lot of organic matter, such as old leaves, manure and worm castings in it. Healthy soil is dark and rich, and water drains out of it, but not too quickly. Water and wind can wash the soil away, but natural mulches like fallen leaves, grasses, weeds and sticks help keep the soil in place and prevent soil erosion.

Procedure:

1. Soil Collection

Pose the following questions to students as they collect soil samples at various sites on your school grounds:

- Is the soil hard or easy to dig?
- If it's hard, how can you loosen it?
- Is the soil wet or dry?
- Does it get wetter or drier as you dig deeper?
- What is the temperature?
- What does the soil feel like? Smell like? Look like?
- Do you see anything besides soil in your sample? Seeds, leaves, bugs?
- Are there plants growing near your sample?
- Do people walk on this site? (Is it compacted?)
- Is it shady or sunny during the morning or afternoon?
- Does it appear that a plant or seed would have an easy time putting down roots for nutrients?

In your group time you can compare and contrast the answers to the questions and discuss different factors that would affect the soil.

Indoor option: Ask children to bring in soil (dirt) samples from home in a container. Transfer the samples to baby food or jelly jars. These samples can be looked at as a large group.

2. Soil Drawing

Use the soil samples collected from different locations on the school campus or brought in by students to begin an artistic exploration of soil characteristics. Take a pinch of soil and rub it on a white sheet of paper without adding water. This process helps children feel the texture of different soils and notice the different color

rubblings the varied soil samples make. Allow students to use descriptive words for texture, color, smell, and drawing ability. Try creating a picture by just using soil smudges! They can also make a rainbow by sharing different soil samples with their classmates. This activity can be done outside or inside on newspaper for easy clean up.

3. Soil Analysis

Use an empty glass jar or clear plastic container to make layers of various soil samples. Students can then draw their observations and color them different shades to recognize that all soils are not the same. A terrarium can also be made using the soils.

4. Extension

Students can use the soil samples to plant identical seeds and keep all variables constant - light exposure, temperature, water, amount of soil - to see if the soil may make a difference in germination and growth.