The Erosion Patrol

Educator Guidebook

2026 Revision - 3rd Grade



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The Erosion Patrol

Educator Guidebook

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Welcome to the Patrol!



Dear Educator,

Welcome to The Erosion Patrol! We are thrilled to have you join us. This comprehensive packet was thoughtfully designed using an interdisciplinary approach to enhance your third-grade plants and ecosystem curriculum. Created specifically for educators, this kit directly integrates and expands upon core objectives from the North Carolina Standard Course of Study across science, language arts, mathematics, social studies, and visual arts while simultaneously introducing college and career readiness pathways in erosion and sedimentation control.

We hope these ready-to-use materials and engaging activities enrich your current lessons and inspire your students to explore the impacts of erosion within their own communities.

Program Objectives:

- Understand the harm sediment, as a pollutant, can cause and the importance of plants in our ecosystem as a way to reduce erosion and sedimentation within our communities.
- Apply Erosion Patrol practices within educational programs.
- Create a collaborative community of erosion and sedimentation control stewards across North Carolina.

Introduction



What did you have for breakfast this morning? Was it only a cup of coffee? Maybe you had some cereal or a roll. Did you have cream in your coffee or milk on your cereal? Perhaps you skipped breakfast, got dressed, and drove your car to work.

Consider the source of all the things that helped you start your day. Broken down to their most basic elements, they all came from the soil. That's right! The beans that were ground to make your coffee grew on a tree that needed soil to thrive. The wheat used to make your cereal or roll also came from a plant that grew in rich soil. The soil grew the grass that fed the cow which produced the milk or cream that went into your coffee. The raw materials used to produce your clothing, coffee mug, and even your car ultimately came from the soil beneath our feet.

As you can see, soil is one of the most basic and important natural resources on Earth. As educators, it is important that we teach soil conservation to our students. Sediment is the largest single pollutant, by volume, in North Carolina's lakes, rivers, and streams. Students should understand how to recognize erosion and the measures that can be taken to prevent soil erosion and sedimentation. They should also recognize that soil is home to many forms of life and understand the importance of preserving the quality of our land for future generations.

Why Conserve Soil?



Soil is a basic resource that is easily taken for granted. We rarely give much thought to the soil beneath our feet or whether it will always be there for us to use. Therefore, it is important to ask the question, "Why should we conserve soil?"

Many people simply accept that soil exists and never wonder where it comes from. Soil is a natural body that results from the interaction of five soil-forming factors. These five soil-forming factors are:

- **Climate** involves the temperature and precipitation that influence the chemical reactions involved in soil formation from geologic material.
- **Topography** refers to the slope, position, and aspect of the land where soil forms.
- **Parent Material** is the geologic material from which soil develops. It determines the types of minerals found in the soil and influences the type of soil that forms.
- **Organisms** include all living things, such as earthworms, humans, microorganisms, and plants, that influence soil formation.
- **Time** is required for soil to form from parent material. Over many years, parent material is slowly weathered into the soil that surrounds us. It can take 500 to 1,000 years to form just one inch of topsoil.

We must conserve soil because it takes hundreds of years to form, yet a single rain event can wash it away.

Why Conserve Soil?



There are hundreds of reasons to conserve our soil, but most of these reasons can be grouped into four categories.

- **Humanitarian** - Soil gives life to green plants. High soil productivity has allowed the United States to become one of the world's leading producers and exporters of agricultural products. If our soil is not protected, we may not be able to grow enough food to sustain ourselves and the millions of people around the globe who depend on agricultural products for nourishment.

- **Economic** - Poor soil quality reduces crop yields, which can increase food prices for consumers and lower profits for farmers. In addition, repairing erosion damage on construction projects can be extremely expensive, and those costs are often passed on to taxpayers and consumers.

- **Environmental** - Soil helps filter our drinking water and keeps rivers, lakes, and streams clean. When soil washes away as sediment, it can harm aquatic habitats, reduce water quality, and contribute to flooding. Healthy soil is also essential for supporting wildlife habitats and sustaining forests.

- **Recreational** - We must preserve our soil to help maintain the beauty of our natural surroundings. Without proper conservation practices, we risk losing scenic landscapes, parks, trails, and other recreational areas that people enjoy for relaxation and outdoor activities.

How Can You Help?

Being an Erosion Patrol Scout



Protecting soil is not just the responsibility of scientists, engineers, and environmental professionals. Every person can play a role in preventing erosion and protecting natural resources. Small actions taken by individuals can have a positive impact on soil health, water quality, wildlife habitats, and community safety.

Students can become "Erosion Patrol Scouts" by practicing simple stewardship habits in their everyday lives. Staying on designated trails helps prevent unnecessary soil disturbance and protects plant roots that hold soil in place. Leaving natural materials such as rocks, sticks, and fallen leaves where they are found helps maintain ground cover and reduces erosion. Planting native vegetation strengthens soil stability because plant roots help anchor soil and absorb rainfall.

Students should also be encouraged to observe their surroundings and report signs of severe erosion to a trusted adult. By recognizing erosion problems and understanding how they can be addressed, students become active participants in protecting their communities and the environment.

Through these actions, students learn that protecting soil is a shared responsibility and that even small efforts can make a meaningful difference.

Meet the Erosion Patrol



There are many careers that focus on the health and safety of the Earth and its inhabitants, some that we will learn about in this guide include:

- **Soil Scientists** - Specialists who study, map, analyze, and manage the chemical, physical, and biological properties of soil. They often collect soil samples while they help support agriculture, protect natural habitats, and ensure healthy ecosystems.
- **Field Technicians** - Specialists who collect data and conduct observations in the field. They may measure water quality, monitor erosion, inspect construction sites for proper upkeep of best management practices, and assist scientists and engineers with environmental projects.
- **Landscape Architects** - Specialists who study, map, analyze, and manage the physical, ecological, and structural properties of outdoor spaces. They help support communities, protect natural habitats, and ensure functional, sustainable ecosystems.
- **Horticulturists** - Specialists who study, breed, cultivate, and manage the growth, health, and production of plants. They help support agriculture, protect natural biodiversity, and ensure healthy, productive botanical ecosystems.

The Erosion Patrol

Lesson Plans



Field Journal Activity

Field notebooks are used by a variety of professionals. In this initial activity, students will become familiar with the purpose of field notebooks and prepare and decorate their field notebook for use throughout the activities in this packet.



Vocabulary

Field Notebook
Hand Lens
Munsell Color Chart
Saftey Gear
Soil Probe
Shovel

Duration: 30 minutes

Location: Indoors/classroom

Materials: (For each student)

- Student Intro Packet
- Field Notebook Printable
- Coloring utensils
- Stapler

Preparation

- Download the field notebook printable as a PDF.
- Open in Adobe Acrobat.
- Print using booklet settings.

Procedure

1.) ***Opening Question*:** What types of professionals use field notebooks? What other tools do they use?

2.) Introduce the ***Field Notebook Activity*** and guide students through the different members of the Erosion Patrol. Discuss each career, the role they play in protecting the environment, and the tools they use in their work. Who are the erosion patrol?
   - Who are the Erosion Patrol Members?
   - What do they do?
   - Why are they important?
   - What tools do they use?

3.) After discussing the careers, students will choose a member of the Erosion Patrol they are most interested in and draw themselves in that role, including the tools they would use.

4.) Explain how scientists and environmental professionals use notebooks to record observations, collect data, and organize information.

5.) Students will assemble their field notebooks and decorate the covers using coloring materials. Encourage students to personalize their notebooks while incorporating elements related to environmental science or the Erosion Patrol.

Field Journal Activity



Assessment

The teacher will assess student understanding through observation, participation in class discussions, and completion of lesson activities. Students will demonstrate their understanding by:

- Participating in discussions about the members of the Erosion Patrol and the tools they use.
- Drawing themselves as a member of the Erosion Patrol and including appropriate tools or equipment related to their chosen role.
- Explaining the purpose of a field notebook and how it can be used to record observations and collect information.
- Succesfully assembing and personalizing their field notebook for use throughout future activies.

Closure: Students will share one Erosion Patrol career and explain how that professional helps protect soil and/or water resources.

Learning Targets

- I.1.2 Construct compelling questions that promote inquiry with peers.
- I.1.5 Understand academic and domain-specific words in sources to create responses to compelling questions.
- I.1.10 Construct responses to compelling questions with specific claims and information from teacher-provided sources.

What Do Plants Need?

Students will explore and observe what plants need to grow through a hands-on experiment while comparing the different conditions between each plant to determine which factors help plants grow. Students will record their observations and use their results as a way to measure their differences.



Vocabulary

Plant
Seed
Sunlight
Water
Soil
Grow
Observe

Duration: 2 weeks

Location: Indoors/classroom

Materials: (For each group)

- Field Notebook Printable
  - Activity #1
- 6 small, clear cups
- 12 lima beans for each group
- Soil
- Water
- Marker
- Ruler

Procedure

1.) **Opening Questions:** What are some things you need to grow? What do plants need to grow?

2.) Have students discuss the questions with a partner and write down their ideas. Bring the class together to discuss what they think they need and plants need to grow.

3.) Introduce the experiment and explain that students will test different conditions to determine what plants need to grow.

4.) Divide students into groups and provide each group with the materials needed for the experiment. Have students arrange the six cups according to the directions in their **Field Journal**, making sure each cup is labled correctly.

5.) Review the conditions for each cup with students and discuss how each cup is different. Make sure students understand that only cups 3, 5, and 6, should recieve water.

6.) Have students place the cups in an appropriate location and observe their plants each day. Students shoul record their observations and any changes they notice in their **Field Journal**.

7.) After the experiment is complete, have students review their observations and compare the growth of the plants in each cup.

8.) Bring the class together for a discussion. Ask students which plants grew the best and which grew the lease. Encourage students to use their observations from the experiment to explain why.

9.) Have students complete the **Wrapping Up** section of their **Field Journal** by answering what plants need to grow and drawing the cups that produced the best and worst growth.

What Do Plants Need?



Assessment

The teacher will assess student understanding through observation, participation in discussions, and completion of the Field Journal. Students will demonstrate their understanding by:

- Identifying factors that plants need to grow.
- Recording observations and changes throughout the experiment.
- Comparing the growth of plants under different conditions.
- Using observations from the experiment to explain why some plants grew better than others.
- Identifying the conditions that helped plants grow best.

Learning Targets

- I.1.2 Construct compelling questions that promote inquiry with peers.
- I.1.5 Understand academic and domain-specific words in sources to create responses to compelling questions.
- I.1.10 Construct responses to compelling questions with specific claims and information from teacher-provided sources.
- LS.3.2.1 Carry out investigations to explain the structures and functions of plants and how they are essential for life.
- LS.3.3.1 Carry out investigations to explain how environmental conditions determine how well plants survive and grow.
- NC.3.MD.2 Solve problems involving customary measurement.
  - Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit.

What is Soil?

Students will explore what soil is and learn about the different materials that make up soil. Through hands-on observation and a sorting activity, students will examine sand, silt, and clay and compare their size, color, and texture. Students will then use their observations to solve the Great Soil Mystery and identify different soil samples.



Vocabulary

Soil
Dirt
Sand
Silt
Clay
Ecosystem

Duration: 30 - 45 minutes

Location: Indoors/classroom or outdoors

Materials: (For each group)

- Field Notebook Printable
  - Activity #2
- Writing and or coloring utensils
- Samples of sand, silt, clay

Procedure

1.) ***Opening Question*:** What is the difference between soil and dirt?
2.) Have students discuss the opening question with a partner and write down their ideas. Bring the class back together and discuss their responses.
3.) Allow students time to complete the soil sorting activity. Encourage students to think about how soil and dirt are different.
4.) Discuss what sand, silt, and clay are. Have students describe each type based on observable characteristics such as particle size, color, and texture.
5.) Introduce **The Great Soil Mystery**. Explain that students will use what they have learned about sand, silt, and clay to identify three unknown soil samples.
6.) Divide students into groups of 3-4 and provide each group with three samples labeled A, B, C. Have students examine each sample and complete the questions in their **Field Journal** activity.
7.) After students have has time to examine the samples and complete the activity, bring the class together to discuss their answers. Have students share their observations and explain how they identified each sample.

What is Soil?



Assessment

The teacher will assess student understanding through observation, participation in group discussions, and completion of the Field Journal activity. Students will demonstrate their understanding by:

- Identifying sand, silt, and clay based on their observable characteristics.
- Comparing soil samples using particle size, color, and texture.
- Using observations to identify unknown soil samples.
- Explaining how they determined which type of soil was in each sample.

Learning Targets

- I.1.2 Construct compelling questions that promote inquiry with peers.
- I.1.5 Understand academic and domain-specific words in sources to create responses to compelling questions.
- I.1.10 Construct responses to compelling questions with specific claims and information from teacher-provided sources.
- LS.3.3.2 Construct an explanation to infer how the basic properties and components of soil determine its ability to support the growth and survival of many plants.

What's The Right Way to Plant Your Garden?



Students will explore how the way soil is plowed and tilled can change how erosion occurs. Through a hands-on experiment, students will create different soil patterns and simulate rainfall to observe how water moves across the soil. Students will compare the different patterns of erosion they observe.

Vocabulary

Plowing
Tilling
Erosion
Soil
Run Off

Duration: 30-45 minutes

Location: Indoors/classroom

Materials: (For each group)

- Field Notebook Printable
  - Activity #3
- 2 Aluminum Pans
- Soil
- Water
- Spray bottles

Procedure

1.) ***Opening Question*:** Think about a farm field. What does it look like? Do you see lines or rows in the soil? Why do you think farmers make these rows?
2.) Have students share their ideas about why farm fields may have lines or rows in the soil.
3.) Introduce the terms plowing and tilling and explain how farmers use these practices to prepare soil for planting. Discuss how different ways of preparing the soil can affect what happens
4.) when it rains.
Introduce the activity and explain that students will create different soil patterns and simulate rainfall to observe how water moves across the soil.
5.) Divide students into groups and provide each group with two aluminum pans, soil, water, and a spray bottle. Have students follow the instructions in their Field Journal to prepare their pans.
6.) Have students create the different soil patterns shown in the activity. Explain that each pan represents a different way soil may be plowed or tilled.
Have students use the spray bottle to simulate rainfall over each soil pattern. Encourage
7.) students to observe how the water moves and where the soil begins to wash away.
Have students record their observations and answer the questions in their Field Journal.
8.) Bring the class together to compare the results. Ask students how the erosion looked different between the two soil patterns and which pattern appeared to slow the movement of water or soil.
9.) Discuss how farmers can use different plowing and tilling practices to help reduce soil erosion.

What's The Right Way to Plant Your Garden?



Assessment

The teacher will assess student understanding through observation, participation in group discussions, and completion of the Field Journal activity. Students will demonstrate their understanding by:

- Identifying and describing different plowing and tilling practices.
- Observing how water moves across different soil patterns.
- Comparing the patterns of erosion produced by each soil setup.
- Explaining how different plowing and tilling practices can affect soil erosion.
- Using observations from the experiment to support their conclusions.

Learning Targets

- I.1.2 Construct compelling questions that promote inquiry with peers.
- I.1.5 Understand academic and domain-specific words in sources to create responses to compelling questions.
- I.1.10 Construct responses to compelling questions with specific claims and information from teacher-provided sources.
- LS.3.3.1 Carry out investigations to explain how environmental conditions determine how well plants survive and grow.
- LS.3.3.2 Construct an explanation to infer how the basic properties and components of soil determine its ability to support the growth and survival of many plants.
- ESS.3.2.1 Use models to compare Earth's saltwater and freshwater features (including oceans, seas, rivers, lakes, ponds, streams, and glaciers).

Where Will My Seed Grow?



Students will investigate how the location of a seed can affect its growth. Students will plant seeds in three different locations, make predictions about which location will produce the best growth, and observe their plants over four weeks. Students will record their observations and compare the growth of their plants to determine which location was best for growing.

Vocabulary

Seed
Plant
Grow
Soil
Sunlight
Water

Duration: 4 weeks

Location: Indoors/classroom or Outdoors

Materials: (For each group)

- Field Notebook Printable
  - Activity #4
- 3 seeds
- Soil
- 3 cups, if planting indoors
- Writing utensils
- 3 designated outdoor locations, if planting outdoors
- 3 location markers, such as popsicle sticks
- Water

Procedure

1.) ***Opening Question*:** Where do you think a seed would grow best? What makes a good place for a plant to grow?
2.) Have students discuss their ideas with a partner and share their predictions with the class. Review what plants need to grow before beginning the activity.
3.) Explain that students will plant seeds in three different locations to investigate how location can affect plant growth.
4.) Divide students into groups and provide each group with the materials needed for the experiment. Have students choose three different locations for their seeds and record the locations in their Field Journal.
5.) Have students plant one seed in each location. Students should follow the directions in their Field Journal and make sure each seed receives the same amount of water.
6.) Have students make a prediction about which location they think will produce the best growth and which will produce the least growth. Have students record their predictions in their Field Journal.
7.) Have students check their seeds each week for four weeks and record their observations in their Field Journal. Encourage students to observe and record changes in the plants as they grow.
8.) After four weeks, have students compare the plants from each location. Discuss which location produced the best growth and which produced the least growth.
9.) Have students complete the Wrapping Up section of their Field Journal by explaining what they did to help their seeds grow and drawing a picture of each plant.

What's The Right Way to Plant Your Garden?



Assessment

The teacher will assess student understanding through observation, participation in discussions, and completion of the Field Journal activity. Students will demonstrate their understanding by:

- Identifying factors that can affect plant growth.
- Making a prediction about which location will be best for growing a plant.
- Recording observations and changes in plant growth over time.
- Comparing the growth of plants from different locations.
- Using their observations to explain which location was best for growing and why.

Learning Targets

- I.1.2 Construct compelling questions that promote inquiry with peers.
- I.1.5 Understand academic and domain-specific words in sources to create responses to compelling questions.
- I.1.10 Construct responses to compelling questions with specific claims and information from teacher-provided sources.
- LS.3.2.1 Carry out investigations to explain the structures and functions of plants and how they are essential for life.
- LS.3.3.1 Carry out investigations to explain how environmental conditions determine how well plants survive and grow.
- NC.3.MD.2 Solve problems involving customary measurement.
  - Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit.

The Erosion Patrol and the Case of the Missing Roots!



This comic introduces students to the essential professionals who manage erosion and sediment control in our communities. Through this narrative, students will learn about various career roles, the tools these experts use, the importance of environmental protection, and the use of plants and groundcover to protect soil and their communities.

Vocabulary

Soil Scientist	Soil
Field Technician	Mud
Horticulturist	Plant
Landscape Architect	Native Plants
	Roots

Duration: 30 minutes

Location: Indoors/classroom

Materials: (For each student)

- The Erosion Patrol and the Case of the Missing Roots comic book

Procedure

1.) Have students **read as a class or on their own**. Provide the following comprhension questions to answer as a group or individually:

2.) Review the highlighted vocabulary words and discuss their meanings.

3.) Facilitate a class discussion using the following comprehension questions:

- What kind of environmental problems occur during rain showers?
- Why do you think the playground was so muddy?
- What should the Erosion Patrol do to help stop the playground from being so muddy?
- Would you have handled the situation differently? Why or why not?
- What do the different highlighted words mean?

4.) Encourage students to support their answers using evidence from the comic.

The Erosion Patrol and the Case of the Missing Roots!



Assessment

The teacher will assess student understanding through participation in class discussions, responses to comprehension questions, and vocabulary application. Students will demonstrate their understanding by:

- Identifying environmental problems related to the story
- Explaining how members of the Erosion Patrol work together to solve environmental challenges.
- Using key vocabulary correctly in discussions and responses.
- Supporting their answers with information from the comic.
- Describe how plants can aid in decreasing erosion.

Learning Targets

- I.1.2 Construct compelling questions that promote inquiry with peers.
- I.1.5 Understand academic and domain-specific words in sources to create responses to compelling questions.
- I.1.10 Construct responses to compelling questions with specific claims and information from teacher-provided sources.
- RL.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- RL.3.3 Describe characters in a story and explain how their actions contribute to the sequence of events.

The Erosion Patrol

Glossary



Glossary



Clay – The smallest type of sediment particle. Clay particles hold water well and are often sticky when wet.

Conservation – The careful use and protection of natural resources to ensure they remain available for future generations.

Dirt - Displacement or unwanted soil that has been removed from its natural environment. Dirt is loose, lacks the structured nutrients or living organisms found in healthy ecosystems, and is typically found on clothes, floors, or tools.

Ecosystem – A community of living organisms and the nonliving parts of their environment that interact with one another.

Environment – Everything that surrounds an organism, including living things, land, water, air, and other natural features.

Erosion – The movement of soil, rock, or sediment from one place to another by water, wind, ice, or gravity.

Field Notebook – A notebook used by scientists and environmental professionals to record observations, measurements, and data.

Field Technician – A professional who collects data, conducts observations, and assists with environmental investigations in the field.

Ground Cover – Vegetation or materials placed on the soil surface to protect it from erosion and reduce runoff.

Hand Lens – A small magnifying tool used to closely examine rocks, soil, plants, and other natural materials.

Humus - The dark, decayed organic matter found in soil. Humus adds essential nutrients to the ground and improves the soil's ability to hold water.

Minerals - Naturally occurring inorganic elements found within the earth. Minerals break down over time to form the nutrient basis of healthy soils.

Moisture - The liquid water content present within soil and plant tissues. Moisture dissolves nutrients so they can be easily absorbed by living things.

Glossary



Munsell Color Chart - – A standardized book of color chips used to classify and identify the exact color of soil. The Munsell Color Chart translates visual data into specific codes for hue, value, and chroma so scientists can consistently communicate soil properties worldwide.

Nutrients – Substances that living things need to grow and survive. Soil nutrients help plants develop healthy roots, stems, and leaves.

Particle size - The specific dimension and measurement of individual soil grains. Particle size determines how well a soil drains water and circulates air.

Precipitation – Atmospheric water that falls to the earth's surface as rain, snow, sleet, or hail. Precipitation acts as a primary source of fresh water for ecosystems.

Root – The underground network of a plant. Roots anchor the plant firmly into the ground and absorb water and nutrients from the surrounding soil.

Safety Gear – Equipment worn to protect people from injury while working or conducting investigations.

Sand – A type of sediment particle larger than silt and clay. Sand feels gritty and allows water to drain easily.

Silt – A sediment particle that is smaller than sand but larger than clay. Silt feels smooth and powdery when dry.

Soil – A natural mixture of minerals, organic matter, water, air, and living organisms that supports plant growth.

Soil Probe – A tool used to collect and examine soil samples below the ground surface.

Wind Erosion – The removal and transport of soil particles by wind.