

*Education Programs offered through Randolph Soil and Water

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Lessons below can be modified for any grade level.

If you would like a lesson on a particular topic not listed, please contact me and I can design a lesson to fit your needs.

Education programs are for formal and non-formal education groups.

Click the links below to go directly to the lessons and standards for the grade you are teaching.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade
5th Grade	6th Grade	7th Grade	8th Grade	High School

[Additional Lessons Offered](#)



Kindergarten

Essential Standard	Clarifying Objectives	Lessons
<p>LS.K.1 Understand the characteristics of living organisms and nonliving things.</p>	<p>LS.K.1.1 Engage in argument from evidence to summarize the characteristics of living organisms and nonliving things in terms of their: structure, growth, changes, movement, basic needs LS.K.1.2 Use models to exemplify how animals use their body parts to obtain food and other resources, protect themselves, and move from place to place.</p>	<p>Discover Diversity- students take “mini-hikes” in small areas and look at the plants and animals with magnifying glasses, student then record observations of what they saw and then we have a class discussion to share their findings NC Wildlife Habitats- this lesson talks about habitat needs for wild animals, we focus on wildlife that is found in NC and play an interactive game outside to show how food, water, space and shelter are viable for wildlife to live Bird Beak Buffet- students use different utensils to gather food, just like a bird uses their beaks. Each utensil represents a different beak type.</p>
<p>LS.K.2 Understand characteristics of organisms that make them alike and different.</p>	<p>LS.K.2.1 Analyze and interpret data to compare the characteristics of different types of the same animal to determine individual similarities and differences.</p>	<p>Bird Adaptations- as a group, we will look at different bird adaptations used for finding food, flying, color, etc. then they will draw a picture of their own bird species with some of the adaptations we talked about The Closer You Look- students will look at different characteristics of trees, we will begin by having them draw a picture of a tree from memory then we will head outside to observe tree characteristics in person</p>
<p>ESS.K.1 Understand change and observable patterns of weather that occur from day to day and throughout the year.</p>	<p>ESS.K.1.1 Analyze and interpret data to compare changes in the environment due to weather.</p>	<p>Water Pollution Demonstration- as a class we add different ingredients to a tub of water while we tell a story of how the water became polluted Erosion Demonstration- we compare 2 bottles of soil to see which one has more erosion when it “rains”, students can feel the soil samples and see the water as it drains through the soil</p>

1st Grade

Essential Standard	Clarifying Objectives	Lessons
LS.1.1 Understand the basic needs of a variety of plants and animals in different ecosystems.	LS.1.1.1 Obtain, evaluate and communicate information to summarize the needs of different plants and animals.	NC Wildlife Habitats- this lesson talks about habitat needs for wild animals, we focus on wildlife that is found in NC and play an interactive game outside to show how food, water, space and shelter are viable for wildlife to live Albemarle-Pamlico Estuarine System Virtual Field Trip- we embark on a virtual field trip to look at the different habitats that make up the A-P estuarine system, after traveling students group animals based on their habitats and then sort them out into producers, consumers or decomposers
ESS.1.2 Understand the physical properties of Earth materials.	ESS.1.2.1 Obtain, evaluate, and communicate information to summarize the physical properties of Earth materials, including rocks, minerals, soils and water.	The Rock Cycle- explore the rock cycle by playing a game that shows how rock material moves from place to place The Incredible Journey- students travel through the water cycle to discover the journey of a water droplet, they track each destination to have a conversation on how their state of matter changed based on different circumstances Soil Bottles- to see the different properties of soil, students shake bottles with different soil types and make observations about how long it takes for the soil to settle Diggin' in the Dirt- students examine the difference between sand and soil by using their senses of sight and touch Seed Growth Comparison- compare sand, potting soil and local soil to see which soil type provides the best environment for the seeds to grow

ESS.1.3 Understand that natural resources are important to humans.	ESS.1.3.1 Obtain, evaluate and communicate information to summarize ways in which humans use natural resources. ESS.1.3.2 Engage in argument from evidence to explain ways that humans can protect natural resources in the environment.	To till or Not to Till- using an erosion demonstration model, we look at how farmers use different plowing methods to help protect the fertile soil in their fields Introduction to Waste- lesson focused on teaching students where their garbage goes after it leaves their home and how they can recycle or make compost
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2nd Grade

Essential Standard	Clarifying Objectives	Lessons
LS.2.1 Understand animal life cycles.	LS.2.1.1 Summarize the life cycle of animals: • Birth • Developing into an adult • Reproducing • Aging and death	Monarch Marathon- students participate in an outdoor activity to show how monarch butterflies migrate after we discuss and look at the stages of life of the butterfly
LS.2.2 Understand that organisms differ from or are similar to their parents and other offspring based on characteristics of the organism.	LS.2.2.1 Identify ways in which many plants and animals closely resemble their parents in observed appearance and ways they are different.	Grow as we Go- we look at different life cycles of animals and compare how they look as babies to adults

3rd Grade

Essential Standard	Clarifying Objectives	Lessons
LS.3.3 Understand how environmental factors aid in the survival of plants.	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.	Soil Properties- students work in small groups to learn about soil compaction, percolation and texture and how each of those properties influences plant growth Seed Plant Life Cycle- students will dissect a seed and then see the way a plant grows when it is germinated Caring for the Land- in small groups, students examine how different environmental and agricultural factors affect plant growth by reading different scenarios to identify cause, effect and solutions Keeping Soil in Its Place- in this hands-on activity, students look at the effects of water on exposed soil which then leads to discussion on erosion control practices

4th Grade

Essential Standard	Clarifying Objectives	Lessons
LS.4.1 Understand the effects of environmental changes, adaptations, and behaviors that enable organisms to survive in changing habitats.	LS.4.1.1 Use models to explain that plants and animals have external structures that function to support survival. LS.4.1.3 Engage in argument from evidence to explain how differences among animals of the same population sometimes gives individuals an advantage in surviving and reproducing in changing habitats.	Adaptation Artistry- students use their creativity to create a new species of bird after we discuss and look at adaptations of bird species Bird Beak Buffet- using different tools, students learn how different bird beaks are used to gather food
ESS.4.2 Understand patterns of change in the Earth's surface over time.	ESS.4.2.2 Carry out investigations to classify rocks as metamorphic, sedimentary or igneous based on their composition, how they are formed and the processes that create them.	The Rock Cycle- explore the rock cycle by playing a game that shows how rock material moves from place to place

5th Grade

Essential Standard	Clarifying Objectives	Lessons
ESS.5.1 Understand how Earth systems (hydrosphere and atmosphere) impact patterns of weather and climate.	ESS.5.1.4 Use models to explain how the sun's energy drives the processes of the water cycle (including evaporation, transpiration, condensation, precipitation and runoff).	The Incredible Journey - students travel through the water cycle to discover the journey of a water droplet, they track each destination to have a conversation on how their state of matter changed based on different circumstances
LS.5.3 Understand the interdependence of plants and animals within their ecosystem.	LS.5.2.1 Engage in argument from evidence to compare the characteristics of several common ecosystems (including estuaries and salt marshes, oceans, lakes and ponds, rivers and streams, forests, and grasslands) in terms of their ability to support a variety of populations. LS.5.2.2 Use models to classify organisms within an ecosystem according to the function they serve: producers, consumers, or decomposers. LS.5.2.3 Use models to infer the effects that may result from the interconnected relationships of plants and animals to their ecosystem.	Albemarle-Pamlico Estuarine System Virtual Field Trip - we embark on a virtual field trip to look at the different habitats that make up the A-P estuarine system, after traveling students group animals based on their habitats and then sort them out into producers, consumers or decomposers

6th grade

Essential Standard	Clarifying Objectives	Lessons
<p>ESS.6.2 Understand the lithosphere and how interactions of constructive and deconstructive forces have resulted in changes in the surface of the earth over time.</p> <p>ESS.6.3 Understand the reciprocal relationship between the lithosphere and humans.</p>	<p>ESS.6.2.3 Use models to explain how the rock cycle and its relationship to the formation of soil (including how different types of soil come from different types of rocks)</p> <p>ESS.6.3.1 Engage in argument from evidence to explain that the good health of humans and the environment requires: monitoring of the lithosphere, maintaining soil quality and stewardship.</p> <p>ESS.6.3.2 Obtain, evaluate, and communicate information to compare the implications of sustainable and unsustainable land use practices (including agriculture and deforestation) and the importance of stewardship.</p>	<p>The Rock Cycle- explore the rock cycle by playing a game that shows how rock material moves from place to place</p> <p>Soil Properties- students work in small groups to learn about soil compaction, percolation and texture and how each of those properties influences plant growth</p> <p>How No-Plow Farmers try to save our Soil- can be an extension of a social studies lesson on the Dust Bowl, this demonstration shows students the effects of how plowing soil creates erosion. After looking at the results we then discuss the improvements that have been made in the agriculture industry to prevent another Dust Bowl from happening</p> <p>Enviroscape- watershed model to show the effects of pollution on water quality, certain areas focus on maintain soil quality</p> <p>To till or Not to Till- using an erosion demonstration model, we look at how farmers use different plowing methods to help protect the fertile soil in their fields</p>
<p>LS.6.2 Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.</p>	<p>LS.6.2.2 Analyze and interpret data to predict how the abiotic factors (such as temperature, water, sunlight, and soil quality) of biomes (freshwater, marine, forest, grasslands, desert, Tundra)</p>	<p>Trophic Transfer- working as an assembly line, the class models organic production and energy loss through the different trophic levels in an ecosystem</p> <p>Albemarle-Pamlico Estuarine System Virtual Field Trip- we embark on a virtual field trip to look at the different habitats that make up the A-P estuarine system, after traveling students group animals based on their habitats</p>

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7th grade

Essential Standard	Clarifying Objectives	Lessons
ESS.7.1 Understand the atmosphere and how the cycling of water relates to Earth's weather and climate.	ESS.7.1.3 Analyze and interpret data to explain the relationship between the movement of air masses, high and low pressure systems, frontal boundaries and weather conditions that may result.	Raindrops and Ranges- using various maps, we analyze the climates of NC and compare it to land use, as well as why certain animals live in particular areas of the state. In discussion about climate we also compare to other states in the US with varying climates.
ESS.7.2 Understand the reciprocal relationship between the atmosphere and humans.	ESS.7.2.1 Engage in argument from evidence to explain that the good health of humans and environment requires: monitoring of the atmosphere, maintaining air quality and stewardship ESS.7.2.3 Obtain, evaluate, and communicate information to explain the impacts on humans and mitigation strategies of potentially hazardous environmental factors (including air quality index, UV index, Heat index, wildfires) and storms (hurricanes, blizzards, tornadoes, severe thunderstorms, floods)	Forecasting Air Quality- students will look at maps and data from a day in 2011 in Charlotte, NC to make an air quality forecast, along the way they will learn about ground level ozone and the pollutants present. The lesson wraps up with discussion on ways we can prevent air pollution. Lichen or Not- students will participate in a Citizen Science project to submit data about Lichens found on their school grounds, we will then have a conversation on how lichen are environmental indicators

8th grade

Essential Standard	Clarifying Objectives	Lessons
<p>LS.8.2 Understand how organisms interact with and respond to the biotic and abiotic components of their environment.</p>	<p>LS.8.2.1 Explain how factors such as food, water, shelter and space affect populations in an ecosystem.</p> <p>LS.8.2.2 Summarize the relationships among producers, consumers, and decomposers including the positive and negative consequences of such interactions including: • Coexistence and cooperation • Competition (predator/prey) • Parasitism • Mutualism</p>	<p>Oh deer! – demonstration game to show the relationship between deer and factors in their ecosystems that affect their population</p> <p>Good Buddies- students participate in a matching game to find their “good buddy”. Once they find their buddy they have a discussion using guiding questions about their relationship, we then review the definitions of commensalism, mutualism and parasitism and classify the sets of buddies</p>
<p>ESS.8.2 Understand the hydrosphere including freshwater, estuarine, ocean systems</p>	<p>ESS.8.2.1 Use models to explain the structure of the hydrosphere including: water distribution on earth, local river basins, estuaries, and water availability.</p>	<p>Albemarle-Pamlico Estuarine System Virtual Field Trip- we embark on a virtual field trip to look at the different habitats that make up the A-P estuarine system, after traveling students group animals based on their habitats and then sort them out into producers, consumers or decomposers</p> <p>A Drop in the Bucket-using a demonstration, students will see how much water is available for use and how much water is in glaciers, oceans and freshwater, then they will incorporate math to see how much water is actually available per person</p>

<p>ESS.8.3 Understand the reciprocal relationship between the hydrosphere and humans.</p>	<p>ESS.8.3.1 Analyze and interpret data to predict the safety and potability of water supplies in NC based on physical and biological factors, including: temperature, dissolved oxygen, pH, nitrates and phosphates, turbidity and bio-indicators</p> <p>ESS.8.3.2 Engage in argument from evidence to explain that the good health of humans requires: • Monitoring of the hydrosphere • Water quality standards • Methods of water treatment • Maintaining safe water quality • Stewardship</p>	<p>Enviroscape- watershed model to show the effects of pollution on water quality, local river basins are discussed as well as the watersheds in Randolph County, maintaining water quality practices are also discussed</p> <p>What can Bugs tell us about Water Quality? - students investigate water quality issues in Aquatown by identifying macroinvertebrates that were collected at different sites along the Aquatown River and determine causes of the water pollution based on the species collected</p> <p>Reaching your Limits-this demonstration helps students visualize the process that happens at wastewater treatment plants to meet the drinking water standards and what happens when things go wrong</p>
<p>ESS.8.4 Understand the environmental implications associated with the various methods of obtaining, managing, and using energy resources.</p>	<p>ESS.8.4.1 Construct an explanation to classify the primary sources of energy as either renewable (geothermal, biomass, solar, wind, hydroelectric) or nonrenewable (coal, petroleum, natural gas, nuclear)</p> <p>8.P.2.2 Explain the implications of the depletion of renewable and nonrenewable energy resources and the importance of conservation.</p>	<p>Mining for Resources- students play a competitive game to see who can mine the most non-renewable resources. After collecting data, we have a class discussion about their results and what they observed while doing the activity then relate it to how companies are mining for non-renewable resources</p> <p>To till or Not to Till- using an erosion demonstration model, we look at how farmers use different plowing methods to help protect the fertile soil in their fields</p>

High School

Enviroscape- watershed model to show the effects of pollution on water quality, local river basins are discussed as well as the watersheds in Randolph County, maintaining water quality practices are also discussed

Soil Texturing- students learn how to do a soil texture test by collecting soil samples and answering questions in a flowchart to determine if they are working with sand, silt or clay soils

Amazing Grazing- using scenarios, students build a food system to meet their needs and learn about the efficient use of renewable resources, each scenario directs students to understand why grazing is an environmental best management practice

Water Filter Challenge- before doing this lesson, teachers will need to have students bring in some items to complete this challenge. Using minimal items and directions, students invent a way to make dirty water clean.

Soil Matters Board Game-students play a board game to keep their soil healthy and functioning to support growing food for our population

Additional Activities

Tracks!- This lesson requires me to set up an animal tracking station the day before on the school campus. The tracking station includes a pile of flour, popsicle stick with peanut butter and wildlife camera. As a class we check on the tracking station the next day, students use a chart with animal tracks to try and identify which animal(s) have visited the area. They then get to make a track impression for them to take home (depending on time left in class).

Agriculture Based Lessons- available on many topics to show how conservation practices are used in the agriculture industry.

Nature Journals- students create nature journals, we then use them over a period of time to make observations and recordings about different objects in nature

Tree related Lessons- can provide multiple lessons based on different topics related to trees