

1st Grade Agriculture Program Plan

NC Science Standards: 1.L.1.1, 1.L.1.2, 1.L.1.3, 1.L.2.1, 1.L.2.2

Discussion:

Say "People need food. Animals need food. Do plants need food?"

- Talk about how plants need food, but they make it themselves.

Say "People can prepare food and cook food, but can they 'make' food in their bodies?"

- Talk about how we have to get food from plants or animals.

Ask "What do plants take in that they could use to make food?"

1. ...through their roots? [A: water]
 2. ... through their leaves? [A: sunlight]
 3. ... through the tiny holes on the underside of their leaves? [A: air/CO₂]
- Ask "What else do people bring into their bodies besides food and water (or drinks)?" [A: air/oxygen]

Ask "Why do people need to eat food?". [A: for energy, growth, etc.]

Ask "Why do plants need the food they make?". [A: for energy, growth, etc.]

Activity:

Lead students in acting out plants taking in water through their roots, sunlight through the top of their leaves, and air (CO₂) through the underside of their leaves.

Watch Video: <https://vimeo.com/436129545>

Discussion:

Say "Some of you probably take vitamins and all of us get vitamins in the healthy foods we eat. Plants need more than just water, sunlight, and air (CO₂) to grow and stay healthy. They need additional nutrients too – minerals like nitrogen, phosphorous, potassium, calcium, magnesium, sulfur, and more."

- Ask "Where do you think plants get these nutrients since plants don't swallow vitamin tablets?". [A: from the soil or fertilizer]
- Ask "How do you think the nutrients get into the plant: through its flowers, leaves, roots, stems, or seeds?". [A: roots]

Ask "Could you fit 100 more people in your kitchen and still be able to get food out of the refrigerator and have the family fix meals in there?". [A: no]

- Ask "So do people need space in order to live?". [A: yes]
- Ask "Would a pine tree that grows big enough to be a Christmas tree be able to fit in a space the size of a shoebox?". [A: no]
- Ask "So do plants need space in order to live too?". [A: yes]

Ask "Are you likely to see plants where it's very cold and icy like the North Pole?". [A: no]

- Ask “Are you likely to see plants where it’s very, very hot like the sun?” [A: no]
- Ask “So do plants need a certain range of temperatures that are not too hot and not too cold?”. [A: yes]

Say “We breathe air in and out of our nose or mouth. We breathe in oxygen that our bodies need. We breathe out carbon dioxide that our bodies need to get rid of. Plants do the opposite. They take in carbon dioxide and get rid of oxygen.”

- Ask “Plants don’t have noses or mouths. They take in the air they need through tiny holes on the underside of their leaves. Where do you think they get rid of the air they don’t need: through the same holes on the underside of their leaves, through their roots, or through their flowers?” [A: holes on underside of leaves]

Activity:

Say “Different kinds of plants grow in different places. The types of plants that grow somewhere depend on the conditions and type of soil. See if you can match the types of plants to the places they are most likely to grow in North Carolina.”

Watch video: <https://vimeo.com/436148351>

Say “Different soils can be found in different places. Differences in soils affect how they help plants grow. Soil may be made of sand, silt, clay, organic matter, or a mixture of these.”

- Sand grains are big enough to see easily.
- Silt grains are the next smaller sized grains.
- Clay-sized grains are too small to see without a magnifier. If you wet clay, it makes mud.
- Organic matter in soil could be dead plants, dead animals like bugs, or other tiny things that are alive or used to be alive. Soil with a lot of organic matter is usually dark-colored.
- Most plants grow best in soil that is a mixture of sand, silt, and clay (called loam) and organic matter.
- In the mountains of NC, there is a lot of loam (made of sand, silt, and clay). In the piedmont, there is a lot of clay. In the coastal plain, there is a lot of sand and organic matter in the soil.

Name _____

Plant Activity Worksheet 1st Grade Agriculture Program

Draw lines to match the plants to where they grow (lines will not be horizontal):

Plants	Area where they grow (not in order)
<p>Virginia pine, loblolly pine, dogwood</p> 	<p>Coast</p> 
<p>Sea oats, American beach grass</p> 	<p>Coastal plain</p> 
<p>Fraser fir, mountain ash, red spruce, rhododendron</p> 	<p>Piedmont</p> 
<p>Insect-eating plants like Venus fly trap and sundew, cypress</p> 	<p>Mountains</p> 

Plant Photographs: J.S. Peterson, Doug Goldman, Richard A. Howard, Larry Allain, C. Ford, William S. Justice, Robert H. Mohlenbrock, E. LaVerne Smith, Richard A. Howard all hosted by the USDA-NRCS PLANTS Database. Kathy Shore Nursery.

Map: <http://www.thomaslegion.net/>

[A: Virginia pine, loblolly pine, dogwood – Piedmont; Sea oats, American beach grass – Coast; Fraser fir, mountain ash, red spruce, rhododendron – Mountains; Insect-eating plants like Venus fly trap and sundew, cypress – Coastal plain]

Activity:

Say “Let’s test different types of soils to see how well they hold water, hold nutrients, and hold up (provide structural support for) plants.”

Watch video: <https://vimeo.com/436154247>

1. Holding water

- Predict which soil will hold more water and hold it the longest: sand or clay.
- Get some sand (or sandy soil) and some clay (or clayey soil). Maybe you could get a little sand from a sand box.
- Get 2 funnels, sieves, or colanders and put a coffee filter in each one.
- Put the 2 funnels with coffee filters over 2 jars, glasses, or bowls.
- Put sand in one and clay in the other.
- Pour an equal amount (maybe 1/8 cup) of water slowly through the soil in each sieve.
- Watch which soil the water runs through faster and which one holds the water longer. Notice how much water ended up in each jar.
- Was your prediction correct? Which soil held water better? How might holding water help a plant? [A: clay, it lets plants take in water through the roots]

2. Holding nutrients

- Predict which soil will hold nutrients better: sand or clay.
- Use the same set up you just used for the water-holding experiment.
- We’ll mix up some grape Kool-Aid and pretend it’s a soil nutrient (it’s not really, but it will help us show an idea). [The Kool-Aid has to be grape for this to work because the purple dye will stick to one kind of soil particle. Other colors/flavors won’t work well.]
- Pour an equal amount of grape Kool-Aid (about 1/4 cup) slowly through both the sand and the clay.
- Observe the color of the Kool-Aid you collect in the jar. You may want to put a piece of white paper under the jar so it’s easier to see the color.
- Which soil changed the color of the Kool-Aid? [A: clay]
- The reason the color changed is that some of the dye stuck to the grains of that soil, just like nutrients can stick to grains of that soil. And then plant roots can absorb the nutrients.

3. Structural Support for plants (ability to hold up plants)

- Predict which soil would provide more structural support and hold up a plant better – sand or clay.

- Get 2 long sticks (or 2 rulers or 2 pencils). Put one in some fairly dry sand (in the ground, in a sandbox, or in a container). Put one in some fairly dry clay.
- Now gently try to push each stick over so it falls down.
- Which stick fell easier: the one in sand or in clay? [A: in sand]
- Which soil did a better job of supporting or holding up the stick? [A: clay]

Say “You might think from the activity that clay is the best soil for plants, but a mixture of sand, silt, and clay (called loam) and organic matter is better for most plants. And different plants do better in different soils.”

Discussion:

Say “There are ways that people can protect the soil and water in the environment and improve plant growth when they farm or garden.”

- We can cut down on erosion – when wind or water carry soil away. If we prevent erosion, we keep the soil that plants need, and we keep the water and air cleaner too. We can build up the organic matter, like dead plants, and the nutrients in the soil. And we can protect living things that help plants or soil, like bees and tiny microbes (like bacteria) that help soil form.
- Here are some ways to do this:
 - Use windbreaks – a line of trees at the edge of a field that slows down the wind, so it won’t blow soil away.



<https://www.qcsupply.com/blog/product-tips-and-how-tos/guide-to-planting-a-windbreak.html>

- Plant cover crops instead of leaving the ground bare after harvest.



<https://www.extension.iastate.edu/news/cover-crops-reduce-loss-nitrogen-and-phosphorus-waterways>

- Leave parts of crops we don't use, like corn stalks, on the ground to protect the soil after harvest.



<https://www.no-tillfarmer.com/articles/4304-webinar-managing-crop-residue-decomposition-turning-trash-into-a-treasure?v=preview>

- Leave some trees, shrubs, and other plants next to streams to stop soil from washing into the water when it rains.



https://www.chesapeakebay.net/images/issues/06.17_buffers_issues_image.jpg

- Plow or till soil less so it doesn't form a hard crust or ruin the soil's structure.



<https://www.no-tillfarmer.com/articles/489-no-till-movement-in-us-continues-to-grow?v=preview>

- Don't let cows eat all the grass and leave the ground bare.



<https://lpfw.org/our-work/ending-resource-abuse/overgrazing/>

- Rotate crops. For example, grow corn one season, then soybeans, and then wheat. Corn takes nitrogen out of the soil. Soybeans put nitrogen back in. Nitrogen is a nutrient that helps plants grow.



<https://toptillers.com/crop-rotation/>

- Protect insects like bees that pollinate flowers by avoiding or using less chemicals that harm them. Some pesticides kill pollinators and microbes (tiny living things) that make soil healthy.



<https://www.sciencenewsforstudents.org/article/pesticides-offer-bees-risky-allure>