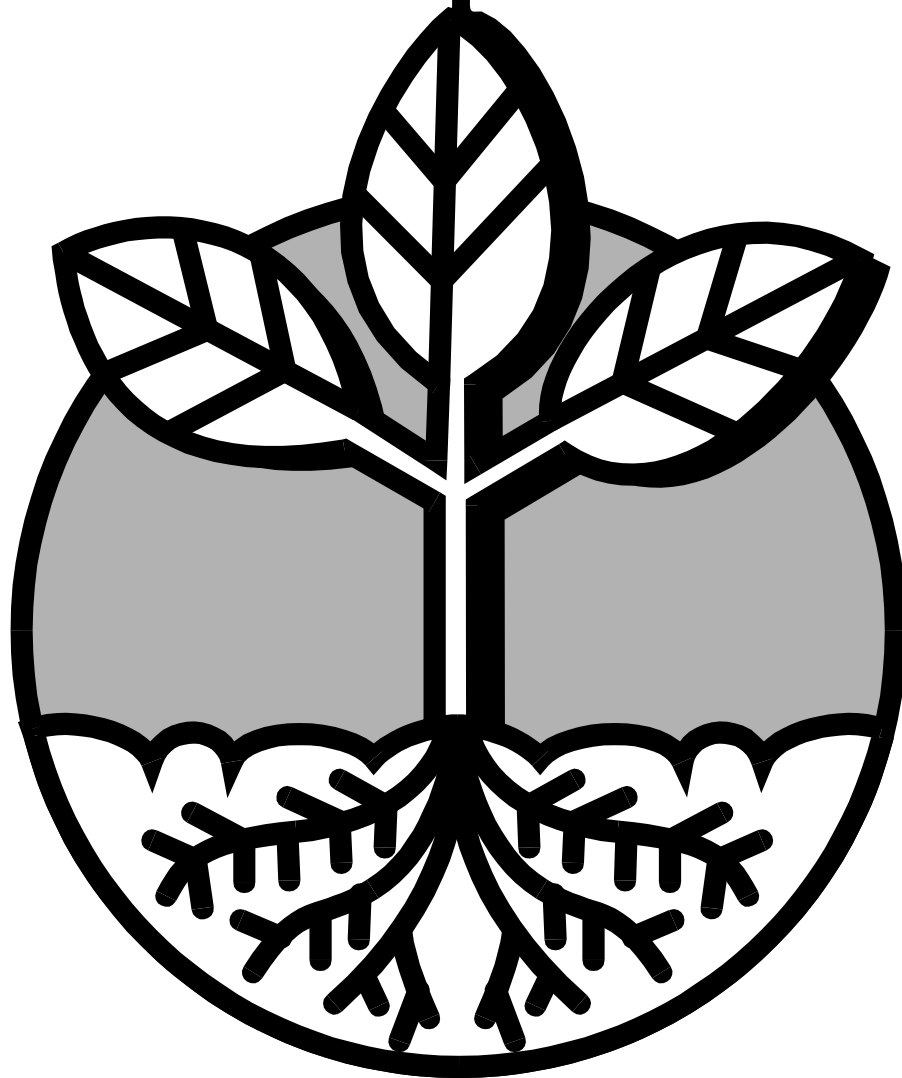


From the Ground

Up



**An Environmental Education Lesson
Plan Developed and Updated by
Airlie Gardens
2006**

This lesson plan is available online at: <http://www.airliegardens.org/education.asp>
Please photocopy or download this plan if you plan to mark in this document. Other teachers will be using this resource, so please maintain this plan in its original quality

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Airlie Gardens wishes to acknowledge the following organizations whose efforts made this Environmental Education Activity possible:

**Tidal Creeks Advisory Board
Clean Water Management Trust Fund
Airlie Gardens Foundation Board of Trustees
New Hanover County**

Table of Contents

1. Introduction	
• Introduction to Airlie Gardens.....	4
• Activity Summary.....	6
2. Pre-Visit Activities	
• Seeds on the Move.....	7
• Here’s the Dirt.....	13
3. On-Site Activities	
• Waterwise Garden – Parts of a Tree, Seed Dispersal, Plant Reproduction, and Carnivorous Plants.....	17
• Airlie Woods – Tree Aging, Soil Types, Decomposers, and Vermicomposting.....	19
4. Post-Visit Activities	
• The Faults of Asphalt.....	23
• Rotting Log Box.....	25
• Worm Bins.....	26
5. Glossary of Terms.....	28
6. References.....	29
7. Forms	
• Scheduling worksheet.....	30
• Parental Permission Form.....	31
• Airlie Gardens Program Evaluation.....	32
8. Notes.....	33

Introduction to Airlie Gardens

Designed in the early 1900s, Airlie Gardens is a valuable social and ecological piece of Southern and North Carolina history. Pembroke and Sarah Jones originally bought the property where Airlie stands in 1884. The 1920s saw the height of Airlie's botanical collections, with 5,000 camellias and a half million azaleas in bloom, as well as a collection of exotic plants. Area businessman Walter Corbett and his wife Bertha Barefoot bought Airlie in 1948 and the family maintained it until 1999 when they sold it to New Hanover County.

A major grant from the Clean Water Management Trust Fund and the support of the residents of New Hanover County have made possible the purchase and restoration of the remaining 67-acres of Airlie Gardens to become a local, state, and national treasure.

Airlie Gardens as an Outdoor Classroom

The mission of Airlie Gardens is to be a historic public garden with cultural and environmental education programs that serve the residents and visitors of New Hanover County.

Airlie Gardens is a rich resource for environmental education. It is one of the last undeveloped tracts along Bradley Creek and provides us with the opportunity to teach firsthand about tidal creek ecosystems and North Carolina's horticulture.

We have also created a WaterWise Garden that emphasizes the use of native plants in a constructed wetland to treat stormwater. This helps to reduce erosion and sedimentation as well as filter out pollutants before they reach the tidal creek. The WaterWise Garden is a wonderful outdoor classroom, which helps students to learn about water quality through hands-on activities.

Groups are encouraged to schedule a field trip, making use of our Environmental Education Lesson Plan. See page 32 for scheduling a trip. Field trips will include a guided tour of two of our outdoor teaching areas with hands on science education experiences. The program is correlated to the third grade science curriculum in the Standard Course of Study for North Carolina and focuses on: plant growth, plant adaptations, and soil properties.



Scheduling a Trip:

1. Please contact Airlie Gardens as soon as possible. At least two weeks advance notice is required to make a reservation. Call Airlie's Environmental Education Program at (910) 798-7564.
2. Complete the scheduling worksheet found on page 32 in the appendix of this document or the worksheet found in the science kits and return it to Airlie Gardens as soon as possible.

Before the Trip:

1. Complete the pre-visit activities provided.
2. The group leader should discuss behavior expectations with students and chaperones. Airlie Gardens is not responsible for disciplining misbehaved students.
3. Each classroom should be divided into two groups prior to arrival. Each group must have an adult chaperone. Airlie recommends a 1:10 ratio between chaperone and students.
4. Make sure the students dress appropriately for the

weather. **Comfortable close-toed shoes should be worn.**

5. The group leader must obtain a parental permission slip for each student, including medical concerns. The leader may use the sample form on page 33.
6. If you are going to be late or need to cancel, please notify Airlie Gardens as soon as possible. (798-7564)

While at Airlie Gardens:

1. When on hikes, students should walk behind the guide at all times. Running is not permitted.
2. All of the plants and animals are protected and should not be touched or removed unless guide gives permission.
3. Please use the trash and recycling receptacles, and do not litter.
4. In case of emergency, please contact garden staff immediately.

After the trip:

1. Post-visit activities are designed to complement

your field trip experience and are created for classroom use.

2. Encourage students to seek answers to any questions they may have after visiting the gardens.
3. If appropriate, give evaluations or tests to find out if the students gained the desired information.
4. Please fill out and send the written evaluation on page 34 to the garden office. This is a very important step that allows us to make sure your experience is the best it can be.

Airlie Contact Info:

Airlie Gardens
300 Airlie Road
Wilmington, NC 28403
Main Office Phone:
(910) 798-7700
Education Office Phone:
(910) 798-7564
Fax: (910) 256-5083
Website:
www.airliegarden.org

Office Hours:

8:00 am – 5:00 pm
Monday – Friday

Regular Season Garden Hours:

9:00 am – 5:00 pm
Tuesday – Sunday

Activity Summary

“From the Ground Up” was created to provide hands-on environmental education activities for an on-site visit to Airlie Gardens as well as in the classroom. The packet provided includes pre-visit, on-site, and post-visit activities. All of the activities were designed specifically for the third grade to meet the established curriculum objectives of the North Carolina Department of Public Instruction’s Standard Course of Study.

An Airlie staff member or education volunteer

will conduct the on-site activities at Airlie Gardens. The pre- and post-visit activities are designed for use in the classroom. We encourage the use of the pre-visit activities before the field trip so the students are prepared with the necessary background information. We have developed the post-visit activities to reinforce the concepts and skills learned during the field trip.

The major concepts students will encounter are as follows:

- Plant adaptations
- Plant biology and structures
- Soil properties
- Decomposers and composting
- Seed Dispersal and plant reproduction

There is a list of vocabulary words defined in the glossary. A list of references that were used in the creation of this publication, and which may be helpful in the classroom, is also included.



Pre-Visit Activity #1

Seeds On the Move

Curriculum Links:

Grade 3

Science

Competency Goal 1: The learner will conduct investigations and build an understanding of plant growth and adaptations.

1.01 Observe and measure how the quantities and qualities of nutrients, light, and water in the environment affect plant growth.

1.02 Observe and describe how environmental conditions determine how well plants survive and grow in a particular environment.

1.03 Investigate and describe how plants pass through distinct stages in their life cycle including growth, survival, and reproduction.

1.04 Explain why the number of seeds a plant produces depends on variables such as light, water, nutrients, and pollination.

Location:
Classroom

Group Size:
30 students
(entire class)

Estimated Time:
Approx. 1 hour

Materials Needed:

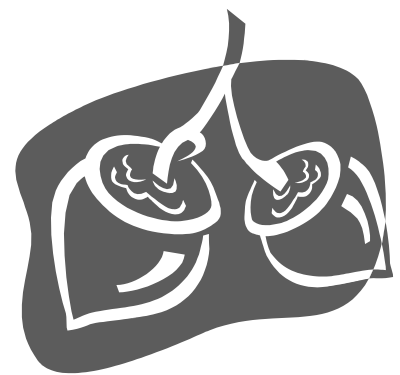
- Dried beans
- Materials for seed construction (everyday objects such as: straws, string, toothpicks, balloons, tape, paperclips, construction paper, cork, Styrofoam peanuts, glue, Velcro, feathers, rubber bands, etc.)
- Copies of the inserts provided

Major Concepts:

- Different plants disperse their seed in different ways.
- Seeds of any plant require certain things to grow.

Objectives:

- List five different seed dispersal mechanisms used by plants.
- List four different things that seeds need in order to survive.
- Create your own seed with a specific dispersal mechanism using everyday items.



Educator's Information:

In this activity, students will learn what seeds need in order to grow. They will also discover the various dispersal mechanisms that plants have adapted to ensure their seeds obtain these needs. Methods of dispersal used by plants include being carried by the wind (dandelion, milkweed), by water (coconut), hitchhiking on an animal (burs), self propulsion (jewelweed), and being eaten as part of a fruit and deposited elsewhere by an animal (apple). Finally, students will create their own seeds, using everyday items, which can disperse using a specific mechanism.

Instructions:

- Divide students into groups of 3-5.
- Ask the students what they had for breakfast. What does what they ate have to do with seeds? They will see that everything they eat, and even a lot of what they wear and use everyday, begins as a seed.

(Example: bacon comes from pigs, pigs eat grain, grain comes from a seed)

- At this point, the student should understand that **we all depend on seeds**. Ask the students if they know what seeds depend on? Possible answers: soil, water, sunlight, and nutrients (nutrients are within the soil and different soils have different amounts of nutrients).
- Introduce the students to the idea of seed dispersal using the idea of space. For example, you could ask the following questions: What would happen if they never moved away from home? What if when they had kids, they stayed in the house and when their kids had kids they stayed in the house too? Eventually the house would not be big enough to support all of those people. Seeds are the same way. If all the seeds are dispersed right next to the parent plant, the new seeds will not have enough space to grow. Since plants cannot move, they have

adapted special ways to disperse their seeds.

- Have the students use the cards provided to think of different ways plants could disperse their seeds.
- Play a matching game with the students using the pictures of the plant seeds and the method of dispersal.
- Review with students the four things seeds need to survive as well as five dispersal mechanisms they have learned about.
- Hand each group a card from Insert 3. Each group will have 10 minutes to make their own "seed" using the items provided and using the specific dispersal mechanism they have been given.
- After they are finished, have each group stand up and explain their seed and how it disperses.



What is a seed? A **seed** is like an egg of a plant. It contains the baby plant and some nutrients to help start it growing. Plants are living things, and so they must **reproduce**. There are many kinds of seeds. Think of some examples on your own right now... You may have come up with apple seeds, acorns, sunflower seeds, and many others!

Seeds need water, sunlight, **nutrients** from the **soil**, and space to grow, but they cannot walk around like an animal to find these things. The parent plant must have a way to spread out, or **disperse**, its seeds to give them the best chance of **germinating**.

Different plants have different ways of dispersing their seeds. There are five ways that plants may disperse their seeds. Each plant usually uses only one of these methods.

The first way seeds might be dispersed is by the wind. Have you ever picked a dandelion and made a wish as you blew on it? Those fuzzy things that you blow away are actually the seeds of the dandelion. By blowing on them, you have helped disperse them!

Another way seeds can be dispersed is by being surrounded by a yummy fruit. Many animals will come eat blackberries that grow in the wild. Eventually, these animals will go to the bathroom and the seed will be deposited. This is a way for the seed to travel quite a long way from its parent plant, depending on how far the animal travels.

Some seeds can float on the water. Trees with seeds that can float grow near water so that when the seed falls from the tree, it floats away. The largest seed in the world, a coconut, can float on the water to a new place where it can germinate.

Some plants have a way of shooting their seeds away, almost like a slingshot! If you have ever touched the seedpod of jewelweed, you have seen this in action. Jewelweed seed capsules are almost like a coiled spring. When the wind blows on them, or when somebody touches them, the spring uncoils and the seeds go flying!

The last way seeds can disperse is by latching on to a person or animal. That is why these seeds are called hitchhikers. Have you ever walked through a field and come out with burs stuck to your clothes? Burs are seeds, and when you pick them off your clothes and toss them on the ground, you have helped them disperse.

Next time you are taking a walk, look at a nearby tree or plant and see if you can figure out how it disperses its seeds!

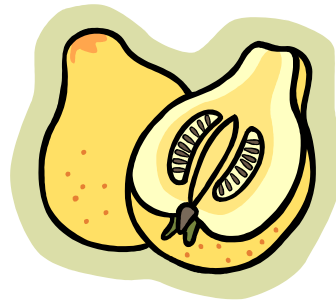
Insert #1

Kinds of Seed Dispersal

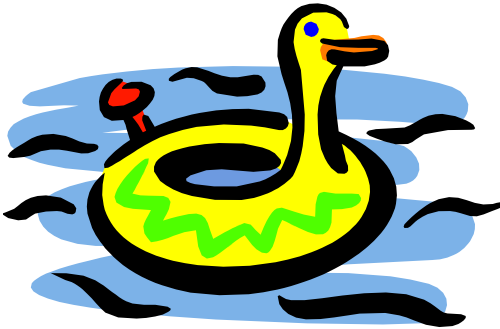


How are some seeds like this kite? _____

What does this piece of fruit have to do with a seed? _____



How are some seeds like this inner tube? _____



How are some seeds like this slingshot? _____



How are some seeds like this hitchhiker? _____



Wind Carried

Dandelion
Milkweed
Maple trees (helicopters!)
Cattail
Thistle

Water Carried

Coconut
Lotus
Arum

Hitchhikers

Stickseed
Cocklebur
Sand bur
Wild barley

Self-propelled

Jewelweed
Members of the pea family
Wild geranium

Eaten

Oak trees (acorns)
Black cherry
Raspberry
Blackberry
Poison Ivy (although it is not recommended)
Solomon's seal
Jack-in-the-pulpit

Make a seed that will float on water for at least five minutes.

Make a seed that will attract an animal.

Make a seed that has a mechanism to throw the seed at least two feet from the parent plant.

Make a seed that can hitchhike on an animal for at least ten feet.

Make a seed that will float on the wind.

Make a seed that must spread itself with no help from wind, water, or animals.

Curriculum Links:

Grade 3

Science

Competency Goal 2:

The learner will conduct investigations to build understanding of soil properties.

2.01 Observe and describe the properties of soil:

- Color.
- Texture.
- Capacity to hold water.

Location:

Classroom or outside (this activity can get a little messy)

Group Size:

30 students (entire class)

Estimated Time:

Approx. 1 hour

Materials Needed:

- Soil samples
- 500ml or larger beaker for each group of four students (or one beaker if you plan on demonstrating for the class)
- Calculators for each group of four students
- Copies of the insert provided for each student

Major Concepts:

- What is soil?
- Soils found in different areas have different characteristics.

Objectives:

- State the definition of soil.
- List three characteristics of soil that can vary from place to place.
- State the definition of soil porosity.

Educator's

Information:

This lesson is designed to give students a chance to explore soil from their own area through hands-on activities. They will look at the color and texture of the soil and how it feels when mixed with water. They will compare their soils to their classmates'. Finally, they will do an experiment to determine the porosity of one of the soil samples.



Instructions:

- Each student should bring in a one-gallon bag full of soil from where they live.
- Before exploring the soil, ask the class if they know what soil is. Soil is what covers the surface of the Earth. It contains minerals, like rock, sand and clay, as well as air, water, and plant and animal material. Ask your students why soil is important. They should remember from the previous activity that almost all of what we eat and much of what we wear comes from plants that need soil to grow.
- Ask your students if they think all soils are the same. How do they think they differ? Break your students up into groups of four and have them fill out the Insert 1 worksheet while exploring their soil. When everyone in their group has completed the worksheet, have

them compare their answers. How does their soil differ from the other people in their group? Where did the soil come from? How do you think they are similar or different?

- Ask your students what would happen to their soil if they added water to it. Why do they think it reacted the way that it did? Explain that different kinds of soil can hold different amounts of water. Water can fit into the spaces between the particles of soil. These spaces are known as pore spaces. The porosity of the soil is the percentage of the soil that consists of pore space. Ask your students why this would matter and how this relates to Wilmington, an area with heavy rain. Would the porosity of the soil make a difference after a large rainstorm?
- There is a way that porosity can be measured. Each group can measure

the porosity of one type of soil, or you can demonstrate the experiment with a soil sample for the entire class. It is also interesting to compare porosity between soil and pure sand.

- In order to test the porosity, fill a beaker up with 500ml of soil. Fill another beaker with 500ml of water. Slowly pour the water into the beaker of soil until the water level reaches the top of the soil. How much water were you able to pour in? This measurement divided by the 500ml of soil will give you the porosity of the soil. The higher the porosity, the more water the soil can hold.



Soil – it's something you walk on everyday, but do you ever stop to wonder what makes soil? Why is it there? Why is it important to us?

Soil, also known as dirt, is simply the loose layer of the Earth's surface. Soil is made up of small pieces of rock, bits of dead plants, water, air and all sorts of living things.

There are many different kinds of soil. The type of soil in an area helps determine what type of plants can grow there. Some plants like very

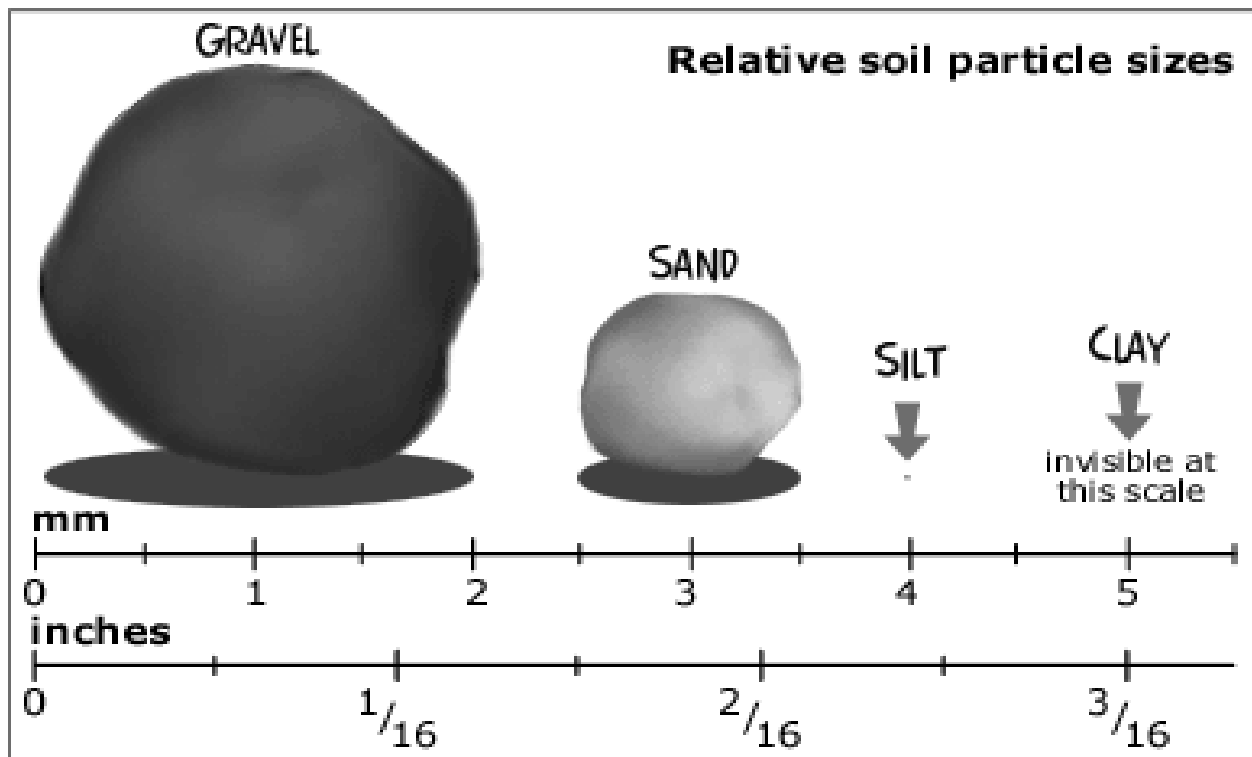
sandy soil, while other plants like soil with lots of what we call **humus**. Humus is another word for plants that have died and broken down into little pieces by decomposers like worms. This provides nutrients to the plant that grows in this type of soil.

It takes a long time for soil to be made. It is formed when rocks **erode** into smaller pieces. This can happen in a couple of ways. One way larger rocks can be broken down is by water. Think of when a wave crashes on

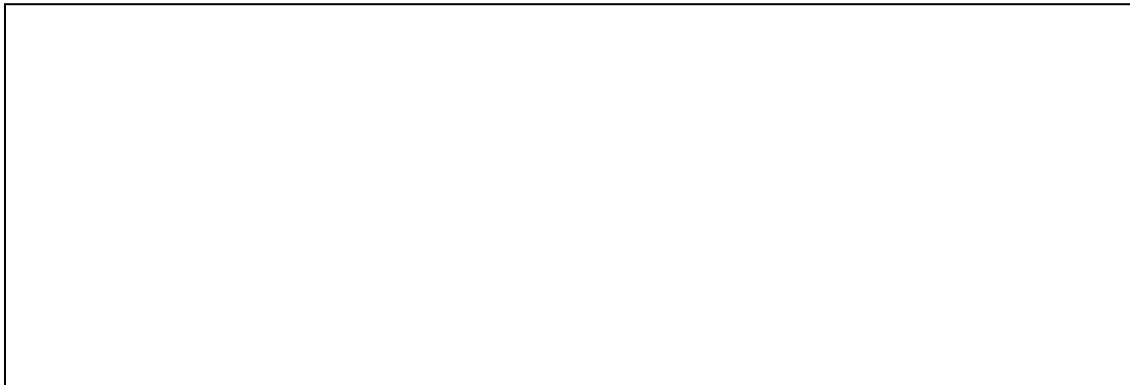
the beach. Water can pound rocks together over and over until they break into smaller pieces.

If we were to look under a microscope at the different types of soil, we would see that the tiny pieces are different sizes. The particle size depends on the type of rock that made that soil and how much it has broken down.

Next time when you're outside, look under your feet. There is a whole other world down there that you can explore!



1. Where did you collect your soil sample?
2. What color is your soil?
3. What does your soil smell like?
4. What does your soil feel like?
5. Make a sketch of your soil.



6. The way soil compacts when mixed with water can give us some clues about what it is made of. Make soil “putty” by mixing a small amount of soil and water in your hand. Try to make a “ribbon” of soil by squeezing your fist around the putty until some squirts out. If the soil sticks together well, it is mostly clay. If no ribbon can be formed by squeezing the soil, then it is mostly sand and aggregate (broken pieces of rock). If it is somewhere in between, the soil is loam – a mixture of clay and sand. What do you think is in your soil?

Curriculum Links

Grade 3

Science

Competency Goal 1: The learner will conduct investigations and build an understanding of plant growth and adaptations.

1.01 Observe and measure how the quantities and qualities of nutrients, light, and water in the environment affect plant growth.

1.02 Observe and describe how environmental conditions determine how well plants survive and grow in a particular environment.

1.03 Investigate and describe how plants pass through distinct stages in their life cycle including growth, survival, and reproduction.

1.04 Explain why the number of seeds a plant produces depends on variables such as light, water, nutrients, and pollination.

Competency Goal 2:

The learner will conduct investigations to build an understanding of soil properties

2.02 Analyze the ability of soil to support the growth of many plants, including those in our food supply.

Location:

WaterWise Garden

Group size:

Maximum of 30 students, split into two groups.

Estimated time:
45 minutes

Materials needed:

(all materials provided by Airlie)

- Examples of various seed types
- Carnivorous plants

Major Concepts:

- Plant structure
- Plant adaptations
- Seed dispersal mechanisms
- Soil quality

Objectives:

- Describe the parts of a tree and how each part is important to the plant's survival.
- Give at least three methods of seed dispersal and explain how they work.
- Discuss the life stages of the pitcher plants and how flowers come up first for pollination and later during the life cycle the traps become active
- Explain the special adaptation of carnivorous plants and how it helps them survive in their environment.

**Educator’s
Information:**

The students will be learning about plant structure, seed dispersal, and some special adaptations to plants in our area. An Airlie Gardens staff person, intern, or education volunteer will lead the students through two different teaching activities. Students should be divided into groups prior to arrival. Each group will visit the two teaching stations and will be led by an Airlie representative.

Prior to your visit, please distribute copies of the Student Information sheets so your class is familiar with the subject.

Instructions:

An Airlie representative will greet the students and give them a brief orientation of what they will be doing on their visit. Each class will be divided into groups, and each group will be assigned an Airlie instructor. The instructor will take them through each of the two activities listed below.

**Activity #1:
Plant Structure and
Seed Dispersal**

Students will learn about the parts of a tree and what each part does for the tree. They will also review seed dispersal, which was previously covered in a pre-visit activity, and look at some examples of various seed types.

**Activity #2
Carnivorous Plants**

The instructor will lead the students to Airlie’s carnivorous plant garden. They will explain the concept of adaptations, showing how Venus flytraps, sundews, and pitcher plants work. They will also discuss why these plants are adapted in this way. How nutrients, sunlight, and other environmental conditions affect growth will be discussed.

Curriculum Links

Grade 3

Science

Competency Goal 1:

The learner will conduct investigations and build an understanding of plant growth and adaptations.

1.01 Observe and measure how the quantities and qualities of nutrients, light, and water in the environment affect plant growth.

1.02 Observe and describe how environmental conditions determine how well plants survive and grow in a particular environment.

Competency Goal 2:

The learner will conduct investigations to build understanding of soil properties.

2.01 Observe and describe the properties of soil:

- Color.
- Texture.
- Capacity to hold water.

2.03 Determine the ability of soil to support the growth of many plants, including those important to our food supply.

2.04 Identify the basic components of soil:

- Sand.
- Clay.
- Humus.

2.05 Determine how composting can be used to recycle discarded plant and animal material.

Location:

Airlie Woods

Group size:

Maximum of 30 students, split into two groups.

Estimated time:

45 minutes

Materials needed:

(all materials provided by Airlie)

- Increment borer
- Tubs of soil types
- Soil auger
- Worm bin

Major Concepts:

- Trees can be aged by counting the rings
- There are many types of soil
- Worms are decomposers
- Composting can happen at home

Objectives:

- Explain why and how a tree has rings and how to age the tree using the rings
- Give one alternative method of tree aging and give pros and cons to this method as well as tree boring
- Explain how interpreting the rings of a tree can help determine what weather, pests, and environmental factors were experienced by the tree during its life history
- Name three soil types
- Explain why a worm is considered a decomposer and why this is an important role in the environment.

Educator's Information:

The students will be learning about plant structure, seed dispersal, and some special adaptations to plants in our area. An Airlie Garden's staff person, intern, or volunteer will lead the students through three different teaching activities. Students should be divided in groups prior to arrival. Each group will visit the two teaching activities and will be led by an Airlie representative. **Prior to your visit, please distribute copies of the Student Information sheets so your class is familiar with the subject.**

Instructions:

An Airlie representative will greet the students and give them a brief orientation of what they will be doing on their visit. Each class will be divided into groups, and each group will be assigned an Airlie instructor. The instructor will take them through each of the three activities listed below.

**Activity #1:
Aging a Tree**

The instructor will show students how to use an increment borer to obtain a tree core sample. Students

will then learn about why a tree has rings and estimate the age of the tree.

**Activity #2:
Soil Types**

Students will learn about sandy, humus, and clay-like soils. They will investigate the soil at Airlie and figure out what kind of soil is present. Students will also search for decomposers in the soil and learn about the important role they play in the environment.

**Activity #3:
Worm Bin**

The instructor will show students an example of a worm bin and students will be able to explore what is inside. Students will learn about worms and their role as decomposers. They will also learn about how they can make a worm bin and what kinds of materials can go into it.

Student Information

The Parts of a Tree

We learned that plants need soil in order to grow. The soil keeps them in place, and also gives them **nutrients**. But how do the plants get the nutrients to where they need them?

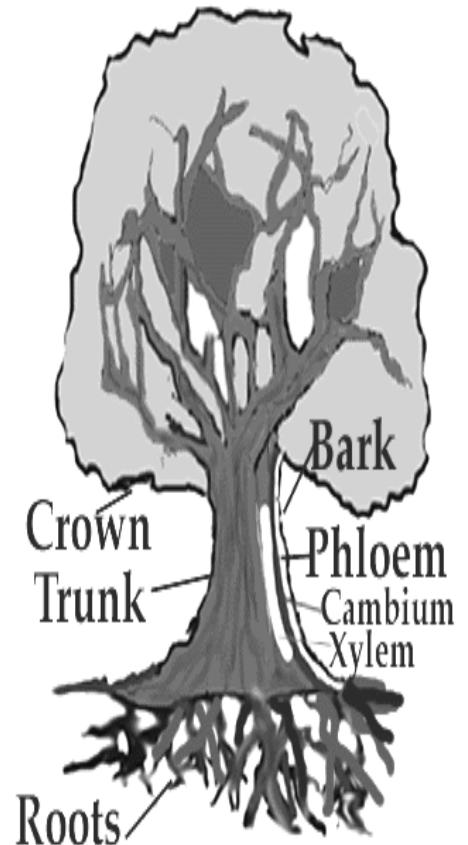
We are going to look at a tree and start from the bottom and work our way up. **Roots** are a part of the tree that you usually don't see because they are underground. Roots help keep the tree in one place, and also suck up water and nutrients.

The **xylem** (pronounced zi-lum) moves the water and nutrients up to the other parts of the tree, such as leaves or branches. Think of the xylem like a bunch of drinking straws running all the way up the tree.

When the water and nutrients reach the **leaves**, food is made inside of those leaves by a process called **photosynthesis**. Plants, unlike animals, can make their own food using water, carbon dioxide, and sunlight.

Once the food is made inside of the leaves, the food must be sent to the rest of the tree. The **phloem** (pronounced floe-um) moves the sugars to where they need to go, all the way down to the roots!

Xylem and phloem are present in all plants, but they are much easier to see in trees. New xylem (remember the straw part!) is always being added to trees. It grows faster in spring when there are more nutrients and sunlight, and slower in winter when there is less sunlight. The xylem cells added more slowly in the winter appear darker than the spring xylem cells. These dark and light bands show up as rings when you cut down a tree. Since one dark ring and one light ring are added every year, you can count them to find out how old the tree is!



Some plants have **adaptations** that help them get food in other ways. An adaptation is something a plant or animal has or does that helps it to survive and that trait gets passed along to its young.

Here is an example of a plant adaptation: Let's say there is a plant called a sweebee plant that grows in very dry areas. Some of these sweebee plants have much longer roots than others. The plants with the very long roots are able to get more water.

Since they can get more water, the long-rooted plants are healthier than the other sweebees with normal-sized roots. Healthier plants will have more energy to put into reproduction, and they will probably pass on long roots to their young. Their young will be healthier and will reproduce more than the young of sweebees without long roots.

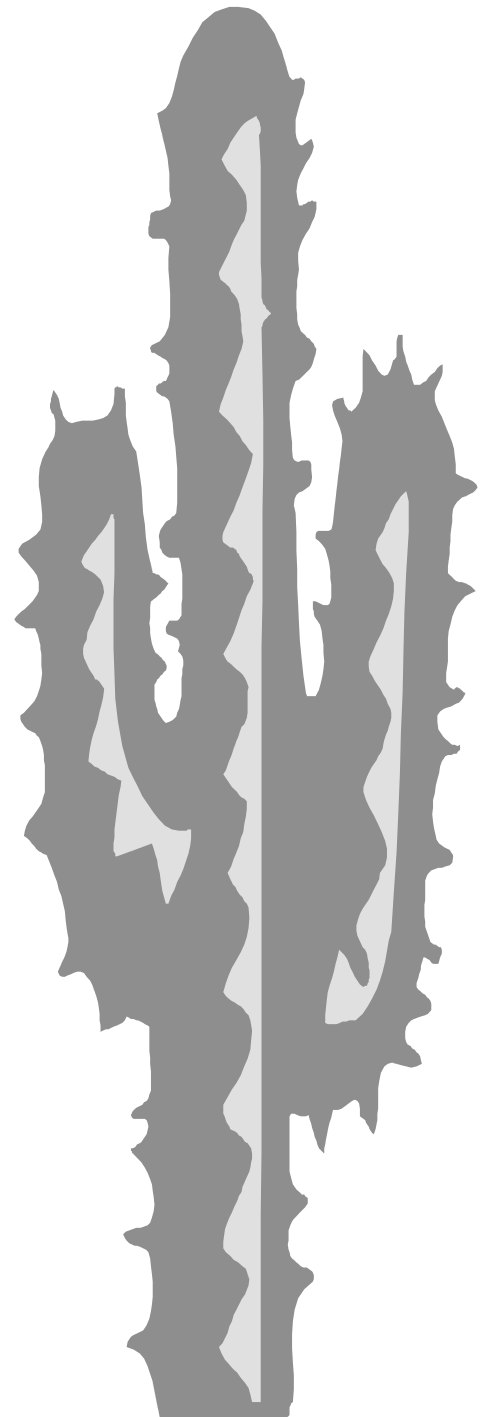
Eventually all sweebees would have very long roots. These long roots

would be an adaptation that helps plants to live in a dry environment.

That was a quick explanation--the actual process happens over thousands of years.

Can you think of some real plants that have adaptations? How about a cactus? Just like the sweebee, they are adapted to live in places like deserts that are very hot and dry.

What about a Venus Fly-trap? They have a very special adaptation....they digest bugs! When you visit the Gardens we will explore the lives of many different kinds of carnivorous plants.



Post-Visit Activity #1

The Fault With Asphalt

Curriculum Links

Grade 3

Competency Goal 2:

The learner will conduct investigations to build understanding of soil properties.

2.01 Observe and describe the properties of soil:

- Color.
- Texture.
- Capacity to hold water.

Location
Outside

Group Size

30 students (entire class)

Estimated Time

½ hour

Materials Needed

- Water
- Alternative asphalt

Major Concepts

- Asphalt does not absorb water.
- Replacing soil with asphalt has an effect on water quality and water movement.

Objectives

- Name two effects of covering soil with asphalt.
- Name one alternative to asphalt that reduces the negative effects of building a parking lot.

Educator's Information

Soil is not only important to plants, but it is also important for water quality. Students will observe firsthand the difference between soil and asphalt and their interactions with water. They will discuss how this affects water supply, plants, and people.



Instructions:

- Review with your students why soil is important to plants. Ask your students what happens when soil is covered up for buildings and parking lots. They will probably answer that plants can no longer grow there. Is there any effect on the water? Tell them that they are going outside to find out!
- Go to an area outside that has areas of short grass or bare soil next to areas of asphalt. Pour equal amounts of water on the soil and on the asphalt. What do you notice? The water is quickly absorbed by the soil, but not by the asphalt. So what? Ask if they can think of any ways that this might be harmful to the environment.
- Explain that soil helps to filter impurities out of the water. By

the time the water gets to our streams and rivers, the soil has done a lot to clean it up. The asphalt does not absorb and filter the water, so water going to streams and rivers in areas with a lot of asphalt has not been filtered as well. Soil also helps to slow down the water, preventing erosion.

Post-Visit Activity #2

Rotting Log Box

Curriculum Links

Grade 3

Science Competency Goal 2: The learner will conduct investigations to build understanding of soil properties.

2.05 Determine how composting can be used to recycle discarded plant and animal material.

Location

Outside and in classroom

Group Size

30 students
(entire class)

Estimated Time

Whatever you like – this is a great activity to do when you have just a few minutes, or you could spend longer and do a journaling activity.

Materials

- Plastic container
- Soil
- Rotten log
- Spritzer bottle

Major Concepts

- Decomposition

Objectives

- Name two critters that act as decomposers.

Educator's Information

A rotten log box is about the easiest way to study decomposition first hand. Students will get to see some of the many critters that aid in the decomposition process.

Instructions:

- Get a hard plastic box with small holes (small critter carriers work well and are inexpensive and easy to find). Fill about 1/3 of the container with soil. Find a rotting piece of wood. Put it in the container.
- Have your students explore what critters are living in the rotting log. How

is the log changing? What evidence of critters can they see on the log?

- Be sure and keep the container damp by spritzing it every few days.
- Important safety tip! Whenever you are looking under logs outside, you should always roll the log towards you. That way, anything that might have been hiding under the log will move away from you.

Post-Visit Activity #3

Worm Bin

Curriculum Links

Grade 3

Science Competency

Goal 2: The learner will conduct investigations to build understanding of soil properties.

2.05 Determine how composting can be used to recycle discarded plant and animal material.

Location

Classroom or outside (making a worm bin can be a little messy)

Group Size

30 students (entire class)

Estimated Time

45 minutes

Materials

(the list here is for a single worm bin for the entire class.

Adjust accordingly if you are making more than one)

- Styrofoam box or Rubbermaid container
- Drill to make holes in container
- Shredded newspaper (enough to fill your container $\frac{3}{4}$ of the way)
- Water
- Handful of sand or soil
- 50-100 red wiggler worms
- Organic food scraps

Major Concepts

- Worms are decomposers.
- Food waste can be made into something useful, soil.

Objectives

- Give the definition of “decomposer” and explain how worms fit into this role and form soil.
- Give one example of how waste can be reused.
- List four things that worms need to survive.

Educator’s Information

This activity allows students to see the cycle that exists between plants and soil, two of the things they learned at Airlie, using a hands-on approach. Students will create their own classroom worm bin to help recycle food waste, which can be used throughout the school year.

Instructions:

- At Airlie Gardens we learned about different kinds of soil and how important it is to plants. What do plants get from the soil? Students should remember that plants use nutrients that are stored in the soil. Ask your students how the soil gets these nutrients back. Are they lost forever? No. Through the process of decomposition, nutrients are recycled from dead plants and animals back to the soil.
- Ask your students if they have ever heard of the word “decomposer.” They should be familiar with the term from the field trip. What is a decomposer? A decomposer is something that breaks down dead matter into something that can be used again. Ask them if they can think of anything that is a decomposer.
- Worms act as decomposers, and

they can do a good job of breaking down food waste that people leave behind. Explain that you are going to make worm bins in the classroom. You can either make one worm bin for the entire classroom, or break students into groups of 4-6 and have each group make their own bin.

- First you will need to make holes in your worm bin. This will provide the worms with air as well as allow for excess water to drain out of the box.
- Next, you will add damp, shredded newspaper to the bin, filling it about $\frac{3}{4}$ of the way up. The newspaper should be soaked through, but not so wet that it causes water to collect at the bottom of the bin.
- Add a handful of sand or garden soil to the newspaper.
- Now you are ready to add your worms. Red wigglers (*Eisenia foetida*) are recommended. These can be ordered through various sources or

found at your local bait store. How many worms you need depends on how much food waste you will be adding to the bin. It is a good idea to start with 50-100 worms and go from there.

- Start feeding your worms slowly to see how much they can handle. Each time you add food, place it in a different spot in the bin. Keep the bin closed and make sure the worms don't dry out. It is a good idea to keep a spray bottle next to the bin to keep the worms moist.
- A few very important tips: Stick to fruit and vegetable scraps in the worm bin. Do not add any dairy products, meats, or oily food. Items you can add to your worm bin include vegetable and fruit scraps, bread products, and coffee grounds (including the filter).

Glossary of Terms

Adaptation: something a plant or animal has or does that enables it to survive and reproduce in its natural environment and that trait can be passed on to offspring

Clay: the smallest particles of soil

Compost: recycling food and yard waste by using decomposers to produce very rich, nutritious soil

Decompose: to break down or decay

Decomposer: an organism that aids in the break down of dead plants and animals, such as fungi, termites, and worms

Disperse: to send out in different directions; to spread around

Erode: to wear away; to slowly break down

Germinate: to sprout or bud

Heartwood: the older, non-living center section of some trees that gives the tree a lot of support

Leaf: the food-producing structure on trees and plants

Nutrient: a substance that is needed in order for a plant or animal to grow and develop

Phloem: the part of a plant that carries the food made in the leaves to the rest of the plant

Photosynthesis: the process that plants go through to turn water, sunlight, and carbon dioxide into food in the form of sugar

Roots: the part of a plant, usually below ground, that takes up nutrients and water

Sand: the largest particles of soil

Seed: the part of a plant that can develop into a new plant once dispersed

Silt: the medium-sized particles of soil

Soil: the minerals and organic, or living, matter that form a thin layer over the Earth's surface

Vermicompost: to compost using worms as the primary decomposer

Xylem: the part of a plant that carries water up the plant to the leaves

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Airlie Gardens Program Evaluation

Please take a moment to evaluate the program you received. Airlie Gardens is committed to providing quality programs that meet teachers' needs. **By filling out the provided form, you are helping us to achieve this goal. Please mail completed forms to 300 Airlie Road, Wilmington, NC 28403 Attn: Environmental Education Program.**

Date of Program: _____

Program leader(s): _____

Did the program meet your curriculum needs? Yes No

If no, please explain:

How would you rate the on-site program? Excellent Good Fair Poor

Comments:

Would you recommend this program to other teachers? Yes No

Are you likely to return for a program in the future? Yes No

How would you rate the pre-visit activities?

Excellent Good Fair Poor

Comments:

How would you rate the post-visit activities?

Excellent Good Fair Poor

Comments:

Notes