

Life Circles Program

Pre- and Post-Activities

BACKGROUND FOR TEACHER

Students will trace the life cycle of plants, trees, and insects connecting the cycles of nature with life science in the garden. While at Longwood students are challenged to sequence the stages of insect and plant cycles as well as identify the interdependence of plants and animals.

Every living thing has a life cycle. A life cycle includes all the stages a living thing goes through between the time it is born and the time it reaches maturity or adulthood. A plant begins life as a seed. Seeds can come in many different shapes and sizes, including beans, cones, and fruits. When a seed is provided with all of its needs (soil, sunlight, and water), the seed breaks open, the stem and roots begin to grow, and over time, a flower is produced. The flower needs to be pollinated in order for the life cycle of the plant to begin again.

The life cycle of an insect can differ from one species to another. An insect that looks different at every stage of growth goes through a complete metamorphosis. An insect that looks the same at every stage, just smaller, goes through an incomplete metamorphosis. Just like plants, all insects must reach maturity before being able to produce offspring and begin the life cycle again.

VOCABULARY

Abiotic	Ovary	Seed
Anther	Ovule	Seed Coat
Biotic	Petals	Seedling
Dormant	Photosynthesis	Sepal
Filament	Pistil	Stamen
Flower	Pollen	Stem
Germination	Pollination	Stigma
Leaf	Root	Style
		Vector



NEXT GENERATION SCIENCE STANDARDS FOR LIFE CIRCLES

Standard: K-8-LS1. From Molecules to Organisms: Structures and Processes Performance Expectations

- 3-LS1-1** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- 4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- 5-LS1-1** Support and argument that plants get the materials they need for growth chiefly from air and water.

Standard: K-8-LS2. Ecosystems: Interactions, Energy, and Dynamics Performance Expectations

- 3-LS2-1** Construct an argument that some animals form groups that help members survive.

PRE- AND POST-ACTIVITIES

Growing Grass (K-2)

Curriculum Connections: Science, mathematics

Materials: Grass seed, clear cups, soil, water, colored permanent markers, teaspoons, rulers, paper, pencils

1. Lay out the materials on a table or counter.
2. Give each student one clear cup.
3. Have students fill the cup $\frac{3}{4}$ full of soil.
4. Allow students to take one teaspoon of grass seed and sprinkle the seeds on top of the soil in the cup.
5. Sprinkle a small amount of water over the seeds. The soil should be wet.
6. Place the cups in a sunny spot.
7. Give students paper to set up a simple graph. This graph will allow the students to record measurements over a period of 7-10 days.
8. In a few days, the grass seed will begin to send out roots and the grass will begin to appear.
9. Allow time each day for students to measure the length of the grass using a ruler.
10. Compare student results. Which plant had the most growth? What differences are observed?

Extension/Modification Activity: As an extension, allow students to use colored permanent markers to create faces on the cups. The growing grass will appear to be the hair. Students can then have fun giving the face a haircut using scissors.



Metamorphosis (3-8)

Curriculum Connections: Science

Materials: Pencils, computers or library resource materials, paper

1. Students will need to research the life stages of the assigned insect by using a computer or other library resources.
2. After collecting the facts, students will draw the life cycle stages of the specific insect on paper.
3. Have students share findings. Which of the insects go through a complete metamorphosis? Which insects go through an incomplete metamorphosis?
4. Display life cycle drawings.

Extension/Modification Activity: Students can create models of the various stages of the life cycle using air dry clay or other craft materials.

Quick Growing Seeds (K-5)

Curriculum Connections: Science, language arts

Materials: Four types of seeds from a natural foods store (mung beans, mustard seeds, alfalfa seeds, and aduki beans suggested), 4 large glass jars with lids, strainer, sink, paper towels, magnifying glasses

Day One

1. Give each student a sample of each seed/bean and a magnifying glass.
2. Compare and contrast the seeds/beans describing size, shape, and color.
3. While students are observing the seeds/beans, label one jar for each seed/bean.
4. Have the students watch as you place the mung beans in the strainer, and rinse with water.
5. Next, place the mung beans in the mung jar. Fill the jar half way with warm water and screw the lid on loosely.
6. Place the mung jar on a windowsill overnight.
7. Complete the same process with the other three seeds/beans.
8. Ask students what they think will happen overnight.

Day Two

1. Have students compare the four jars.
2. Use the strainer to drain the water from each jar of seeds/beans and rinse with cold water.
3. Give each student one seed/bean that has sprouted. Using a magnifying glass, ask for observations. Did all of the seeds/beans sprout?
4. Place seeds/beans back into the jar and screw lid back on loosely.
5. Complete the same process with the other seeds/beans.
6. Watch them grow! Which ones will grow the fastest in the next few days?
7. Continue rinsing the seeds/beans each day while conducting this experiment to avoid mold.
8. Allow students to use the magnifying glasses to compare the sprouts each day. Compare and contrast growth.



Extension/Modification Activity: Students can use their fingers to dissect the tiny plants growing in the jars. Magnifying glasses can be used to get a closer. Older students could form a hypothesis and record findings on graph paper each day.

The Adventures of My Seed (3-8)

Curriculum Connections: Language arts, science

Materials: Writing paper, pencils, crayons or colored pencils, magnifying glasses, various flower seeds (marigold, zinnia, daisy), book *The Dandelion Seed's Big Dream* by Joseph Anthony

1. Read *The Dandelion Seed's Big Dream* to the students.
2. Discuss the adventures of the dandelion seed. Where did it start? What places did it go? How did the seed feel during its travels?
3. Give each student a pencil, paper, one seed and a magnifying glass.
4. On paper, ask students to describe the seed using detailed language. Details must include size, shape, and color.
5. Students will then create a short story using the seed as the main character.
6. Be sure to encourage creative ideas. Stories should include answers to the following questions: Where did the seed come from? Where will the seed go to start growing? What type of weather will it endure? How long before rain starts to fall? How long will it take to start growing? Who will take care of it? Will it grow a flower? What will it look like when it is fully grown? Will it have seeds? Then what?
7. Students may draw pictures with crayons or colored pencils to go along with the storyline.
8. Once enough time has lapsed, allow students time to share their stories.

Extension/Modification Activity: Students can create a booklet by folding five pieces of paper in half. Students could be partnered up with a lower grade level to read the creative seed adventures to younger students.

Measuring Growth (3-8)

Curriculum Connections: Science, math

Materials: Graph paper, rulers, paper, various seeds (marigold, zinnia, grass), soil, clear cups, large baggies, water, permanent marker

1. Provide various seed choices for the students to pick from. Have each student choose one type of seed to plant in a clear cup with soil. Moisten the soil.
2. On the outside of the cup, record the date and the type of seed planted with a permanent marker.
3. Place the cup into a baggie and seal. Place the cup in a sunny window.
4. Give each student a piece of graph paper to record the growth of the seed over a two-week period of time.
5. Along the bottom axis of the graph have students write one day increments (0-10 days).
6. Along the left axis have students write one inch increments (0-12 inches).



7. Each day, students should use a ruler to measure plant growth and record results on the graph. Students may want to include other visible observations on the back of the graph for each day of the experiment.
8. When the plant is big enough, remove the baggie. Plant should not touch the side of the baggie during this experiment.
9. At the end of two weeks, compare and contrast the growth and observations of the various seeds planted. Which seeds grew the fastest? Which seeds grew leaves first?

Extension/Modification Activity: If students have access to an outdoor garden area, use these plants for a garden outdoors. Observations can continue until flowers are visible. Flowers can be dissected to identify the parts of the plant responsible for reproduction.

A Seed is Sleepy (K-5)

Curriculum Connections: Language arts, science

Materials: *A Seed Is Sleepy* by Dianna Hutts Aston, a variety of seeds, paper, pencils

1. Read *A Seed Is Sleepy* by Dianna Hutts Aston with the students and ask them to focus on the descriptive words used throughout the book.
2. Distribute paper, pencils, and a few seeds to each student.
3. On paper, have students brainstorm a list of descriptive words for their seeds. Words should describe shape, color, size, and texture.
4. Using the descriptive words listed, have students complete a paragraph beginning with the sentence "A seed is...".
5. Encourage students to share paragraphs.

Extension/Modification Activity: Have students create a Venn diagram to help sort the seeds. Students can compare characteristics of various seeds provided.



WEB RESOURCES FOR TEACHERS AND STUDENTS

The Children's Butterfly Website

<http://www.kidsbutterfly.org/life-cycle>

Butterflies and Moths of North America

<http://www.butterfliesandmoths.org/>

Pollinator Partnership

www.pollinator.org

SUGGESTED PRINT RESOURCES FOR STUDENTS

Krauss, Ruth, and Crockett Johnson. *The Carrot Seed*. New York: Harper & Brothers, 1945. Print.

Carle, Eric. *The Hungry Caterpillar*. New York: Philomel Books, 1969. Print.

Anthony, Joseph, illustrated by Cris Arbo. *In a Nutshell*. Nevada City, CA: Dawn Publications, 1999. Print.

Anthony, Joseph, and Cris Arbo. *The Dandelion Seed's Big Dream*. Nevada City, CA: Dawn Publications, 2014. Print.

Ward, Jennifer, illustrated by Lisa Falkenstern. *The Busy Tree*. New York: Marshall Cavendish Children, 2009. Print.

Richards, Jean, illustrated by Anca Hariton. *A Fruit is a Suitcase for Seeds*. Brookfield, CT: Millbrook Press, 2002. Print.

Jordan, Helene J., illustrated by Loretta Krupinski. *How a Seed Grows*. New York: Harper Collins Publishers, 1992. Print.

Gibbons, Gail. *Ladybugs*. New York: Holiday House, 2012. Print.

