



# Seeds and Sprouts

## 1<sup>st</sup> Grade

### Standards

GPS S1L1 c  
NGSS 1.LS1.1

### Time

Day 1 - 30 min  
Day 2 - 1 hr, 15-30 min  
Day 3 - 30 min  
Day 4 - 30 min + germination time  
Day 5 - 1 hour

### Supplies

8 sets - Variety of fruits and vegetables for sorting by teams of 4  
Seeds and kitchen veggie scraps (raw)  
Jars and glasses for rooting  
Toothpicks for keeping avocado seeds half in and half out of water  
Soil, preferably with aged compost  
School garden area  
Bucket or trash can for potatoes

### Garden Connection

Students will grow many of the plants needed for this lesson in the school garden.

### Overview

Students will harvest edible plant parts from the garden, investigate structure and function of those plant parts, and argue from evidence about which parts are fruits. They will save seeds from the garden and grow new plants from seed. In addition, they will propagate plants by encouraging new growth on old plant parts, creating a “kitchen scrap garden.”

### Essential Question

How are new plants grown? What is a fruit? What is the connection between a flower and a fruit? What is the purpose of a flower? The purpose of a fruit? Can a plant be grown any other way than by seed?

### Engaging Students

Students will watch time lapse films of flowers fading and growing into fruits.

### Exploration

Students will observe and dissect plant parts to investigate the connection between structure and function and determine what constitutes a fruit. They will argue from evidence in support of their conclusion.

### Explanation

Students will argue from evidence regarding which plant parts are fruits.

### Environmental Stewardship

Students will create a kitchen scrap garden using saved seeds and leftover portions of (raw) plant roots and stems.

### Evaluation

A rubric is attached to assess student performance in lesson activities and demonstration of understanding.

### Extension

Students may grow white potatoes from potato chunks planted deep in a bucket or trash can.

## Standards

### Georgia Performance Standards in Science

S1L1. Students will investigate the characteristics and basic needs of plants and animals.

c. Identify the parts of a plant.

### Next Generation Science Standards

1.LS1.1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs

## Teacher Preparation

Plant and harvest with the timing of this lesson in your scope and sequence, in mind. Supplement with plant parts from the grocery, if needed. Find a way to project the films identified in the Engage section.

## PROCEDURES FOR LESSON ACTIVITIES

Day 1

### Engagement (30 min)

Students will watch time lapse films showing the growth of fruits from flowers, on a smartboard or lcd projector and monitor. Show students several time lapse films of fruit developing from flowers, such as these: [apple](#) simulation, [dragonfruit](#), [zucchini](#), [pear](#), [clay fruit](#), [dandelion](#). After watching the films, divide students into teams of four and ask them to come up with a definition of a fruit. Record each group's definition without correcting.

Day 2

### Exploration (45 min – 1 hour)

Harvest edible plant parts from the school garden and / or grocery store. These should include some sweet fruits (grapes, strawberries, apples, blueberries, bananas, etc.); some fruits that are not sweet and which often referred to as vegetables (squash, beans, eggplant, tomatoes, etc.); and some non-fruits that are considered vegetables (carrots, lettuce, celery, onions, etc.).

Provide each team with at least three clean, edible plant parts and tools to investigate them, such as magnifiers and cutting instruments. (A cake server with a serrated edge, such as the kind some grocery store bakery departments give away for free, is safer and may not conflict with school rules against student use of knives). Demonstrate safe cutting techniques. Invite students to practice cutting bananas with peeled fruit flat on table, fingers curled out of the way on hand holding banana, and cake server cutting down towards table,). Tell each team to investigate the plant parts provided by observing, touching, cutting, or tasting, and to sort them into two categories: fruits and non-fruits.

### Explanation (30 minutes)

Give a spokesperson from each team a chance to explain their rationale for deciding whether the plant parts were fruits or non-fruits. Encourage students to ask each other what evidence they have for their conclusions. Allow students to revise their definitions of fruits, as necessary. Ultimately, students will reach a consensus that a fruit is a plant part that grew from a flower and contains seeds for making new plants. Students should re-sort their plant parts into categories based on the class's revised definition of fruit. Students may use the Lab Report form to draw and label a flower with w fruit growing behind it.

## Day 3

### **Environmental Stewardship** (30 min to propagate, 2 – 3 weeks to germinate, 1 hour to plant)

Students can create a small school garden by growing plants from seeds and from sprouts. After eating fruits at home or in the school cafeteria, students can bring seeds from fresh pumpkins, peaches, tomatoes, avocados, bell peppers, chestnuts, lemons or apples.

Explain to students that – in addition to growing a new plants from seed – many plants can also sprout new growth on the end of the old plant if given a chance to grow roots. Ask students to bring in (raw) scraps of stems and roots that are cut from vegetables at home, to see which can be coaxed to re-grow. For example: celery, bok choy, romaine lettuce and cabbage will all re-grow from the root end. Just place the whitish root end in a shallow bowl of water, cut side up. Do not cover top of plant part with water (though it is helpful to mist the top). Garlic, ginger, and onions can re-grow if the root portion is placed directly in nutrient-rich soil (such as soil enriched with compost). Carrot tops can regrow, after cutting the carrot off and setting the top in shallow water. Basil and other herbs can regrow from cuttings placed in water, with bottom leaves pulled off. Pineapples re-grow in soil from the leafy top, as long as no fruit remains attached.

Sections of regular potatoes with eyes, as well as top and bottom halves of sweet potatoes, can be re-grown if placed in shallow water or covered in soil, though many non-organic plants are treated to stop them from sprouting. After cutting potatoes into sections that include several eyes (or cutting sweet potatoes in half across the middle), let the cut sides harden or “cure” for a day or two before placing in shallow water or soil. After sweet potato “slips” with leaves form, twist off the slips and root them in water before planting them in soil. All plants that are started in water will grow well when transferred to nutrient-rich soil, after roots and first leaves form. Scroll down to the bottom of [this article](#) to see a Whole Foods chart that illustrates how to re-grow different edible plants from leftover parts.

After the kitchen scraps have grown roots and leaves, students can transfer them to the school garden to grow. Be sure to have students mark the plants so they will know what is growing where.

### **Evaluation**

A rubric is attached to assess student performance in lesson activities and demonstration of understanding.

### **Extension**

Students may also want to try growing white potatoes from scraps in a bucket or trash can full of potting soil, according to [these directions](#). (Sweet potatoes are not recommended for this approach, because they prefer heat, must be kept moist for the first two or three weeks, and like sandy soil).



# Seeds and Sprouts Lab Report




Name: \_\_\_\_\_

**Draw a picture of a flower that shows a fruit forming behind it. Label the flower and fruit.**



## Assessment for Seeds and Sprouts

Student Name(s): \_\_\_\_\_ Date: \_\_\_\_\_

<p style="text-align: center;"><b>Level of Mastery</b></p> <p style="text-align: center;">↓</p> <p style="text-align: center;">→</p> <p style="text-align: center;"><b>Benchmark or Performance Measure</b></p>	 <p style="text-align: center;"><b>EMERGING</b> Not yet proficient 1 point</p>	 <p style="text-align: center;"><b>COMPETENT</b> Partially proficient 4 points</p>	 <p style="text-align: center;"><b>PROFICIENT</b> Mastered task 5 points</p>	<p style="text-align: center;"><b>TOTAL POINTS</b></p>
<p><b>Plant Parts Sorting</b></p>	<p>Students sort plant parts into two groups</p>	<p>Students sort plant parts into two groups: fruits and others, with some errors</p>	<p>Students sort plant parts into two groups: fruits and others, using seeds as criteria for fruits</p>	
<p><b>Argumentation</b></p>	<p>Students argue from evidence about which plant parts are fruits but do not establish criteria for sorting</p>	<p>Students argue from evidence that any plant parts that can produce new plants are fruit; or fruit is always sweet; or other incorrect criteria</p>	<p>Students argue from evidence that only plant parts with seeds can be considered fruits, and all fruits come from flowers</p>	
<p><b>Environmental Stewardship: Kitchen Scrap Garden</b></p>	<p>Students help plant a kitchen scrap garden.</p>	<p>Students harvest or save seeds and use them to plant a kitchen scrap garden</p>	<p>Students propagate cuttings from stems and roots, and harvest seeds from uneaten raw foods to plant a kitchen scrap garden</p>	