

**Outline of Lesson
Growing with Seeds
Unit 1, Lesson 3
Grade 1-3**

Lesson Time: 60 Minutes

Lesson Outline:

1. Functions and Parts of Seeds

- Seeds store and protect the baby plant

2. Seeds as a Good Source of Protein

- Healthy Meal: Meat and Beans
- Seeds (including beans) give us protein to help us grow, heal, and build strong muscles

3. Planting our Outdoor Vegetable Garden

- Planting a variety of seeds in the outdoor vegetable garden

4. Role Play “Room to Grow” Skit

- Learning about plant requirements for space

Student Learning Objectives:

By the end of this lesson students will:


- Know the functions of seeds.
- Recognize that seeds are a healthy source of protein.
- Be able to list three ways that protein benefits our bodies.

References:

- Fortin, Francois and D’Amico, Serge. The Visual Food Encyclopedia: The Definitive Practical Guide to Food and Cooking. MacMillan, 1996.
- Pranis, Eve and Cohen, Joy. GrowLab: Activities for Growing Minds. National Gardening Association, 1990.
- University of California Cooperative Extension, San Mateo County. TWIGS: Teams with Intergenerational Support Gardening and Nutrition curriculum. 1997.

Growing with Seeds

Overview (for Teacher)

Pre-Class Preparation	Collect magnifying glasses to use with class, if available.
Teacher Involvement During Class 	<ul style="list-style-type: none">• Lead students in “Room to Grow” skit.• Assist in behavior management of students.
Post-Class Teacher Responsibilities	<p><u>Seed Snack</u></p> <ul style="list-style-type: none">• Have students wash hands, or serve snack after the students have already washed their hands to reinforce food safety issues being taught in CHANGE.• Hand out sunflower seed snack to students. <p><u>Gardening</u></p> <ul style="list-style-type: none">• If possible, take students to the garden to observe seeds that were planted and watch for new growth.
Vocabulary	<p>Protein- a nutrient found in food that helps our body grow, helps cuts heal, and builds strong muscles. Animal sources of protein include fish, chicken, and eggs. Plant sources of protein include nuts, seeds and beans.</p> <p>Seed- the part of a plant from which a new baby plant can grow.</p> <p>Sprout- a new baby plant from a growing seed.</p>
Critical Thinking Activity	Role Play “Room to Grow” Skit
Supplementary Activities	Student Assessment
Web Resources	Protein for kids: http://kidshealth.org/kid/stay_healthy/body/protein.html
Suggested Books for Reading in the Classroom	<ul style="list-style-type: none">• Gibbons, Gail. <u>From Seed to Plant</u>. Holiday House Inc., 1993.• Robbins, Ken. <u>Seeds</u>. Atheneum Books, 2005.• Jennings, Terry J. <u>Beans</u>. Garrett Educational Corporation, 1995.• National Science Teachers Association. <u>Dig In - Hands On Soil investigation</u>. NSTA, 2001.

Growing with Seeds

EALR & GLE Alignment

EALR	GLE	Lesson Applications
<p>Science</p> <p>1.2 Understand how components, structures, organizations, and interconnections describe systems</p> <p>1.3 Understand how interactions within and among systems cause changes in matter and energy</p> <p>2.1 Developing the knowledge and skills necessary to do scientific inquiry</p>	<p>1.2.1 Understand that things are made of parts that go together</p> <p>1.3.10 Know that plants and animals need a place to live</p> <p>2.1.2 Understand how to plan and conduct simple investigations following all safety rules</p>	<ul style="list-style-type: none"> • Functions and Parts of Seeds • Planting our Outdoor Vegetable Garden • Role Play Room to Grow Skit • Seed Dissection Observations • Check on Plants in Outdoor Garden
<p>Health and Fitness</p> <p>1.4 Understand the relationship of nutrition and food nutrients to physical performance and body composition</p> <p>2.1 Recognize patterns of growth and development</p> <p>2.2 Understand the concept of control and prevention of disease</p> <p>3.3 Use social skills to promote health and safety in a variety of situations</p>	<p>1.4.1 Identify the nutrients provided by a variety of foods and describe how bodily functions and physical performance are affected by food consumption</p> <p>2.1.1 Describe the influence of nutrition on health and development</p> <p>2.2.1 Identify and demonstrate skills that prevent and reduce the risk of contracting and transmitting communicable diseases</p> <p>3.3.1 Express emotions constructively and form safe and respectful relationships</p>	<ul style="list-style-type: none"> • Seeds as a Good Source of Protein • Functions and Parts of Seeds • Hand Washing • Planting our Outdoor Garden (in teams)
<p>Communication</p> <p>1.1 Focus attention (Listens for a variety of purposes and sustains attention)</p> <p>3.1 Use language to interact responsibly and effectively with others</p> <p>3.2 Work cooperatively as a member of a group</p>	<p>*GLE not available at this time</p>	<ul style="list-style-type: none"> • Planting our Outdoor Garden (in teams) • Planting our Outdoor Gardens (in teams) • Role Play “Room to Grow” Skit

Growing with Seeds

Preparation Outline

Activity Supplies

⊗ *Items marked with this symbol may not be purchased using FSNE funding, nor included as part of cost share*

Seed Dissection

- Soak and sprout bean soup mix prior to classes (1 seed/student). **Soak for 4 days prior to class, change water twice a day.**
- Magnifying glass (1 per student)

Healthy Meal

- Plastic lunch tray
- Purple food group label (Meat and Beans)
- Protein food cards or models
- Tape
- 1 oz serving size of nuts or seeds (2 ounce equivalents)
- 1 animal protein food model to show serving size

Outdoor Garden

- ⊗ Variety of seeds (lettuces, chard, kale, bok choy, radish, etc)
- ⊗ Watering can
- ⊗ Popsicle sticks
- Magnifying glass (use from bean dissection)

Healthy Snack

- 1 ½ cups sunflower seeds (1 tablespoon per student)

Review

- 4' long piece of butcher block paper (Plant Part Poster)
- Marker
- 6 snack-size bags of seeds with name of seed written on bag in permanent marker (sunflower, sesame, pumpkin, poppy)—a different kind for each learning team
- Classroom Tasting Challenge checklist

Overheads	Diagram of a Seed
Student Handouts	None
Teacher Handouts	<ul style="list-style-type: none"> • “Room to Grow” Skit instructions • Student Assessment and Answer Key
Changes for K and ELL Classes	Omit detailed discussion on seed parts
Rainy Day Activity Supplies	<ul style="list-style-type: none"> ⊗ Soil ⊗ Seed flats

Growing with Seeds

Outline

Content

Introduction and Lesson Overview (2 Min)

We have learned about the different food groups that make up a healthy meal. Today we will be learning more about the meat and bean group. We are also going to learn about the functions of seeds.

Functions and Parts of a Seed (15 Min)

- **Seed Dissection**

Today we will observe and dissect seeds to learn about the parts of the seed and why seeds are important.

Seed Dissection

- Show the overhead diagram of a seed.
- Hand out a soaked bean to each student.
 1. Peel off the outer skin or seed coat, this part helps protect the seed the way our skin helps protect our bodies.
 2. Split the bean in half lengthwise by pressing your thumbnail into the seam separating the bean halves.
 3. Find the tiny plant at the end of the seed.
 4. Use a magnifying glass to look at parts of the seed (baby leaves, baby root, cotyledons).

- **Dissection Observations**



- Teach the function, role and parts of the seed through observations (function of seed is to protect the baby plant inside and give it food to eat when it germinates).
- This seed is a dicot. It has two cotyledons (seed leaves). Di=two.

- **Functions and Role of a Seed**

- Have students give a scientific definition of a seed.
- The seed contains the baby plant along with all of the nutrients required for the plant to start growing.
- The seed stores the food (protein) that is needed for the plant's growth.

- **Parts of a Seed** (Do not lecture on these points, discuss definitions throughout the activity.)

Seed Coat: outer protection of the seed, usually paper thin.

Embryo: part that will grow into a plant (a plant in its infant stage).

Germinate: when seeds start to sprout, or grow shoots and roots.

Sprout: new growth of a plant from a germinating seed.

Seeds as a Good Source of Protein (10 Min)

- **Healthy Meal: Meat and Beans**

Healthy Meal: Meat and Beans

- Show the empty Healthy Meal tray.
- Today we are going to learn about the first food group on our healthy meal tray, the meat and beans group.

This food group is a good source of protein. Can anyone tell me what foods fit into this food group?

- Make a list on the board of all the foods named by students. Bring food models or pictures of food from the meat and bean group so the students can see examples of foods that fit into this category.
- Select one of the food models and place it on the healthy meal tray.
- **Serving Sizes:** Have each student hold out their hands. It is recommended that you eat 1 serving of protein at each healthy meal. One serving of animal protein from meat is the size of the palm of one of your palms, or a deck of cards (2 oz). One serving of plant protein from nuts, seeds or cooked beans is approximately the amount you can fit into both palms (1 oz nuts or seeds, 1/2 Cup beans). Mention that the hamburger that they eat at lunch is 2-3 servings, and they can use their palms to gauge that when they are eating lunch.
- **Additional Information for Educator:** For the purposes of this lesson, 1 serving = 2 ounce equivalents. According to the MyPyramid Food Guidance system, children should eat 5 ounce equivalents from the meat and beans group each day. Examples of 1 ounce equivalents include:
 - 1 Tablespoon peanut butter
 - 1/2 Ounce nuts or seeds (~12 almonds, ~4 walnuts)
 - 1/4 Cup cooked beans
 - 1/4 Cup tofu
 - 1 Ounce meat (3 thin slices deli meat)
 - 1 egg

Nutrition Information about Seeds

- Nuts, seeds, and beans are great foods to eat for protein, and they are plants we can grow in our gardens. When we eat seeds instead of planting them, we are getting the food protein that is stored for the baby plant.
- Can anyone tell me how protein helps our body? (Take all answers from the students)
- Protein helps us grow, helps heal cuts, and it builds strong muscles.

Planting Our Outdoor Garden (30 Min)

- Now that we talked about how protein helps our body and what foods are high in protein we are going to go out to the garden to plant seeds. The garden is another part of our classroom, so we will call it our

- **Brainstorm gardening behaviors as a class**

- **Instructions for planting** (Discuss with students in classroom)

- **Plant garden outside:** ½ class performs “Room to Grow” skit with teacher while other ½ plants with CHANGE educator. Switch after 10 minutes.

- **K,ELL and 1st graders should do all activities together with educator**

outdoor classroom. We need to listen, work together, stay on task, and use indoor voices even though we are outside.

- Ask students to brainstorm other behaviors in the garden, and write on plant part poster / learning contract. Be sure to include the following behaviors:
 - Use tools safely
 - Respect for plants, property and animals (always return worms to the garden after looking at them)
 - Don't step on or in the garden beds because there may be seeds inside even if you don't see anything growing
 - Follow instructions

Planting Instructions

- Today we will be planting peas, radishes, and carrots in our outdoor garden.
- Remind students to think about what they learned about planting in Lesson 2.
- Teach them to make furrows, use fingers or sticks to measure spaces between seeds, and always water seeds after planting.
- Tell them that we are planting different kinds of seeds, and they have different spacing needs and depth needs (bigger seed=deeper, bigger plant=more space).

Planting

- **Explain Planting procedures.** Each student will get to plant 3 seeds – one of each type of seed being planted.
- Have the students gather around the garden so they can all see the educator.
- Demonstrate the steps to planting a seed. First, flatten the ground so that it is level. Second, make a furrow with your hand. Third, plant the seeds. One at a time give each student a seed to plant in the first furrow. Ask a helper to write out the name of the vegetable on a popsicle stick that will be planted. Have the students place the seed in the furrow and then use their pinky finger to measure the distance between the seed for the next person in line. Once every student has gone through the line, close the furrow and pat the seeds to bed. Go through the same process for all of the vegetables that will be planted.
- Follow seed spacing instructions on the back of the seed packet for each vegetable.
- Bring magnifying glasses for students who are not actively planting. Have them observe the soil and what

is living in it.

- **Importance of proper watering**

Watering

- Explain that seeds are very small, so they need a lot of water, but they also could get lost in the soil if they get too much water. Tell them the soil has the right amount of water if it feels moist like a sponge.
- Have students do a “water test” by sticking their finger into the soil. If it is moist as deep as the plants roots, that is enough water.

- **Wash Hands**

Hand Washing

Remind students that they need to wash their hands after gardening. Each student should wash his or her hands with warm water and soap for 20-25 seconds.

Role Play “Room to Grow” skit



- **Act One:** Divide class by combining 2 cooking teams: one half of the class does Act 1 while others observe and then the 2nd half of class does Act 2.

Purpose: to learn the importance of spacing and thinning of plants.

Act One

- We are going to pretend we are plants growing in a garden and role play the spacing needs of plants.
- We are going to pretend to be plants in a garden plot. Form 2 rows of 3-5 people, shoulder to shoulder. Each row close together (approx. 1 foot).
- Everyone squat and pretend we are a seed. It rains and slowly we begin to grow (start to stand up slowly).
- As seeds grow, they get leaves, everyone **SLOWLY AND CAREFULLY** try to extend your arms being aware of your neighbor.

Ask the following questions:

- What happened?
- Do you have enough space to extend your arms?
- Do you think you can each get enough food and water?
- Have them slowly turn to the sun. Do you think you would get enough sunlight?
- How can we change our spacing so we are not so crowded?

- **Act Two:** Thinning: competition for nutrients

Act Two

- Have students plant themselves shoulder to shoulder like they did in Act One.
- Have students grow by standing up.
- Demonstrate ‘thinning’ by removing plants.
- Now have the students extend their arms (grow leaves)
- Purpose of thinning: Creates more space and decreases competition for nutrients.

Ask the same questions as above



If there is extra time:

- Explain that when we plant inside, the plants are not going to grow to full maturity, so we can plant them closer together than we would if we were planting outside. For example, how much space do they think lettuce needs to grow big? Compare that with the space a sunflower sprout would need.

Healthy Snack (2 Min)

Give the healthy snack of seeds to the classroom teacher (in front of the students). After class the teacher will give approximately 1 Tablespoon to each student as a protein-rich snack. Students should wash their hands before eating the snack.

Review and Reflection

- **Seeds on Plant Part Poster**

- **Plant Part Poster:** Hang poster in front of class. Explain that this is our plant part poster. *Each time I come I will draw a different part of the plant and we will learn about that part.*
 - In this lesson we learned about seeds. (Draw seeds)
 - Give each learning team a bag of seeds (sesame seeds, sunflower seeds, poppy seeds, pumpkin seeds). Have one person from each team take a bag of seeds and tape it onto the plant part learning contract. (Goal is for students to identify as many seeds that we eat as possible)
 - If time, let each student take a seed from the bag and taste and smell it.
- **Outdoor Garden:** Ask students to give their observations about the outdoor garden.
- **Conduct the Classroom Tasting Challenge:** After tasting the seed snack, ask students to raise their hands to show you how many students tasted, liked or did not like the snack. Record the number of students who raise their hands in the appropriate column on your Classroom Tasting Challenge checklist, out of the total number of students in class that day.

- **Check in on plants**
- **Classroom Tasting Challenge**

Lesson Materials

Growing with Seeds

- **“Room to Grow” Skit**
- **Diagram of a Seed**

Supplementary Activities

- **Student Assessment**
- **Assessment Answer Key**

“ROOM TO GROW” SKIT

(Educator Instructions)

Purpose: to learn the importance of spacing and thinning of plants.

1. Divide class in half: ½ class does Act 1 while others are “audience members” and then 2nd ½ of class does Act 2

Act One

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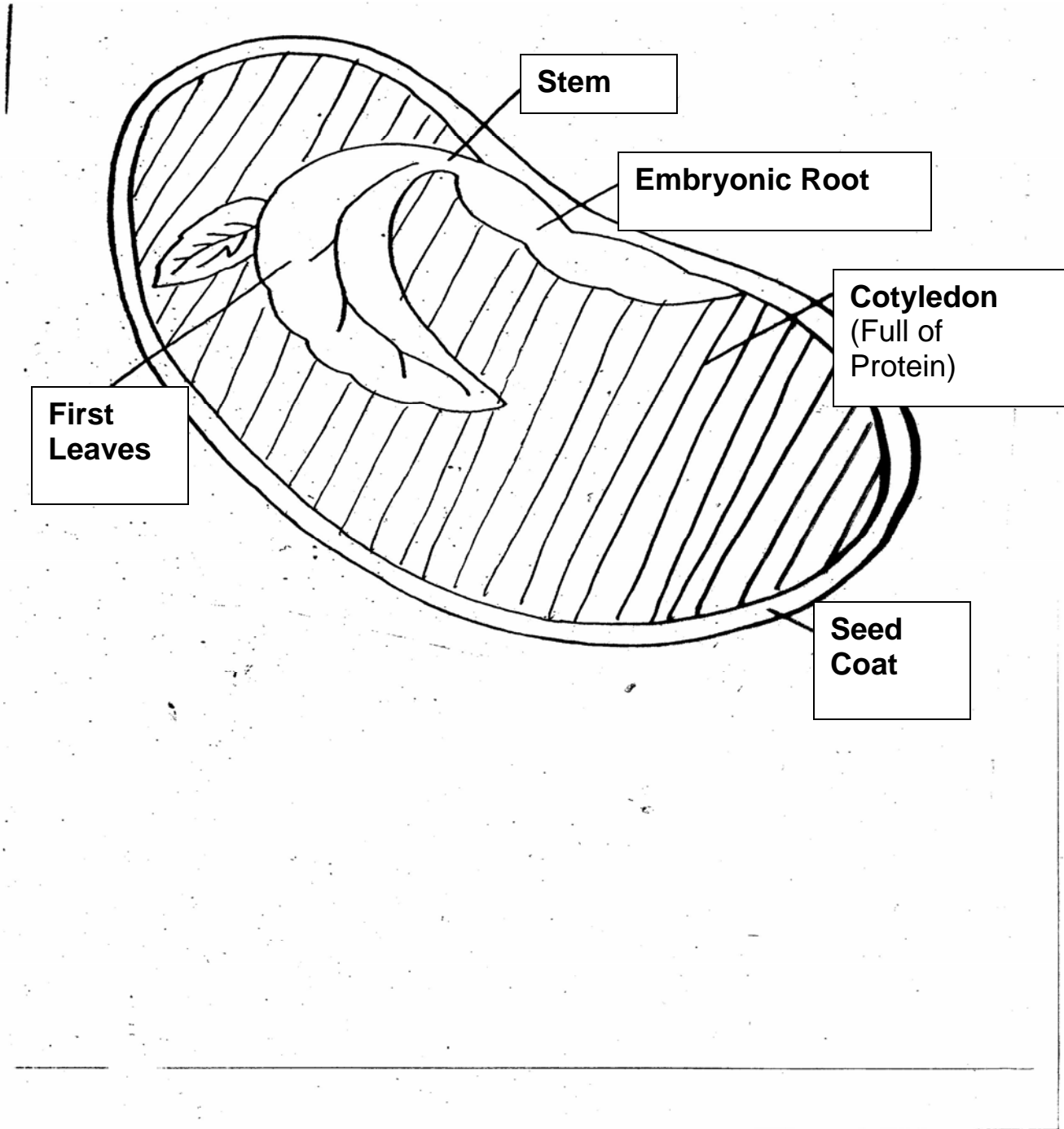
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Explain that when we plant inside, the plants are not going to grow to full maturity, so we can plant them closer together than we would if we were planting outside. For example, how much space do they think lettuce needs to grow big? Compare that with the space a sunflower sprout would need.

Diagram of a Seed



Adapted from: University of California Cooperative Extension, San Mateo County. TWIGS: Teams with Intergenerational Support Gardening and Nutrition curriculum. 1997

Growing with Seeds

Name: _____ Date: _____

Directions: For each question, circle True or False

1. True or False: One job of a seed is to protect the baby plant.
2. True or False: Protein helps your body grow.
3. True or False: Sesame is a type of seed you can eat.
4. True or False: It doesn't matter how close together you plant seeds.

Assessment Key

Growing with Seeds

1. True

2. True

3. True

4. False