

GROW YOUR PALS PROGRAM GUIDE



THE NATIONAL FFA MENTORING PROGRAM

Sponsored by



LESSON 1.8

Creating Artwork with Seeds

Unit:
PLANTS AND GARDENING

PRECEPTS

- J. Mental Growth
- J2. Think creatively

NATIONAL STANDARDS

- CS.01.01.01.a. Work productively with a group or independently.
- PS.01.03.01.a. Explain the basic process of photosynthesis and its importance to life on Earth.
- NL-ENG.K-12.12 – Applying Language Skills
- NS.K-4.3 Life Science



Lesson Type:
Small Group

STUDENT LEARNING OBJECTIVES

As a result of this lesson, the student will ...

- Define **germination**.
- Identify the three basic parts of a seed.
- Explain how the young plant is 'fed' by materials from inside the seed.





TIME

Instruction time for this lesson: **30 minutes.**



RESOURCES

www.indoorherbgarden.org



TOOLS, EQUIPMENT AND SUPPLIES

- ✓ PALS1.8.SG.TM.A – one per group
- ✓ PALS1.8.SG.TM.B – one per group
- ✓ Paper towel – one per student
- ✓ Quick Sprouting Seeds - large supply – number will depend on the type of seed used. Collect enough for each student to create their artwork. There cannot be too many seeds
- ✓ Squirt bottle filled with water – one per group of three students
- ✓ Writing Utensil
- ✓ PALS1.8.SG.AS.A – one per student
- ✓ PALS1.8.SG.ASSESS.A – one per student

KEY TERMS



The following term is presented in this lesson and appears in ***bold italics***:

Germination



CONTENT OUTLINE

Objective 1. | Define ***germination***.

- I. Define ***germination***
 - A. ***Germination*** is the process in which a seed begins to grow
- II. Requirements of ***germination***
 - A. Correct amount of water, oxygen, temperature and light are required before a given seed will begin to grow or germinate

Objective 2. | Identify the three basic parts of a seed.

- I. Three basic parts of a seed
 - A. **Embryo**
 - 1. The **embryo** in the seed is the baby plant waiting to grow
 - B. **Seed coat**
 - 1. Located as the very outside of the seed, the **seed coat** protects the **embryo** and keeps it from drying out
 - C. Supply of nutrients

Objective 3. | Explain how the baby plant is ‘fed’ by materials from inside the seed.

- I. As **germination** begins, the baby plant cannot perform photosynthesis to provide itself with food.
 - A. Photosynthesis: the process in which a plant makes its food
- II. The nutrient supply within the seed provides the plant with enough energy to continue growth until the leaves emerge and can begin photosynthesis for the plant
- III. Activity: Writing with Seeds
 - A. Obtain needed materials
 - 1. Quick sprouting seeds (cress seeds work well)
 - 2. Paper towel
 - 3. Squirt bottle filled with water
 - B. Procedure:
 - 1. Dampen paper towel
 - 2. Have your PALS arrange the seeds on the paper towel in the shape of letters (Their name or initials is a great idea or their school’s mascot or name)
 - 3. Keep the seeds damp and warm
 - 4. In a few days, the seeds will sprout in the shape of the letters you’ve planted

INTEREST APPROACH

Before students arrive, have samples of oranges, grapes with seeds, apples and lemons—enough for each group of three students to see an example of each. As students arrive, instruct them to take their seats and to not touch the materials that are located at their tables. Welcome everyone and make proper introductions, if necessary.



Who will share with us one thing the items on our tables have in common?

Select a few students to answer the question. Answers will vary, from they are all fruits to possibly they all have seeds.



All of the items on our tables have seeds in them. Who will share with us why seeds are important to plants?

Students may or may not know the answer to this question. If they do not, respond letting them know that's OK because that's what we will learn about today.



Each of these pieces of fruit has a seed in it. Seeds are important in allowing the fruit to continue to produce new plants and grow. What could happen if these seeds were not a part of the fruit?

Allow students to respond.



Today we are going to learn about seeds and how those tiny little things can become a brand new plant. There are many different types of seeds, from these that we saw in the fruit to corn, beans, and even peanuts, each of which is important. This may make us hungry, but let's put our thinking caps on and get ready to learn more about a seed's transformation into a plant!

SUMMARY OF CONTENT AND TEACHING STRATEGIES

Before starting the content, have PALS1.8.SG.TM.A available for instruction. If an overhead or technology is not available, have the content on posters displayed large enough in the room for all students to see.



We just learned that seeds are important to plants. Seeds are baby plants just waiting to grow. When a seed grows, we call this **germination**.

OBJECTIVE 1. | Define *germination*



I. Define *germination*

A. **Germination** is the process in which a seeds begins to grow.

Display PALS1.8.SG.TM.A.



When we look at this picture, we see how a seed transforms into a baby plant, surviving on its own. The transformation taking place is called “**germination**.”

Refer to PALS1.8.SG.TM.A.



A seed can only germinate into a plant if the conditions are right. Who will tell us why it’s important to drink milk?

Allow a student to respond. Students should say to grow up big and strong or to make sure they are healthy. If they do not, help them think about their bones and making them strong.



When we drink milk, it makes us grow big and strong. If we were to only drink soda when we were little, then we may not grow as big and strong as we would if we drank milk. Plants are similar. Seeds need certain conditions to make sure the baby plants inside grow up big and strong.

What things might the seed need in order to grow up big and strong?

*Allow students time to think about what a seed might need for **germination** to occur. If they struggle, have them think about the season plants grow (some plants do not grow in the winter, so temperature may make a difference in whether a seed grows), what happens if you do not water a plant (plants need water in order to survive and will die without it), would a plant grow in the dark, and what happens to living things if they do not have oxygen to breathe?*



Thanks for brainstorming! Seeds require the correct amount of water, oxygen, temperature and light before they will begin to germinate, just like we need certain things, like food and sleep, to make sure we grow big and strong. Even if it has some of those things, if the conditions are not quite right, it will not grow to its potential.

II. Requirements of **germination**

- a. Correct amounts of water, oxygen, temperature and light are required before a given seed will begin to grow or germinate.

Make sure to have PALS1.8.SG.TM.B ready to display for Objective 2. The activity in Objective 2 will require the seeds to be cut in half. To expedite time, it is a good idea to cut the seeds before the lesson begins. If the seeds need to be cut during the lesson, only instructors should cut the seeds, not the students.



There are three important parts that make up the seed. We have already discussed one today. We said earlier that seeds were what, just waiting to grow?

Call on students. If they struggle, direct them to think that we have big adult plants, but a seed is really a baby plant waiting to grow.



A seed is a baby plant just waiting to grow, if the conditions are correct. Another name for a baby plant is an **embryo**. Reveal PALS1.8.SG.TM.B. On this diagram, which of the three things looks like the **embryo**? Allow students to look at the diagram and determine that the part labeled A is the **embryo** of the plant.

OBJECTIVE 2. | Identify the three basic parts of a seed.



I. Three basic parts of a seed

A. **Embryo**

1. The **embryo** in the seed is the baby plant waiting to grow



On this diagram, if we look at part A, this is the **embryo**, or the baby plant, waiting to grow.

Fill in the blank next to part A with the word 'embryo'.



OK, there are two more parts of the seed. Let's look at the part labeled B. Who will guess what this is called?

*Allow students to come up with ideas for what this part is called. The correct answer is **seed coat**. If a student guesses 'coat,' ask them why they came up with that answer. This will help students make the connection.*



Those were some great words. Raise your hand if you own a coat. *Allow students to raise their hands.*

Who will explain the purpose of a coat?

Allow students to talk about why we wear coats. From keeping us warm, to keeping us dry – allow students to understand that there are many different purposes of a coat.



Coats keep our bodies warm, dry and even shielded from the sun. Seeds actually have coats too! *Point to part B on PALS1.8.SG.TM.B.* The part that surrounds the outside of the seed is what we call the **seed coat**.

If we have coats that protect us, who would like to guess what the **seed coat** does for the seed?

*Allow students to respond. They should understand that the **seed coat** helps protect the seed, specifically the **embryo**. If they do not say **embryo**, point to part A on the diagram of PALS1.8.SG.TM.B and have them recite the word **embryo** so they can see that is what item it is protecting.*

B. **Seed coat**

1. *Located at the very outside of the seed, the **seed coat** is there to protect the **embryo** and keep it from drying out.*



The **seed coat** is the **embryo**'s protection, as well as making sure that the seed stays moist and does not dry out. Water is very important because one of the items a seed needs to germinate is: *allow students to say the word, WATER!*

Point at the part labeled 'part C' on PALS1.8.SG.TM.B.



There is one more part we will talk about today. Who will share a guess about what part C is on our diagram of the seed?

Allow students to guess what 'part C' is. If a student guesses food, ask them why would the seed have food?



Part C on our seed diagram is actually a supply of nutrients. Who can tell me why the seed would have a supply of nutrients?

Again, let students guess why there would be a supply of nutrients. The correct response is the food is for the **embryo** as it grows until the plant can supply food on its own through photosynthesis.

C. Supply of nutrients



When plants are grown they make their own food through a process called photosynthesis. In order to do this, they must have leaves to collect sunlight and air. Do we see any leaves from our seeds?



Allow students to say no. Some students may make the connection that the leaves are actually a part of the **embryo**, but have them understand those are inside, protected by the **seed coat**, so it cannot help make food.

OBJECTIVE 3. Explain how the baby plant is ‘fed’ by materials from inside the seed.



I. As **germination** begins, the baby plant cannot perform photosynthesis to provide itself with food.

A. Photosynthesis: the process in which a plant makes its food

II. The nutrient supply within the seed provides the plant with enough energy to continue growth until the leaves emerge and can begin photosynthesis for the plant.



Seeds do not have the ability to create their own food because they do not have leaves yet. The nutrients inside the seed are there to help them gain the strength they need to germinate into a mature plant.

Who has seen a seed germinate?

Allow students to respond. If some have seen a seed germinate, have them describe what they have seen – visually and also have them talk about the conditions that needed to be in place in order for it to grow.

For the next activity, each student will have a paper towel and each group of students (not more than three in a group) will share a squirt bottle of water and a collection of seeds. A demo set of materials will help demonstrate the procedures of the activity during explanation.

I. Activity: Writing with Seeds

A. Obtain needed materials

1. Quick sprouting seeds (cress seeds work well)
2. Paper towel
3. Squirt bottle filled with water

B. Procedure:

1. Dampen paper towel
2. Have your PALS arrange the seeds on the paper towel in the shape of letters (Their name or initials is a great idea or their school's mascot or name)
3. Keep the seeds damp and warm
4. In a few days, the seeds will sprout in the shape of the letters you've planted



Today let's setup an experiment so we can see seeds germinate AND have some fun! Each of you has a paper towel (*hold up demo paper towel*), seeds (*hold up demo seeds*) and a squirt bottle of water (*hold up the demo squirt bottle of water*) at your table. Please leave these items untouched at your table until you hear all the directions. Does everyone have the supplies listed for this activity?

Allow students to respond and resolve any issues.



Listen carefully as we get this experiment set up together. As we work through the activity, we will demonstrate the steps for everyone to see. As questions come to mind, please raise a hand so we can make sure that we are all still together!

During the activity, go through each step with the demo materials so students understand what is expected.



The first thing we will do is carefully take our paper towel (*hold up the demo paper towel*) and get it moist with our squirt bottle (*hold up the demo squirt bottle*). When I say SQUIRT, carefully take the squirt bottle and moisten the paper towel so that it is wet. Do not spray your paper towel so much that water drips off of it. Moisten it just enough so that you can tell there is water on the paper towel. We will allow 30 seconds to complete this task with everyone at your table. What questions are there?

Answer any questions that may come up.

SQUIRT

Monitor this action by circulating around the classroom. Make sure that students are moistening their paper towel – but not too much or too little. At the conclusion of 30 seconds, refocus the classes' attention.



The next step is fun! Seeing seeds germinate is neat, but what if we placed them in a pattern so when they all grew, they made a cool shape? The next step is just that. At each table is a supply of seeds. When I say SEED, take the seeds at your table and create a shape, symbol or even a word out of the seeds on our dampened paper towel. Please keep your symbols and words clean, powerful and positive.

Demonstrate this action for all the students to see.



You can even spell out your name! You will only be allowed to use what is at your table – there are no more. Take three minutes to complete this task. Who will explain to the group what we will do with our seeds?

Allow a student to explain the procedure.



Thank you. What questions are there before we get started?

Answer any questions.

SEED

Monitor students as they create their artwork. If students do not know what to create, again suggest their names or their school's name or mascot. They could also create a shape like a heart or star. At the conclusion of the three minutes, refocus the group's attention.



We will have some great artwork in here in a few days! In order to see our seeds germinate, who will share what conditions we need to control?

Allow students to think. References to material learned earlier in the lesson, or starting the thought process out by helping them with water, may get them thinking in the right direction.



That's right – light, temperature, water and air all must be present in the right amounts for seeds to germinate. Of those four items, which one item will we have the most control over?

Allow students to think. The correct answer is water because they will each individually control the amount of water placed on their paper towels. The other three will be controlled by the teacher or are not able to be controlled at all.



When you come in every day, make sure your paper towels are as moist as they are today. In a few days, our seeds should germinate and our paper towel will have sprouted seeds creating our artwork!



Seeds are amazing! We learned all about seeds today and their amazing structure and their ability to germinate. In a few days, we will see our artwork come to life all because of seeds. Let's review what we learned today about this amazing part of plants.



REVIEW / SUMMARY

Today we talked about **germination**, the requirements of **germination** and why seeds store nutrients for the **embryo**.

Pass out a copy of PALS1.8.SG.AS.A to each student along with a writing utensil.

We learned a lot of information. Now let's show what we know! When you hear the word LABEL, take the picture of the seeds (*Hold up a copy of PALS1.8.SG.AS.A*) and label the three parts. When you are finished labeling the picture, put your pencils down. Who will describe the activity we are about to complete? *Allow a student to rephrase the activity.* Thank you. Take one minute to complete this activity. What questions are there? *Answer any questions.*

LABEL

As students are labeling the picture of the seed, monitor progress and help where needed. At the completion of one minute, refocus group.



Who will share with the group what they labeled part number one? *Allow a student to answer. The correct answer is **embryo**.*

That's right – number one on the picture is the **embryo**. Who can tell me what the **embryo** is? *Allow a student to answer. The correct answer is the baby plant inside the seed.*



The **embryo** is the baby plant inside the seed, waiting to grow. Who will share with the group what they labeled part number two?

*Allow a student to answer. The correct answer is the **seed coat**.*



Number two is the **seed coat**. Who will share why the **seed coat** is important to the seed?

*Allow a student to respond. The **seed coat** is there to help protect the **embryo** and keep the seed moist.*



The **seed coat** is very similar to a coat we wear – it helps protect the **embryo** inside the seed and keep conditions right so that it will be ready to grow.

There's one more part – who will share what they labeled part number three?

*Allow a student to answer. The correct response is the **nutrient supply**.*



Part number three is the nutrient supply. Who can tell us why the seed needs a nutrient supply?

*Allow a student to answer. The seed needs a nutrient supply to give the seed nutrients during **germination** before it has everything in place to perform photosynthesis.*



Great job everyone on labeling our seeds! Thanks for being such hard workers today. It will be neat to see our artwork in a few days when our seeds begin to germinate! Make sure to keep those towels moist so that we give our seeds what they need to properly germinate. Next time we meet, we will look at something similar to a seed, but it is called a bulb. Keep those thinking caps on and remember what we learned today – it will help you next time!

APPLICATION



Large Group Idea

Have students look at different types of seeds and why some seeds germinate quicker than others.

*Students could discuss rate of **germination** and understand why not every seed will grow into a plant.*



One-on-One Idea

*Work with student to create an herb container garden from seed. Talk about the package labels that describe the different **germination** rates, water requirements, etc., for each type of seed. Work with students to make sure that seeds germinate and then allow them to use the end product of the herb.*

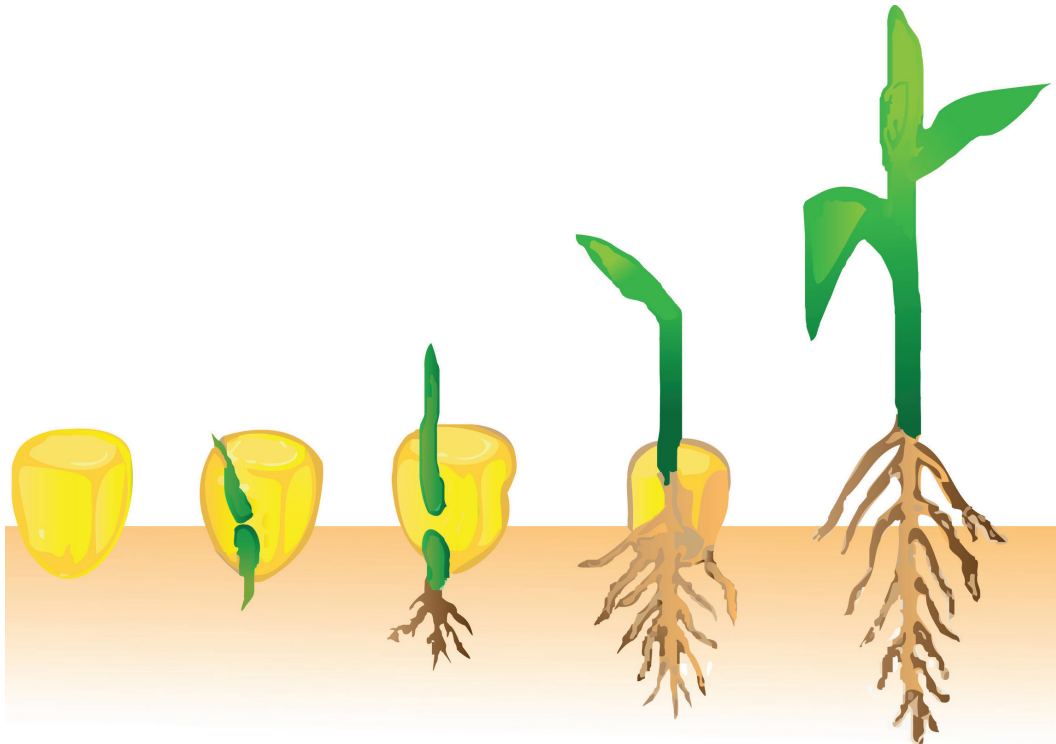


PALS1.8.SG.ASSESS.A | EVALUATION ANSWER KEY

- 1) Grow
- 2) Water, Light, Temperature and Air
- 3) Embryo, Seed coat and Nutrients
- 4) The nutrients help supply the embryo with energy through germination before it can produce food on its own.

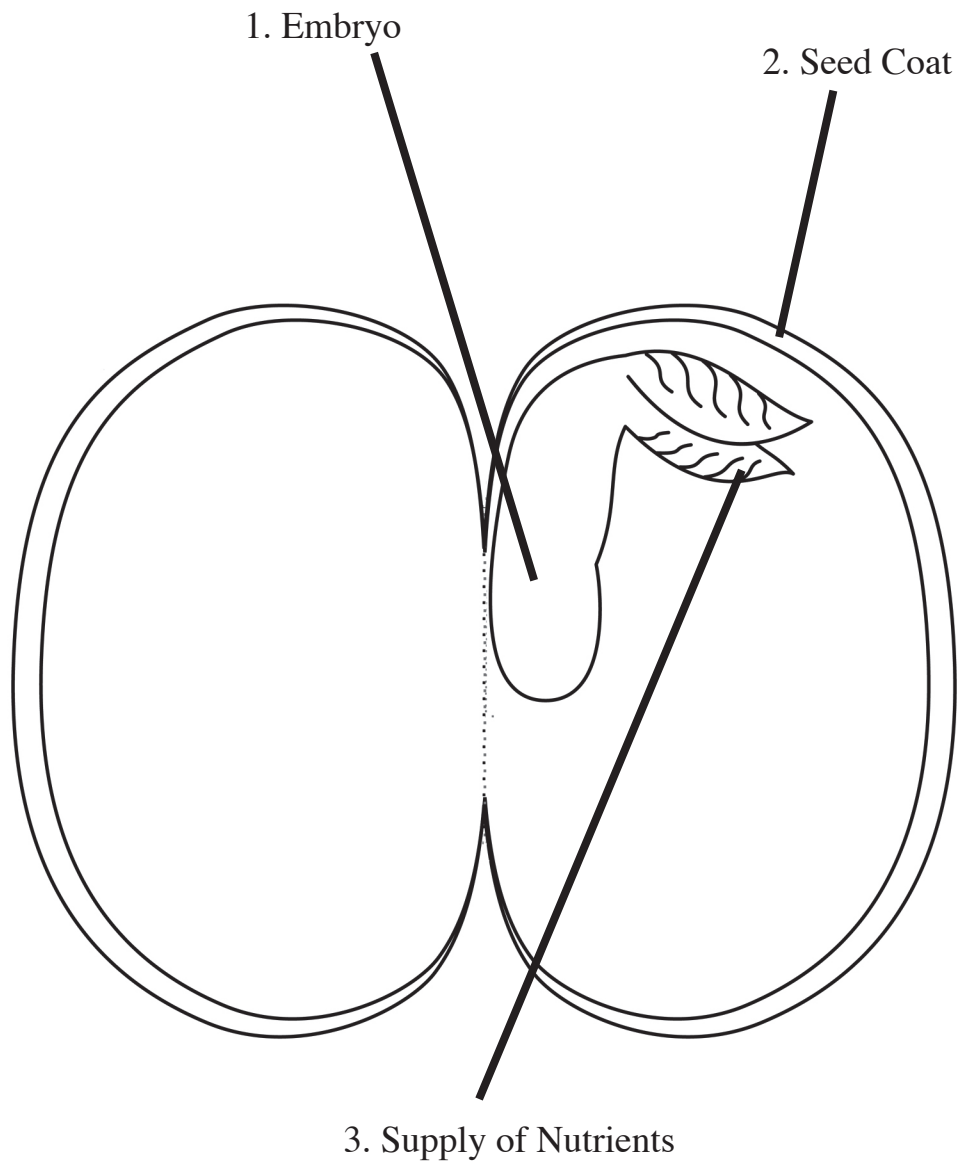
PALS1.8.SG.TM.A

Seed Germination:



PALS1.8.SG.TM.B

Parts of a Seed:



PALS1.8.SG.AS.A

Show What You Know!

