



Problem Solvers Activity SE 2: Super Seeds

CHILDREN ARE LEARNING...¹

Science Content:

- Living things need water, air, and resources from the land.
- Plants live in places that have the things they need.
- Plants need water and light to live and grow.

CHILDREN ARE DOING...

Science Practices:

- Make predictions
- Ask questions

NOTE: This activity extends over a period of time (10-12 days) as children plant seeds and observe their growth. The activity can be broken into two different learning experiences over time.

MATERIALS NEEDED:

2 packets of fast-growing plant seeds—suggested plants include:

- Annual Ryegrass (germinates in 7-10 days)
- Mint (germinates in 10-12 days)
- Morning Glory (germinates in 4-6 days)
- Basil (germinates in 1-10 days)
- Zinnia (germinates in 7-10 days)

1 bag of potting soil

2 small plastic watering cans/pitchers

Planters, one per child—suggested options include:

- Clear sandwich bags
- Small, disposable cups
- Small plastic containers (like a clean yogurt cup)
- Paper egg carton

Small plastic cups (to use as scoops for soil and to hold seeds), 2 per child

Child-sized dust broom and dustpan

Masking tape and waterproof marker (for labeling children's plants)

¹ Adapted from the Next Generation Science Standards (kindergarten): <https://www.nextgenscience.org/>

A small plant that you can remove from its pot to show its roots

White drawing paper, ideally larger in size like 11"x14", one per child

Crayons, enough for the group

Optional: Plastic tray, one per child

Optional: A few sunflower seeds

Optional: Child-safe magnifying glasses, one per child

Optional: **Handout 1: Seed Images** (make 1 copy in color, if possible)

PREPARATION:

For the ENGAGE activity:

- Gather a few sunflower seeds if using and a few seeds from the packets you are using for the activity. Children will observe and compare the different seeds. Alternatively, print out a copy of **Handout 1** to discuss seed sizes, colors, and shapes.

For the EXPAND activity:

- Identify a workspace—inside or outside—where children can work with soil and seeds. (It will be messy!)
- If using trays, place a several seeds in a cup and place one cup on each tray. Place one empty cup (to be used as a scoop) on each tray. Place one planter on each tray.
- If not using trays, keep the materials above nearby and organized so they are easy to distribute to children.
- Open the bag of potting soil but keep out of children's reach. If desired, pour potting soil into smaller containers (like pails from the sandbox) to make it easier to distribute to children.
- Fill the watering cans with water and keep nearby. Have the masking tape and marker handy to label children's planters.
- Loosen the plant from its pot so you can easily take it out to show children the roots.
- Fold each piece of paper in half to form two halves. Have crayons available for children. Place the magnifying glasses in a basket until ready to use (optional).

Activity Instructions

ENGAGE

Gather a group of 4 children at a table or in a circle on the floor. (Note: Groups of 6 children work well if you are teaching 4-year-olds.)

ASK: Use questions like those following to tap into children's knowledge about seeds and growing:

- Have you ever seen a seed? What do seeds look like?
- Has anyone ever planted a seed?
- What do you know about seeds and plants?
- Where do we plant seeds?

- What do you think happens *after* you plant a seed?
- What do we see when a seed starts to grow?
- What do you think plants need in order to grow?

Facilitate a short discussion of children's experience with seeds.

For children aged 3-4 years:

ASK: Would anyone like to draw what a seed looks like on the board? Do you think seeds are small or big? What color are seeds? *(Overall, of course, seeds are small. But you can want to point out that there are smaller seeds and bigger seeds—show children the sunflower seeds and the grass/flower seeds as an example, if you chose this option. Alternatively, you can show children the image of seeds on Handout 1 and have the same discussion.)*

ASK: Would anyone like to draw what you think it looks like when a plant or flower begins to grow? Notice and compare the pictures.

ASK: What would you like to learn about seeds? What are you curious about? *(Take children's ideas and questions.)*

EXPLAIN: Today we're going to plant our own seeds! We are going to be scientists and discover how seeds grow.

EXPAND

Have children seated at a table. Open a seed packet and spread the seeds in front of the children. Let them explore/touch the seeds.

INTRODUCE: Let's look at the seeds. What do you see? What makes them look the same? What makes them look different? What do you think these seeds will become?

ASK: What questions do you have about our seeds today? *(Take children's questions, responding using the content below, if relevant.)*

EXPLAIN: Plants grow from seeds. We are going to plant seeds so that we can watch them grow. What plant do you think will grow from this seed?

- *Listen to children's ideas.*
- *Show children the picture on the front of the seed packet. Explain that this is the plant that the class will be growing.*
- *Encourage children to describe the plant in the picture—size, shape, and color.*

ASK: When plants are outside, where do they grow?

- *Key messages to share:* Plants need soil to grow. Soil holds the plants upright. Soil also gives the plants nutrients (food to grow) and water.

SHOW: Show children the potting soil and encourage them to explore it. You might even spread some across the table for children to touch.

ASK: Plants need water to grow. When plants are outside, how do they get water? *(Some children may share that rain provides water. Others may note that people sometimes water plants. Both are true.)* Let's think about the rain or the water that comes from a watering can. Water drips onto to the plant and the soil. Does anyone have ideas about how the water gets from the soil to the plant? *(Listen and summarize children's ideas to build the group's knowledge.)*

EXPLAIN: Water moves from the soil to the plant through the plant's **roots**. Has anyone seen a plant's roots before? Let's look at some. What do you think these roots will feel like? What do you think they do to help the plant?

- *Loosen the plant and remove it from its pot. Show children the roots of your plant. Let children touch the roots if they wish.*
- *Key messages to share:* The roots take in, or absorb, water from the soil—in the same way that you drink water from a straw and suck it up into your mouth.

Distribute a tray of materials to each child (or if not using trays, give each child a planter, several seeds, and a cup.)

DEMONSTRATE: Model how to plant the seed—how many scoops of soil to put in the planter, how many seeds, how to softly press down on the top, and then use the watering can to gently water the soil once planted. Give children time to complete their planting. Label each child's cup with their name.

OBSERVE: Give each child a piece of paper, folded in the middle to make two boxes. In one box, ask children to draw their seeds right now (the day of planting). Before children start drawing, talk about what they observe using the questions like the ones below:

- What do you see?
- What colors do you see?
- Can you see your seeds? Where are they?
- Is there anything growing out of the soil yet?

Give children the crayons and let them draw what they see. Collect the images, note children's names on each, and place aside.

ASK: Our seeds have soil. They also have water. But there is something else plants need in order to grow. Does anyone have ideas? (*Summarize children's ideas.*) Plants also need **sun** to grow. Sunshine helps the plant make the food or nutrients that it needs to grow.

ASK: Can you help me find a sunny place in our classroom where we can put our plants? (*Listen to children's ideas and summarize their suggestions. Together, choose and move the planters to a sunny location. It should be somewhere that children can reach in order to water their seeds.*)

ASK: Let's make a prediction, or use our knowledge to think about what might happen: Do we think our seeds will grow by tomorrow? Or do we think our seeds will need lots of days to grow? (*Take children's ideas. Encourage them to explain their thinking. While their thought processes may not be correct, focus on their thinking skills, logic, and the connections they are making.*) Hmm. We will have to see what happens! We'll check our plants each day, and water them each day, and see when they start to grow.

EXPLORE

CREATE A ROUTINE: Each day, **create a daily routine of watering** the plants. This can be added to the morning routine after arrival, added as part of the lunch or snack routine, or completed as a quiet activity as children wake from naps. Continue until the plants have begun to sprout. (Ultimately, you can send the plants home with children.)

You will also want to **decide how frequently children will document their plant's growth**—you may want to add a visual to the class calendar on days that children will be asked to observe and document their plant's growth through drawings.

STEM TIP

As you model planting the seeds, count aloud how many scoops of soil and how many seeds you are using. Show children that counting has a purpose in everyday tasks. Encourage them to count their scoops and seeds as way to embed math learning into this activity.

If a child's seeds don't sprout: Consider offering the teacher sample as a substitute for them to water and observe over time.

OBSERVE: Once the seeds start to **sprout** (or grow) in the planters, take the children's drawings out and re-distribute them. Take a few minutes to talk about how the seeds looked right after they were planted. Before children start drawing the sprouts, take time as a group to observe the plants using questions like the ones below. If you wish, distribute the (optional) magnifying glasses so children can see the details of the leaves and stem.

- What do you see in your planter?
- Look at the picture you drew right after we planted the seeds. What is different now?
- What colors do you see?
- Is there anything growing out of the soil? What do you see coming out of the soil? (Label parts of the plant like the *stem* and *leaves*.)
- How big is your plant now—as big as your thumbnail? As big as your pinky finger?
- What questions do you have about your plant?

STEM TIP

You can embed meaningful counting experiences into this activity by noting on the class calendar the day that seeds are planted. Children can then count how many days have elapsed until the seeds start to sprout.

Encourage children to draw their plant as they see it.

- *For children aged 2 ½ to 3:* Ask children to tell you what they did to plant the seeds. What happened after the seeds were in the soil? Scaffold/support their ability to make the connection that planting seeds lead to the growth of a plant.
- *For children aged 3-5:* Create partners. Ask partners to tell each other the story of how their plant grew from a seed: what did they do first, next, and last. Give partners some time to talk together. Ask each set of partners to tell you their seed story.

REFLECT

To close the activity, bring the children back together. Use reflective questions - like those below - to prompt children's thinking about seeds and plants.

- What do you know about seeds and plants now?
- What do you think is important to know about seeds?
- When you see a plant, what do you think it needs to grow?
- Tell me about how water gets from the soil into a plant.

SUMMARIZE: We learned about seeds. Seeds need soil, water, and sunlight to grow into plants. The water moves from the soil into the roots just like we suck water from a straw. The sunlight helps the plant make food in order to grow. Seeds grow slowly out of the soil. They are small at first and then get bigger.

Individualizing the Activity

Make it more challenging:

- Have children plant two different types of seeds (a smaller and larger plant) and notice the differences in the size of seeds and the size of the plants.
- At the end of the EXPAND activity, teachers ask children to make a prediction about whether they think their seed will grow "by tomorrow or whether it will need lots of days to grow." Teachers can use a T-chart to record children's predictions. Post the T-chart where children can see it. Revisit it each day to discuss their predictions and observe how their seeds are growing and changing.
- Plant 3 sets "test" seeds. Set 1 should receive both sunlight and water. Set 2 should not receive any water. Set 3 should be placed out of the sunlight (in a closet or cubby). Ask children to predict (or guess based on their knowledge and experience) what might happen. Notice what happens to these seeds over time.

CREATING A T-CHART

If a T-chart is new to you, use the model below for the data collection activity suggested in the "Make It More Challenging" section.

How Quickly Will Our Seeds Grow?

Tomorrow	Lots of Days

Make it less challenging:

- Consider having a group of children work together to plant seeds in one large planter instead of individual planters.
- Take photos instead of having children draw the seeds at the beginning and end of the activity. Implement as a group activity/observation.

MAKING CONNECTIONS ACROSS THE DAY:

- When you take community walks, notice the plants in the world around you. Which are big? Which are small? Which are getting lots of sunlight (or too much sunlight)? Has it rained recently? Do children think the plants have enough water? What questions do children have about the plants in their community?
- Talk with children about the fruits and vegetables they eat and help them to notice when those items have visible seeds – watermelon, tomatoes, bananas, oranges, strawberries, and cucumbers are great examples for this type of experience.
- During mealtime, make the connection between seeds (that need water and nutrients to grow) and people (who also need water and nutrients to grow).
- If possible, involve children in helping to water outdoor flower plots or other growing areas at your program. Notice how plants are growing/thriving over time, or not (and why that might be).
- In the spring, if there are maple trees where you are located, notice the "helicopters" (maple seeds, also known as *samaras*) dropping down to the ground. Explain that these are the maple tree's seeds. In the fall, if you are near oak trees, you can point out the acorns that are the seeds of the oak. Let children explore and collect these if they wish.

Song: Seeds

Plant a seed in the ground	(Pretend to poke a hole into the ground with your finger)
Put some soil all around	(Pretend to scoop soil back around the hole)
Then pat it down with your hand.	(Pretend to pat the soil down)
And sprinkle water from a can.	(Pretend to water the soil from a watering can)

Then the sun comes out	(Raise hands and "shine")
And the seed starts to sprout	(Hold finger up like a sprouting seed)
Then the roots take hold	(Wiggle fingers downward like roots growing)
And the leaves unfold.	(Reach arms out to the side like leaves)

Break – Spoken (Follow spoken word directions)

Now pretend you're a seed in the ground! Crouch down low in a little ball!

You're waiting and waiting....

Then you feel the water energize you

And suddenly, you break open and push up through the soil,

Growing taller and taller!

Keep your roots firmly in the ground –

While you reach up high toward the sun!

Wave your leaves in the breeze

And shine open your beautiful flower!

What was once a little seed	(Pinch fingers together like holding a small seed)
Is now the grass beneath our feet	(Look down and wave an arm to show the "grass")
Or a flower or tree	(Point around to pretend flowers or trees)
Swaying in the summer breeze.	(Sway body gently like a flower in the wind)
What kind of plant did you grow into...tell us?	
Is it a flower? Or some Grass? Or something else?	(Allow children to tell their ideas!)

BUILD ON THE SONG:

Model the actions suggested in the song and encourage children to do what you do! You can also play the song during the planting activity as an oral reminder of the steps involved in planting a seed.

Making Literacy Connections

Share the following book with children as an opportunity to deepen their understanding of plants and seeds. The literacy extension activity below suggests another play-based experience to explore plant growth.

Suggested Book: *A Seed Grows* by Antoinette Portis

AS YOU READ:

- On the first page ("A seed falls"), ask children to find the seed. Does it look the same or different as their seeds from this activity?
- In the illustration showing the seed sprouting, ask children: "What do you think it means when a seed *sprouts*?" (*Sprouts* means the plant is starting to grow.)
- For the illustrations that show the plant how the plant grows, and grows, and GROWS, ask children to compare the illustrations. How is the plant changing? What does it mean to grow? (*Grows* means to get bigger over time.)
- For the illustration with the sunflower, ask children why they think it's called a *sunflower*? (Notice how the flower is large, round, and yellow like the sun.)
- The book ends with a new seed falling to the ground. Ask children what they think will happen to that seed.

BUILD ON THE BOOK: ACTING OUT A SEED GROWS

Materials: None

1. For each page of the book, think about a simple movement or gesture children can make to go along with the story (through the page where the sunflower blooms, but you are welcome to continue for the whole story). Put these ideas on sticky notes that you place on each page to help you remember. For some ideas, see below:
 - *A seed falls:* Have children stand and trace their pointer finger through the air until it reaches the ground.
 - *And settles into the soil:* Have children get into a little ball and pretend to lay in the soil.
 - *And the sun shines:* Have children stand up and make a big circle with their arms.
 - *And the rain comes down:* Have children wiggle their fingers in front of them to make rain.
 - *And the seed sprouts:* Have children hold their pointer finger up, like a tiny sprout poking out of the soil.
 - *And pushes into the open air:* Have children lift their arm up like a seed pushing up through the soil.
 - *And the plant grows:* Have children squat down on the floor.
 - *And grows:* Have children stand up halfway.
 - *And grows:* Have children stand up all the way and hold their arms up to the ceiling.
 - *Until it forms a bud:* Have children make a little circle with their hands.
 - *That blossoms into a flower:* Have children make a big circle with their arms and place their hands on their hips.

2. Read the book again and model each action. Encourage children to tell the story of the seed growing by moving their bodies.
3. When children are familiar with the movements, give them a turn to tell *you* the story of the seed as they act it out themselves. This can be a good opportunity to give children a movement activity on a rainy day!

Handout 1: Seed Images

Observe with children: Seeds can be big or small. They can be different colors. They can be different shapes.

Share these photos. Ask children: What colors, shapes, and sizes of seeds do you see in this picture? What seeds have you seen? What did they look like?





Plant Play

This week, children planted seeds. You can explore seeds and plant growth at home too!

Here are some ideas to try:

- Do you have any plants inside or outside your home? Can your child help you with them—watering, planting, or another task? Notice the **roots** of the plant. Talk about how the plant began with a **seed**, a long time ago.
- When you see plants outside, ask your child to tell you what they know about seeds. Talk about how a seed needs soil, sunlight, and water to grow into a plant.
- If you go to a park, garden store or plant nursery on an errand, take your child with you. You can also show your child the plants in the supermarket's florist section. Look at the different plants with your child. Notice how they are different sizes and colors. Explain how all of the plants you see grew from seeds. Ask your child what seeds they would like to grow someday.





Solo para familias

Juego con plantas

Esta semana, observe las semillas, las plantas, los árboles y las flores con su hijo.

Estas son algunas ideas que puede probar:

- ¿Tiene plantas dentro o fuera de la casa?
¿Puede su hijo ayudarle a regarlas, a plantarlas o con cualquier otra tarea?
Observe las **raíces** de la planta. Háblele de cómo la planta empezó con una **semilla**, hace mucho tiempo.
- Cuando vea plantas en un jardín, pídale a su hijo que le cuente lo que sabe sobre las semillas. Háblele de cómo una semilla necesita tierra, luz del sol y agua para convertirse en una planta.
- Si va a un parque, a una tienda de jardinería o a un vivero, llévese a su hijo. También puede enseñarle las plantas de la sección de floristería del supermercado. Observe las diferentes plantas con su hijo. Fíjese en los diferentes tamaños y colores. Explíquele que todas las plantas que ve crecieron a partir de semillas. Pregúntele qué semillas le gustaría sembrar algún día.

