



Seed Modeling

Connected Next Generation Science Standards

- 2-LS4-1** Make observations of plants and animals to compare the diversity of life in different habitats.
- 4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Featured Science and Engineering Practices

Developing and Using Models

Featured Cross-Cutting Concepts

Structure and Function

Materials

- Teacher: Seed examples
- Scissors, glue, tape
- Variety of materials for creating a model of a seed: balloons, construction paper, fuzzy fabric, velcro, pipe cleaners, yarn, paper plates, garden leaves, feathers, etc.
- Seed Modeling worksheet or garden journals
- Optional- small rocks, buckets of water

Overview

After learning about seed adaptations and dispersal methods in nature, students will use engineering skills to create a seed model. They will think about seed structures and material properties to build a model that disperses well. This lesson works best if students have already done the Seed Exploration lesson.

Students will

- Design a simple model that mimics a seed.
- Test their models for dispersal range.
- Redesign and retest their models as needed.

Teacher Preparation

- Collect examples of seeds that disperse in different ways. If you do not have real seeds, use pictures of seeds.
- Gather a variety of materials for students to construct their model. These may include, but are not limited to, balloons, construction paper, tape, glue, scissors, fuzzy fabric, velcro, pipe cleaners, yarn, paper plates, cups, and feathers.

Guiding Question - How can we use design principles from nature?



Seed Modeling

Setting

- School garden
 - School garden or classroom
 - Can be taught at any time of year. Fall will have more seeds in the garden.
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- **To increase the modeling difficulty:**
 - Pass out small rocks to each student that they must include in their design. Can they still make the model float on water, fly in the wind, or stick to clothing?
 - Require students to use a certain number of materials.
 - Focus on flight. Who can get their seed to float the furthest?

Explore

- Ask students, When is a time, not in the classroom, you have used science or math to solve a problem? Gather a few examples and provide more if needed (choosing the best garden tool, figuring out how many seeds to plant, building a trellis, or deciding how hard to push a wheel barrow)
- Tell students that today they will be engineers, designing a seed that can adequately disperse in nature by either floating in the water, flying in the wind, or sticking to an animal.
- Show examples of each type of seed dispersal method. What structures on the seed help it disperse?
- Explain that engineers often look to nature when designing new technology (**biomimicry**).
- To get nature inspiration, give students 5 minutes to explore the garden area for different types of seeds or look through the seeds from the Seed Exploration lesson. Remind them to pay close attention to the seeds' structures and how it would disperse in nature. Allow them to bring a journal to sketch drawings, notes, and ideas.

Digging Deeper

- Tell students they will now have the opportunity to design their own seed and test it.
- Show students the materials you have available for them to build with. They may also use natural items they find in the garden, as long as they are not seeds or seed pods.



Seed Modeling

Seed St. Louis Resources

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- Divide students and the seed modeling resources into small groups. They can begin searching the garden for other items to use in their design.
- Have students decide what seed dispersal method they are using and begin creating their models. Before they finish, they should make a quick sketch or list the materials they are using.
- After students have finished their designs, give them a chance to test their seeds either by floating the model on water, tossing the model into the wind, or sticking it to different clothing. They can use the Seed Modeling worksheet or create a different chart to track if it worked.

Making Connections

- After students record their findings, they should then consider what worked and how their design can be improved. Even if it worked the first time, they can still improve it. How could the design be more durable or can they make it waterproof? Create a new material list or seed sketch.
- Give students a few minutes to adjust their models then retest the seeds.
- After trial 2, students should reflect then discuss, How did they decide what materials to use in their seed model? What seed structures did they try to replicate?
- After cleaning up materials, brainstorm other garden problems you could solve with engineering.