Seeds We Need

Grades: Elementary (3-5)

Key Words and Definitions

ADAPTATION	A feature an organism has evolved that allows it to be better suited to its environment in certain ways
AERODYNAMIC	The quality of having a shape which reduces drag when traveling through the air
BURDOCK	A plant that produces seeds with hooked spines, which have adapted to stick to animal fur and skin
MAPLE SAMARA	A wing-shaped seed produced by maple trees that has adapted to help seeds travel on the wind
TEMPERATURE	The degree of heat present in an object, substance, or organism

Pre-Field Trip Activity: Seed Travelers

One 20-minute session; pre-visit

Learning Objective

Students will learn to make reasoned conclusions about the purpose of seed adaptations regarding form and shape through a practical experiment.

Materials

- Maple seed cutouts (linked under resources)
- Paper clips
- Large space for experimenting

Procedure

1. Show the class images of different kinds of seeds. Pictures can be found linked under resources. Say that during our field trip at Wave Hill, we can search for real examples of these seeds!
2. Ask the class what they notice about the structure of the different seeds and make a list on the board of observed physical differences and similarities.
3. Introduce the idea of seeds as travelers. Why might a seed want to go further than where the plant that produced them left them? Say that plants need space to stretch out, and if they grow right next to their parent plant, they may not have enough room to grow. Each of the seeds we've viewed uses a different adaptation to travel.
4. Burdock seeds "hitch" a ride by sticking to animals' fur.
5. Acorns are delicious treats for squirrels, who bury them in anticipation of eating them later, but often forget about them, leading to the sprouting of these seeds.
6. Maple samaras travel on the wind with their lightweight, aerodynamic shape.
7. Say that we will be further examining the design of maple seeds (samaras). Hand out the maple seed cutout sheet linked in resources, either cutting the shapes ahead of time or asking students to cut out the seeds themselves. Also hand out paper clips, three per student.
8. Students should attach the paper clips to the end of the maple seed shapes, as pictured in the handout. They should practice dropping the seeds from a height of about three feet (you may want to clear a space in the classroom to make things less crowded) and observe how they fall to the floor.
9. Students can then experiment with the shape of the seed by twisting and changing it in order to determine which shape is most aerodynamic.
10. If there is time, students can add other design features to their seeds using scissors, by gluing multiple seeds together, or experimenting with new pieces of paper. Ask them to pay attention to how the addition of these features changes the seed's ability to travel through the air. We can continue our investigations at Wave Hill, where we'll be able to observe and explore many kinds of seeds!

Sources

- [Maple seed experiment activity: Maple Seeds (nasa.gov)]

Resources

- Maple samara picture
- The Amazing Ways That Plants Disperse Seeds | Almanac.com
- Acorn picture
- How do seeds travel video: How Do Plant Seeds Travel? | Spring is Here! | SciShow Kids - YouTube

Post-Field Trip Activity: Water Absorption Experiment

One 20-minute session; post-visit

Learning Objective

Students will conduct and test an experiment in order to develop an understanding of the role temperature and water play in the life of a seed.

Materials

- Dried beans
- Clear cups of water, half hot water, half cold
- Markers or tape for marking cups

Procedure

1. Select a dried bean to soak—recommended are black eyed peas, lentils, or split peas. Other seeds may work but will absorb water more slowly.
2. Ask the class if they remember what we learned about seeds at Wave Hill. Why don't dried seeds sprout in the bag at the store? If the class needs a reminder, say that seeds won't sprout until they sense that conditions are right—this means they'll wait until they have water and sunlight, both which the plant will need to grow.
3. Hand out cups, water, permanent markers, and dried beans to small groups of students. Give half of the groups cold water, and half of the groups hot water. Instruct them in filling their cups up about ¼ of the way with dried beans. They should then add water until the beans are completely covered.
4. Every group should mark the spot where the water line is on the cup, as well as write the word "hot" or "cold", depending on which temperature water they received. They can also take pictures if there is a phone camera available.
5. Ask each group what they think will happen to the water as time goes on? Ask everyone to make a prediction about how the water level will change—will it go up, down, or stay the same? If it goes down, how far will it go? Will there be a difference between the hot and cold-water groups? What will happen to the beans?
6. Set the cups aside and continue with class. Set timers in 15-minute intervals for the next 45 minutes, at which point the groups can check the water lines. At each interval, ask the groups to make another mark with their marker where the water line has progressed and write the time that has passed (for instance, "15" then "30", then "45").
7. Discuss once the experiment is complete. Which groups' beans absorbed water faster? Why do they think this happened?
8. Warm water absorbs faster than cold because warm water has more energy from heat in it than cold. Therefore, its molecules will move more quickly!
9. For a simplified experiment: Just monitor the absorption of water without the temperature variation.

Sources

- [Water absorption activity: Soupy Science: Investigate How Dried Beans Absorb Water | Stem Activity (sciencebuddies.org)]

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