

LESSON 10: SEEDS

TEACHER GUIDE

BACKGROUND INFORMATION

- Seeds are the method of reproduction for most plants.
- Not all plants use seeds to reproduce however. For example, moss produces spores in order to reproduce, not seeds.
- Seeds are made up of an embryo (the immature plant), a protective casing for that embryo, and often a food supply for that embryo as well.
- Seeds manifest themselves in a variety of different shapes, colors and sizes. For example, although they look very different, both strawberry seeds and avocado seeds are produced for the same purpose, to create plants.
- Once the seed has matured enough on its parent plant, it moves away from that parent in order to grow on its own.
- Plants have evolved to utilize their environment for seed dispersal. Some plants rely on the wind to distribute their seeds, while others travel via water or on the fur of animals. Other natural devices for seed dispersal exist as well.
- A seed leaves its parent plant in order to grow because it cannot grow off of its parent; it must reach the ground. Additionally, seeds move from their parent (sometimes a far distance from their parents) to avoid competition with the parent. If too many plants are in the same area vying for the same resources, the lives of all the plants can be negatively affected.

- Seeds that plants produce vary widely in their size and abundance. This is due to evolution. Plants have limited “energy” and other required resources to create seeds. Given this, a plant can make a lot of seeds, putting very little energy into each. Or, a plant may make very few seeds, putting a greater amount of energy into each.

LESSON OBJECTIVES

- To understand what a seed does, and of what it is comprised.
- To understand that almost all plants use seeds for reproduction; seeds simply look different on different plants.
- To understand why a seed travels away from its parent.
- To explore some of the ways a seed might travel from its parent.
- To understand that a seed’s size correlates to its ability to survive.
- To explore why some seeds produce a lot of small seeds while others produce very few large seeds.
- To explore the seeds of different plants first-hand in order to fully understand the differences amongst seed production strategies.

LESSON MATERIALS

- Enough fruits, vegetables and nuts to give each group a selection to work with. This selection should have a variety of seed types. You may choose to harvest some of your plants from the aquaponics system. You also may choose to supplement the aquaponics system with plants from the grocery store such as strawberries, bananas and watermelon.

- A paper plate for each plant.
- Markers to mark the paper plates with the plant type and number of seeds.
- Materials for dissection. These may include plastic knives and paper towels. Note: if you choose to use knives, be sure to go over knife safety prior to the activity.
- Clean-up materials. These may include paper towels, a source of water and soap.
- A piece of paper and a writing utensil for each student.
- Copies of the assessment.

ASSESSMENT ANSWER KEY

- 1) An embryo is the baby plant. (C)
- 2) Plants produce seeds for reproduction. (A)
- 3) Avocados, watermelon, flowers and trees all have seeds. (E)
- 4) There are at least four ways seeds can travel away from their parents. These are: by wind, by animal, by water and by falling. Students only need to correctly site two ways.

STUDENT GUIDE – WHAT ARE SEEDS & WHAT DO THEY DO?

VOCABULARY

Embryo – the baby plant.

Casing – the protective layer, the case for the embryo.

Produce – to make.

Reproduce – to create new plants or animals.

Offspring – children, new plants.

LECTURE AND DISCUSSION

- Ask the class: what is a seed?
 - A seed is a baby plant inside of a shell. (Power Point)
 - A seed is made of up the embryo, a casing, and often a source of food for the embryo. (Power Point)
 - Most plants use seeds to reproduce.
- Ask the class: what plants have seeds? Write their brainstorming ideas on the board. You may wish to add the examples from below that the students miss.
- A lot of plants use seeds to reproduce including: (Power Point)
 - Strawberries

- o Avocados
- o Tomatoes
- o Trees (the cones on conifer trees are seeds, for example)
- o Dandelions
- o Flowers
- o Watermelon
- Seeds are produced by the plant.
- Once the seed is ready, it moves away from the plant in order to grow on its own.
- Ask the class: what are some ways a seed might travel?
- A seed can travel in a number of ways including: (Power Point)
 - o By wind
 - o Carried by an animal
 - o By water
 - o Falling from the plant
- Seeds come in all sorts of different sizes.
- Ask the class: from our seed brainstorming list, which plants have large seeds?
 - o Avocados and trees produce fairly large seeds.
- Ask the class: from our seed brainstorming list, which plants have small seeds?
 - o Dandelions and strawberries produce fairly small seeds. (Power Point)
- The bigger the seed, the more prepared that embryo is for living on its own.
 - o A bigger seed means a more protective casing.
 - o A bigger seed means there is more food for the embryo.
- Different plants have different strategies for producing more offspring.
- Plants that have smaller seeds can create more seeds, so the probability that some of them will survive is greater.
- Plants that have bigger seeds cannot create as many seeds, but those seeds are more likely to survive. This is because the seeds are better protected, and are more highly stocked with food.

ACTIVITY

- Divide the class into groups of 3-6 students.
- Give each group a few fruits to dissect.
- Give each group a plate for each one of the fruits they were given. For example, if you give a group four plants, give them four plates as well.
- Have the students write the name of their plants on their plates. One plant name should go on each plate.
- Let each group dissect their fruits, harvesting all of the seeds they can. The students should put the seeds they find for each plant on the corresponding plate.
- Be sure to divide-up the work amongst the groups, ensuring that each student has the opportunity to participate.
- Have the students write the number of seeds they found from each plant on the plate.
- If there are too many seeds to count (in the case of a strawberry for instance) help the students estimate how many seeds are present.
- Have the students clean-up everything in their stations except the plates with the seeds on them.
- Now, have each student write a short reflection on the activity. This reflection may be two paragraphs long. The first paragraph might discuss the strategy of producing a small number of large seeds, citing specific examples from their findings. The second paragraph might discuss the strategy of producing a large number of small seeds, citing specific examples from their findings.
- Once everyone has completed their reflections, have the students clean-up the remaining mess.

CONCLUSION

- Ask the class: what are the three main parts of a seed?
 - An embryo, the baby plant.
 - A casing, the protective layer.
 - Often food for the embryo.
- Ask the class: what are seeds used for?
 - Seeds are how most plants reproduce. They are baby plants.
- Ask the class: why does a seed need to leave the parent plant?
 - A seed cannot grow off of its parent; it must at least hit the ground before it can grow.
- Ask the class: what are some ways a seed can leave its parent?
 - By wind
 - Carried by an animal
 - By water
- Ask the class: why might a plant produce very few large seeds?
 - If a seed is large, it has a higher chance of survival. A greater percentage of the seeds will grow into adult plants.
- Ask the class: why might a plant produce a lot of small seeds?
 - If the seeds are small, a plant can produce more of them. This increases the likelihood that some of the seeds will become adult plants.

EXTENSION

- Science – The difference amongst plants’ “strategies” to seed dispersal is a product of evolution. This lesson is a good lead into a discussion of evolution using seeds as an example.
- Art – seeds are a good item to draw. They could also be used as materials in art projects. If you wish to use the seeds the students collect for art, make sure they do not throw the seeds away after they have completed their reflections.

Name _____

Date _____

ASSESSMENT 10 - SEEDS

1) What is an embryo? (Circle one)

- a) A type of flower.
- b) A way seeds travel away from their parent.
- c) The baby plant.
- d) A type of vegetable.

2) Why do plants produce seeds? (Circle one)

- a) Reproduction.
- b) For humans to eat.
- c) For animals to eat.
- d) To make the plant look nice.

3) Which of the following plants have seeds? (Circle one)

- a) Avocadoes
- b) Watermelon
- c) Flowers
- d) Trees
- e) All of the above
- f) None of the above

4) Name two ways that seeds travel way from their parents:

