Seed Dispersal Activity
FYE Fall 2022

Modified from: Wampler, L., and Dobson, C., (2008). Helicopter seeds and hypotheses... that's funny! Science Scope. Sept. pp. 73-75.

Introduction:

In this exercise we will study traits that contribute to a plant's ability to spread its seeds and reproduce. In *Bloom,* the water lily plants have a unique ability to disperse seeds away from the parent plant in almost a violent, weaponized manner. By shooting seeds out of their seed pods quickly like bullets, the cryptogenic plants also are able to spread their seeds effectively.

For the next few days in class, we'll focus on Maple trees here on Earth and experiment with the ways in which they disperse their seeds. Maple "helicopters" also known as **samaras** contain the seed with the embryos that will develop into the next generation of trees and forests. In addition to the seed, the samaras also are equipped with a papery **pericarp**, or a specific accessory layer with unique characteristics that make it easily wind-dispersed. This pericarp gives the maple seeds a small wing-like structure that allows them to be carried far away from the parent plant on windy autumn days. This is important because plants don't want to have to compete with their offspring for water and resources. Therefore, having their seeds grow far away from the parent plant is important for plant survival and continued evolution.

In this activity, we are asking the scientific question, "***Is there a specific shape or weight that provides for optimal dispersal in Maples?"*** You will start by collecting Maple seeds, weighing them and taking their overall area (cm3) using a leaf area meter. In our next class, you will test a hypothesis by conducting a simple experiment and plotting your data in a graph to visualize your results.

Each group of 3 students will work with 9 Maple samaras. These seeds have distinct sizes and shapes and features that provide lift and help the seeds float on the wind. But there are trade-offs. For example, large seeds are more likely to germinate and produce a vigorous seedling. However, large seeds take more energy to produce and are harder to disperse. Seeds with sails or wing-like structures tend to disperse more widely, but the tree must use energy to produce a structure that will not play a direct role in the development of a new tree. What are your thoughts? What do YOU hypothesize will help Maple seeds be dispersed best from the parent plant?

Write your hypothesis HERE.

Use this space here for writing notes and "annotating" your text.

Methods:

Do a "Read Aloud" in your group to follow these instructions. Write any questions or points of confusion that you have here:

1. Each student will collect 3 intact Maple samaras from trees on campus and gently label them 1, 2, 3 with a sharpie, being careful not to damage them.

2. Using the scales and leaf area meters, measure the weight and total area (in cm2) of each of your maple samaras. Write them in below:

    1. Weight (g) _____ Area (cm2) _____
    2. Weight (g) _____ Area (cm2) _____
    3. Weight (g) _____ Area (cm2) _____

3. You will work in groups of 3. Organize your group members so that someone is in charge of each of the following tasks: 1- Dropping the fruits, 2-Measuring the distance each fruit travels away from the vertical line of its drop position and collecting them, 3-Recording data/distance for each dropped fruit in the chart.

5. We will do this activity in the Science Center lobbies. You will need a plumb line and colored tape to mark the drop position. As directed by your instructor, the dropper will proceed to balcony and the rest of the group will go to the appropriate drop site. Be sure each group has string, a meter stick and tape to mark the position. Work with other groups to determine the height at which your seeds are dropped for each location (3rd to 2nd floor) and (2nd to 1st floor)

6. Now drop each fruit 3 times and record its dispersal distance in meters from the bottom of the plumb line. Record the data in the chart to the right, calculate the average for each seed, and return to the lab to enter your data in Google Sheets on both tabs. We will graph the class's data and discuss it in the next class.

Lab Member Name	_____
Seed #	Distance (m)
1	
1	
1	
1 AVERAGE	
2	
2	
2	
2 AVERAGE	
3	
3	
3	
3 AVERAGE	

Lab Member Name	_____
Seed #	Distance (m)
1	
1	
1	
1 AVERAGE	
2	
2	
2	
2 AVERAGE	
3	
3	
3	
3 AVERAGE	

Thought Questions and Discussion: After Looking at the Class Graph

How did the physical features of the fruits might affect the dispersal process? Did the data support or negate your hypothesis?

How might environmental factors like height and wind speed might influence seed dispersal?

If you could redo this experiment but change a variable, what would you change?

Lab Member Name	_____
Seed #	Distance (m)
1	
1	
1	
1 AVERAGE	
2	
2	
2	
2 AVERAGE	
3	
3	
3	
3 AVERAGE	