

# Seed Dispersal

## Summary

By measuring how fast seeds fall, students will calculate how far a single a generation of plants can disperse by wind. Then they can apply these findings to speculate on plant species' movement and survival as a result of biome shifts predicted with climate change.

## Objectives

Students will recognize fruits and seeds on plants and place them into dispersal syndrome categories based on their morphology.

Students will measure the rate of descent of wind-dispersed seeds and use this to calculate dispersal distances.

Students will apply the concept of wind seed dispersal to global climate change induced biome shifts.

## Main Core Tie

SEEd - Grade 7

[Strand 7.4: REPRODUCTION AND INHERITANCE Standard 7.4.2](#)

## Time Frame

1 class periods of 60 minutes each

## Group Size

Small Groups

## Life Skills

Thinking & Reasoning

## Materials

Attached handout (photocopies well in black and white)

Stop watches

Seeds (a variety shapes of shapes and sizes of wind-dispersed seeds is best)

Measuring tape

Calculators

## Background for Teachers

Seed dispersal is the primary means by which plant species' ranges can change with time. Seeds are dispersed by many agents. This lesson focuses on wind-dispersed seeds. Plants are adapted to a range of temperatures and precipitation regimes that define a biome, but climate change is expected to shift biome distributions. Specifically, biomes are expected to shift poleward and upslope.

## Intended Learning Outcomes

### 1. Use Science Process and Thinking Skills

a. Observe objects, events and patterns and record both qualitative and quantitative information.

h. Construct models, simulations and metaphors to describe and explain natural phenomena.

i. Use mathematics as a precise method for showing relationships.

### 3. Demonstrate Understanding of Science Concepts, Principles and Systems

d. Solve problems by applying science principles and procedures.

4. Communicate Effectively Using Science Language and Reasoning
  - a. Provide relevant data to support their inferences and conclusions.
  - e. Use mathematical language and reasoning to communicate information.
5. Demonstrate Awareness of Social and Historical Aspects of Science
  - a. Cite examples of how science affects human life.

### Instructional Procedures

Explain that plants are adapted to specific environments. Temperature and rainfall determine what species are able to survive in different parts of the Earth. These communities are called biomes. Point out and explain the biome figure on the handout and point out the various artificial plant communities in Red Butte Gardens that are maintained by irrigation.

Ask the students how they think plants might be affected by climate change. Explain that climate change will shift temperature and rainfall patterns and ultimately biome distributions.

Ask the students how plants move to gauge their understanding of seed dispersal. After discussing different ways that seeds can be dispersed, explain that this lesson will focus on wind-dispersed seeds and that we will estimate how long it takes for plants to move great distances.

Divide the students into groups of at least 3. If the season is appropriate and seeds are available, have the students spend 5 minutes searching for seeds. If seeds are not available, distribute a few types of seeds to each group of students. Have the students decide who will be the seed dropper, the timer, and the recorder.

Allow the students to measure the time it takes the seeds to fall a known distance. A raised area such as a bridge or patio is ideal to drop the seeds from.

Lead the students through the calculations on the handout to determine the rate of descent and use the figure to estimate dispersal distance in one generation.

Reconvene the class and discuss the results of measurements and calculations and the questions on the handout.

### Extensions

This activity can catalyze further discussion about the effects of climate change on natural ecosystems. For example, many plants have animal-dispersed seeds. Will these plant species be affected the same way as wind-dispersed plants? (The distance that animal-dispersed seeds can travel is limited by how far their dispersers move them. Depending how the animals that disperse seeds are affected by climate change, they might be expected to move seeds to areas with adequate climates or not.) As biomes shift in response to climate change, how might urban and agricultural areas affect this process? (These areas may impede plants and animals from reaching areas with adequate climates.) What can wildlife managers do to ensure that species do not go extinct because of climate change? (Protect land areas that provide corridors for the movement of wildlife, transplant wildlife to areas with adequate climates.)

### Assessment Plan

Assessment can be adapted to the goals of the teacher. The calculations may be finished during class time. Discussion question can be assigned as homework or discussed during the lesson.

### Bibliography

Augsburger, C. K. 1986. Morphology and dispersal potential of wind-dispersed diaspores of Neotropical trees. *American Journal of Botany* 73:353-363.

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