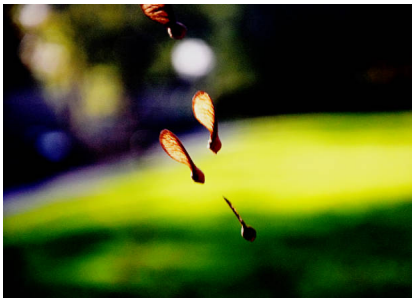
How Seeds Travel

LaCuKnoS Language Booster

Have you ever wondered why there are prickly pods in a dog's fur after it has gone for a walk in the woods? Have you ever noticed that if you take your shoes off in a park or garden, **seeds** from grass or weeds or trees stick on your socks? These seeds have developed **characteristics** that help them to travel far away from their parent plant. Why? So they can find their own place to grow. Scientists call this process **seed dispersal**. Trees or plants can't move so they need other **methods** to make sure that they spread and **reproduce**.



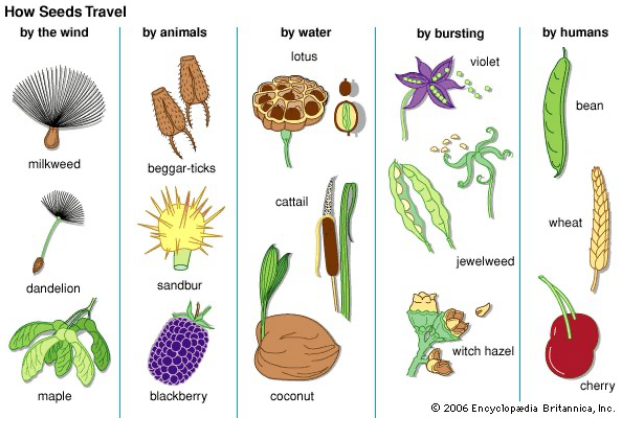


Different kinds of plants grow different kinds of seeds that vary in sizes, shapes, and weights. Large and small seeds use different methods for seed dispersal. For example, a walnut, which is the seed of a walnut tree, is a large and heavy seed that can't blow in the wind or ride in a dog's fur. But a squirrel can carry a walnut in its mouth and bury it in the ground far from the parent tree. A dog, a deer, or other animal may carry a burr, which is the name for a seed that has tiny hooks used to attach to animal fur. Other smaller seeds can easily be carried away by the wind. Dandelion seeds are so small and light weight that little hairs allow them to fly through the air like parachutes. Other larger seeds, such as the maple seeds, can still fly using parts shaped like wings that make the seeds spin like a helicopter. Plants have other strategies for seed dispersal too. Water lilies, which live in ponds, have seeds that float away to other parts of the pond. Coconuts are seeds of palm trees that can float in the ocean for hundreds of miles until they land on a new island. Poppies have seeds that burst out of the plant when they are ready to reproduce.

Discuss these questions with your partner. Then write your answer down.

1. What kind of seeds have you noticed when walking in nature?

2. Use the picture on the right and mark the seeds you are familiar with. Are there other seeds you know that are missing from the pictures? If so, which ones.



Paper Helicopter - Dandelion Parachute - Seeds Lab

LaCuKnoS Science Investigation

This lesson focuses on how seeds travel. Plants cannot move but need to spread and reproduce in order to make sure that they live on. The language booster provides an introduction to the topic by describing what seeds are and how they disperse. The following three activities will help you understand how this works. For example, the paper helicopter simulates how maple seeds fly. The dandelion parachute models how dandelion seeds float in the air. Finally, the seeds lab examines seeds for evidence of how they disperse.

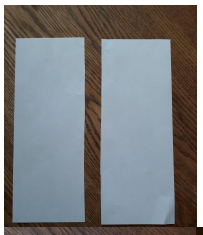
Activity 1: Paper Helicopter

In the following investigation you will build a paper helicopter to simulate how maple seeds disperse by flying. If your class has any real maple seeds, you can compare and contrast the flight of the paper helicopter you build and the maple seed. If you don't have a real maple seed, this video shows you what they look like and how they fly (https://www.youtube.com/watch?v=5-7GIrn99mQ).

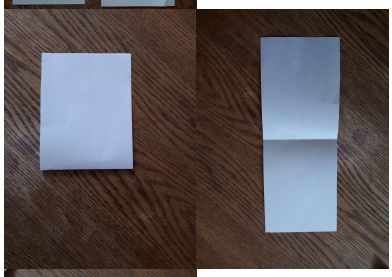
Materials: (for two persons)

- 1 piece of paper
- 1 scissor

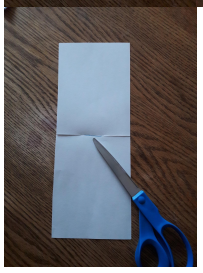
Procedure:



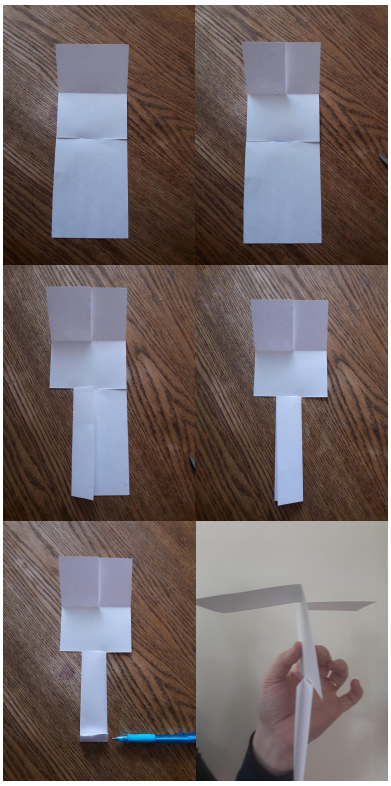
Cut a piece of paper lengthwise. Keep one. The other piece is for your partner or to make a second helicopter.



Fold the piece in half and re-open.



Cut left and right on the fold towards the middle but leave some space between the cuts (about an inch).



Fold the paper from the upper end to the middle, unfold and cut the middle lengthwise until you reach the first fold. These are the rotor blades.

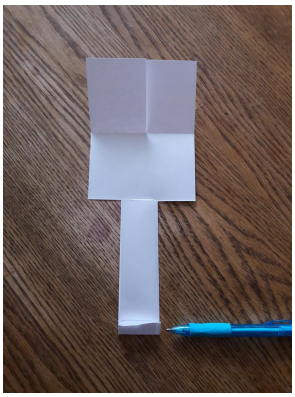
Now fold the longer piece from the left side to the middle, and do the same with the right side. This gives your helicopter stability.

Almost there. See where the blue pen is? Fold the paper about an inch towards the middle. Then hold the paper helicopter between your thumb and index finger. Raise your arm and let go. What do you observe?

Draw a picture and explain in your own words what you saw when your paper helicopter flew. Are there similarities to a flying maple seed?

With your group, discuss and answer the following question:

How does your paper helicopter fly if you don't fold the paper one inch up (see picture)? Did this step really matter? Please explain your thinking in your own words.



Activity 2: The Dandelion Parachute

In the following investigation, you will build a parachute that models how dandelion seeds disperse by floating in the air. If it is the right season and you can find a real dandelion, compare and contrast the flight of the parachute you built and the dandelion seeds. If you don't have a real dandelion, this video shows you what they look like and how they fly (https://www.youtube.com/watch?v=N2UbaDV9O9Q).

Materials: (for one person)

- 1 Plastic bag
- 1 Paperclip
- 1 Pilot (e.g., gummy bear, plasticine)
- Scissor
- Tape
- Thread

Procedure:

Cut 4 pieces of thread (approximately 40 cm)

Shorten the plastic bag by cutting it so that it is approximately 30 cm long (see picture). Cut 4 pieces of tape and put them aside so you can easily grab them later.

Tape the 4 threads on the plastic bag, make sure that the distance in between is about the same.

Tie the 4 threads to the paperclip. Unfold the end of the paperclip as shown in the second picture.

Attach the pilot on the unfolded end of the paperclip. Make sure it fits well and does not fall off. Now, your parachute is ready to fly. Throw your parachute in the air and observe how it falls.

Draw a picture to describe what you noticed when your parachute flew. Are there similarities compared to the dandelion seeds floating in the air?

With your group, discuss and answer the following question:

Does the length of the thread, the size of the plastic bag and/or the weight of your pilot matter for how the parachute behaves? Build different models and observe. Explain in your own words what you discover:

Activity 3: The Seeds Lab

In the following investigation you will observe the **characteristics** of a variety of seeds and consider how they disperse (e.g., wind, water, animals, burst out).

Materials: (per group or station)

- A variety of seeds (e.g., burrs, dandelions, nuts, grass, maple seed, poppies)
- Container with water
- Template "Data Table"
- Pencil
- Balance/ Scale (optional)
- Hair dryer (optional)
- Template "Concept Map Activity"

Procedure:

1. For each seed, you will follow the same procedure.
2. Use the balance to weigh each seed. Record the type of seed and its weight in the data table. In

case you don't have a scale as a group, discuss how to distinguish between light to heavy.

3. With a partner, discuss the **seed dispersal** method you think each seed uses (e.g., by wind, water, burst out, or animals) and why you think that. What is your evidence for how you think each seed travels? Use the template "Seeds Lab" to write down your ideas.

4. Test your idea for how you think each seed travels. For example, if you think that a seed will disperse by water, put your seed in a container with water and test your hypothesis. If you think that the wind is the way a seed travels, try to blow it.

5. Write your evidence and notes in the data table.

6. When done, share your results with another lab group and work together on the following questions.

Look at your complete data table. What does the table tell you about how seeds spread?

Compare your data with the data from other groups. Do you see any differences? If so, why could that be?

7. In the last part of this activity, you will work with a partner to create a concept map to show your understanding of the following topic: ***How do seeds travel?***

8. Your teacher will review with you an example of how to make a concept map.

Step 1—Partner discussion. Start by discussing the following questions with your partner:

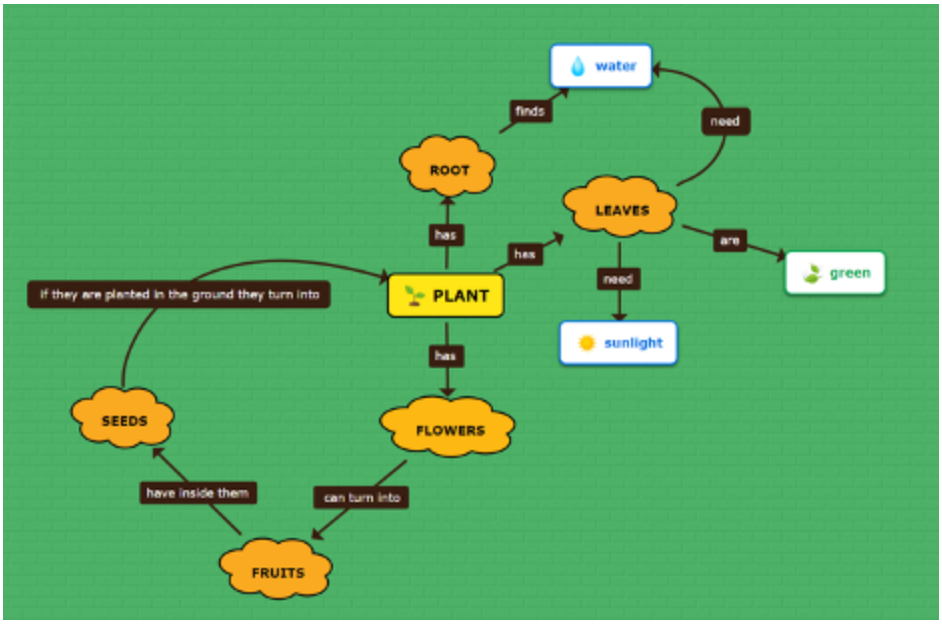
- What are the main ideas we should include in our concept map about seed dispersal. List these main ideas below. The list already has a few concepts you may want to include. What other ones should you add?
- What are the relationships between these main ideas? How are they connected?

List of main ideas for our concept map	Notes on how these ideas are connected
• Seeds • Characteristic • Seed dispersal • Reproduce •	• Seeds have characteristics that affect how they travel •

Step 2—Create your own individual concept map. After your partner discussion, use the next page to create your own concept map. Be sure to include the main ideas you listed and how these ideas are connected to each other.

Feeling stuck? These questions might help you get started.

- What is the most important idea that should go in the middle of your concept map?
- Do all seeds travel in the same way? Why or why not?
- Why do seeds need to travel?
- Below is an example of what a concept map can look like. This one is about the parts of a plant but it can give you ideas about how to draw your concept map.



Step 3— Share and discuss your concept maps with a partner. After you finish your individual concept map, share and discuss your map with your partner or small group. Look for similarities and differences between your concept map and theirs. Why do you think your maps have the similarities and differences that they do? If you want to, you can use a second color to make changes or additions to your concept map.

Step 4— Turn in your concept map to your teacher.

How seeds travel

LaCuKnoS Concept Map Activity

How seeds travel

Data Table

Type of seed	Weight of seed	How does the seed disperse?	Evidence & Notes

How Seeds Travel

LaCuKnoS Concept Cards

Seed/Semilla

A seed is a part of a plant that grows into a new plant.

Una semilla es parte de una planta que se convierte en una nueva planta.

Seeds can be planted in the garden and after a while a new plant grows.

Concept Card

Seed dispersal/
Dispersión de semillas

It is the way seeds get away from their parent plant. This could be either by wind, water, animals, or burst.

Es la forma en que las semillas se alejan de su planta madre. Esto podría ser por viento, agua, animales o estallido.

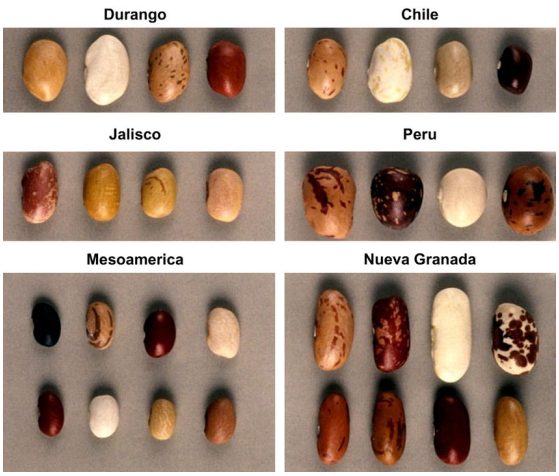
Seed dispersal happens in many ways, including by air, water and animal.

Concept Card

Characteristics / Características

Features that are typical for a person, thing or place.

Características que son típicas de una persona, cosa o lugar.



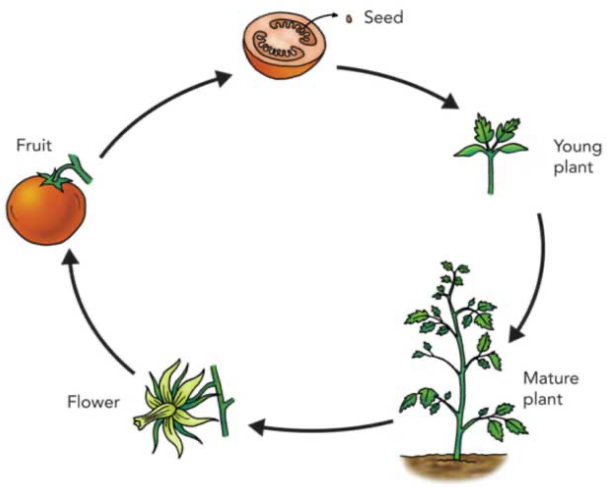
Beans have different characteristics, including color, size and shape.

Concept Card

Reproduce / Reproducir

To make a copy of or to duplicate.

Hacer una copia o duplicar.



Plants spread their seeds to increase the chance that they will reproduce.

Concept Card

Method / Metodo

A way or process to accomplish something.

Una forma o proceso para lograr algo.

A walnut tree cannot move, but it still has a method for its seeds to spread or disperse.

Concept Card

Teacher Page
LaCuKnoS Investigation – How Seeds Travel

Lesson Objective(s)

- Students will learn about seed dispersal and deepen this knowledge through activities.

NGSS Standards:

- 2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

- 5-PS1-3. Make observations and measurements to identify materials based on their properties.

Lesson Description

Students will determine weight and other characteristics that influence seed dispersal to explore how seeds spread. Three activities help to deepen the students' understanding about this topic. This lesson can be done in one class period by using stations, or can be done one after the other over three class periods.

LaCuKnoS Practice(s) being highlighted

L1: Choosing language registers based on topic, purpose & audience

C1: Purposeful student grouping to connect science, culture and language goals

K1: Shared experiences with relevant phenomena as basis for how science knowledge is built and accepted

LaCuKnoS Tools used in lesson

In this lesson we use four LaCuKnoS tools:

- Language Booster (tool L1-1)
- Concept Map" (tool L2-2)
- Multilingual Concept Cards (tool L1-3)
- Shared Anchoring Event (tool K1-1)

Language Boosters (tool L1-1) - LaCuKnoS Language Boosters are short (1-2 page), high interest science readings that provide a "hook" to engage students, a conceptual overview of the investigation topic, introduce some key concepts that will be fundamental to the investigation,

and make a connection between the ideas to be learned and related experiences that students may have had in some context outside of the classroom. The Language Booster closes with 2 or 3 questions or prompts to guide students' oral and written reflections with a partner.

Concept Mapping Template (tool L2-2) – Concept maps are a multimodal communication tool for representing understandings of the relationships among concepts. LaCuKnoS concept mapping templates guide students to work in pairs to plan and construct concept maps to show their emergent conceptual understandings and emergent communication skills. Concept maps can support translanguaging and embodied learning such as by using our bodies and physical materials to construct human concept maps. Creating concept maps can support all three strands of the LaCuKnoS model.

Multilingual concept cards (tool L1-3) – LaCuKnoS concept cards define and explain a limited number (3 to 6) of important concepts, which are mentioned and highlighted in bold in the investigation - often in the *Language Booster*. These cards provide the name, a brief "student friendly" definition and a picture of the concept, using both English and Spanish. The cards can be used flexibly, such as at the start of the lesson, as part of a word wall, to review in lab groups, or introduced as needed when working with the investigation.

Shared anchoring events (with community relevance) (tool K1-1) – LaCuKnoS anchoring events are events or processes that require students to bring together multiple ideas to explain. These events help students see the relationships between *natural phenomena* and *causal explanations*. Anchoring events should be context-rich, meaning that it is about a *specific* event that happens in a *specific* place and time under *specific* conditions (place based). When possible, there should be direct community relevance.

Concepts for Concept Cards

- Seed
- Seed dispersal
- Characteristics
- Reproduce
- Methods

Materials needed

Materials provided by SMILE (per student):

- 1 Piece of plasticine
- 1 Paper clip
- 4 Pieces of Thread
- 1 Paperclip

- 1 Plastic Bag

Materials to be provided by the teacher (per student):

- Paper
- A variety of seeds (e.g., burrs, dandelions, nuts, grass, maple seed, poppies)
- A balance or scale (optional) for the whole group
- A hair dryer (optional) for the whole group
- 1 Container with water
- Pen
- Tape
- Scissors
- Handout for data table and concept mapping

Advance Preparation

Before you teach this kit, you will need to provide the materials listed as not included in the kit. We recommend you familiarize yourself with the topic in general and all sections in this document before teaching this investigation.

Kit Description & Science Content:

- The *paper helicopter* is a model that simulates how maple seeds fly. Falling down the air presses from underneath against the rotor blades and causes them to rotate. By folding the bottom of the longer piece one inch up to the middle functions as the center of gravity and helps the blades stay in the right position.
- The *dandelion parachute* models how dandelion seeds float in the air. The speed of the parachute decreases through an increase of air pressure that causes a dynamic boost when falling down.
- The *seeds lab* examines different types of seeds and distinguishes how they disperse. Depending how heavy the seed is there are different ways of dispersal, such as by wind, water, animals or burst out.

Safety Recommendations

Our science investigations are designed to be kid-friendly and in most cases use everyday materials that are not considered to be dangerous. However, it is important for you to assess potential risks or safety concerns in your particular setting when you teach this science investigation

Alternative Versions

· This lesson can be easily combined with a field trip in the park or to a forest nearby where students can collect maple seeds, dandelions or other seeds for the seeds lab activity.