

The Peter Pan theory of seed dispersal

Adapted with permission from Coast Action Coast Care from an activity originally written by Tracey Gray, Moonbird Education

Victorian Essential Learning Standards

This activity is an extract from a teaching and learning resource currently 'in preparation' that will provide resources and activities for Levels 4 and 5. 'Peter Pan' primarily addresses the Science Learning Focus at Level 4 and can be integrated into English and other Learning Domains to enhance student learning.

Duration: 3 hours **Setting:** The schoolyard and the classroom.

Summary

This unit explores seed biodiversity and the different methods that plants in your garden and around your school use to disperse seeds.

Student Outcomes

Students will gain an understanding of:

- Different seed types and their structure and function;
- Some problems, such as weeds, that seed dispersal can cause.

Background notes for teachers

All plants have a unique method of dispersing or releasing seed. The methods of seed dispersal have been changing or evolving over thousands of years. The purpose of seed dispersal is to increase the distribution of the plant across suitable environments or ecosystems. The most successful plants are those that can disperse or spread their seed over a large area (away from parent plants). Dispersal or spreading of plant seeds occurs in a variety of interesting and amazing ways.

The 'Peter Pan Theory of Seed Dispersal' (Peter Pan theory) helps explain the different ways that some plants can distribute seed. The theory outlines some of the techniques that are used by plants to release their seed into new locations, where seedlings can grow without competition from parent plants.

The activity is broken into 3 sections, which can be done on one day or over several lessons. Students can undertake the activities individually, but pairs or small groups are recommended.

Part 1: The introduction of the Peter Pan theory: The theory is used to explain the different seed dispersal mechanisms used by various plants. Peter Pan refers to the storybook, which you might want to re-visit before or after this activity to help students understand the link.

Part 2: Seed pod hunt: The hunt is used to engage the students in discovering seed pods found in a defined area (in schoolyard ie: the garden or chosen natural environment). This is the opportunity to link the discussion of the Peter Pan theory to the physical examples you see.

Part 3: Seed report: Each group reports back to the class on one seed it has investigated using the Peter Pan Seed Dispersal Theory.

The Activity

Part 1 – The Peter Pan theory of seed dispersal

1. Undertake a quick brainstorming session with your students to revisit the story of 'Peter Pan' – or read the book or watch the movie. Make sure you think about the main elements of the story - who is in the story, where it is set and some of the main scenes in the story.
2. The emerging themes should include hooks, flying, water, pirate ships, crocodile, etc.
3. Explain the Peter Pan Theory pointing out to students that some of the themes they discussed earlier apply to seeds also. For example:

The Peter Pan Theory of Seed Dispersal

There are six elements to the Peter Pan Theory. These different methods of seed distribution by plants include:

Hooks (Captain Hook)	These seeds adhere to animal fur (or your socks) using velcro-like hooks and loops to be carried to another location.
Wings (Tinkerbell)	These seeds have attachments such as a specially designed wing or helicopter to assist them to fly to another location.
Fly (Peter Pan)	These seeds are light and fluffy and have specially designed feathery tufts to help them be carried by the wind (but they don't have a wing).
Sail (oceans/boats)	These seeds are carried by catching a hydro-ride on raindrops, rivers and other water bodies to travel to other locations.
Explosions (pirate ships and battles)	These seeds are self dispersers using a special mechanism where the two halves of the pod twist apart and explode catapulting the seeds into the air.
Digestion (crocodile)	Fruit eaten by animals, where the seeds pass through the digestive system and is ready to germinate in their droppings.

Part 2 - Seed Pod investigations in the school ground or local area

If you don't have an area to look for seeds, bring some in or show pictures of seeds that match the seed dispersal methods mentioned. For example:

Hooks	Grass including both native and introduced grasses, burrs
Wings	Sheoak, Hakea, Pines
Fly	Lettuce, Dandelions, Daisies,
Water	Passionfruit, Water chestnuts, Coconut, Tea tree, Red gum, Apple,
Explode	Pea, Broccoli, Bean, Wattle,
Digestion	Tomato

4. Split the class into groups of approximately 4 students.
5. Each group is asked to find at least **three** seedpods, which represent at least three of the dispersal categories outlined in the Peter Pan theory.

6. Using the key features identified in the Peter Pan theory select **one** seed pod to record a detailed description including:
- What the seed looks like including shape, size, colour, texture (fluffy, hard, soft, etc).
 - How you think the seed is dispersed or released.
 - What distinguishing feature identifies the seed dispersal method and how does it fit into the Peter Pan theory?
 - How to demonstrate the dispersal method you have identified (students may need props such as a fan or tub of water to do this).

Part 3 - Seed report

7. Each group designs a presentation to demonstrate their findings about their chosen seed to the rest of the class.
8. The presentation could be in the form of a Powerpoint presentation, an act or drama activity or simply a verbal report (students could take on the role of scientists reporting back to their peers). Include in the report:
- Your hypothesis on the way your chosen seed is dispersed and how you came to this conclusion;
 - How your findings fit into the Peter Pan theory;
 - The method/s you have used to test your theory;
 - Your conclusions about your testing methods – the method of seed dispersal proved/disproved?

Extension

Investigate how seed dispersal can be a problem in agricultural settings (think about weed seed spreading). Investigate the dispersal methods of some Victorian weeds:

- Spear Thistle
- Bathurst Burr
- Dandelion
- St John's Wort
- Gorse
- Blackberry

Research the ways farmers, community members, scientists and Department of Primary Industries staff address the problem of weed seed dispersal.

See DPI website www.dpi.vic.gov.au then choose Agriculture & Food / Crops, Pastures & Weeds / Weeds.

See Ghastly Guests activities on CRC for Weed Management website http://www.weeds.crc.org.au/for_schools/ghastly_guests.html see Student Worksheets and Teacher Resources.

Acknowledgments

Some images used in this activity come from the 'Ghastly Guests' teacher resource, as developed by the Cooperative Research Centre for Australian Weed Management.