Pre-trip Information for Teachers

Program Description
Seeds fly, float, hitchhike –even travel though the stomachs of birds – all in order to spread to new places and grow. Students explore the Garden in search of seeds with parachutes, hooks or fleshy fruit surrounding them. Students will dissect seeds and make seed babies to take home.

Learning Objectives
Students will:

1. Consider how fall differs to the other three seasons
2. Begin to recognize the variety of seeds found in the natural environment
3. Discover the ingenious ways that seeds disperse themselves and why
4. Relate seed dispersal to the life cycle of a flowering plant

Curriculum Connections

Kindergarten

BIG IDEAS

- Plants and animals have observable features
- Daily and seasonal changes affect all living things

CURRICULAR COMPETENCIES

- Observe objects and events in familiar contexts
- Make exploratory observations using their senses
- Discuss observations
- Share observations and ideas orally
- Ask simple questions about familiar objects and events
- Demonstrate curiosity and a sense of wonder about the world
- Experience and interpret the local environment

CONTENT

- Basic needs of plants and animals
- Adaptations of local plants and animals
- Seasonal changes
- Living things make changes to accommodate daily and seasonal cycle

Grade 1

BIG IDEAS
Living things have features and behaviours that help them survive in their environment.

CURRICULAR COMPETENCIES

- Make simple predictions about familiar objects and events
- Compare observations with predictions through discussion
- Communicate observations and ideas using oral or written language, drawing, or role-play
- Consider some environmental consequences of their actions
- Identify simple patterns and connections
- Ask questions about familiar objects and events
- Demonstrate curiosity and a sense of wonder about the world
- Experience and interpret the local environment

CONTENT

- Classification of living and non-living things
- Names of local plants and animals
- Structural features of living things in the local environment

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Grade 2

BIG IDEAS

Living things have life cycles adapted to their environment.

CURRICULAR COMPETENCIES

- Communicate observations and ideas using oral or written language, drawing, or role-play
- Consider some environmental consequences of their actions
- Identify simple patterns and connections
- Ask questions about familiar objects and events
- Demonstrate curiosity and a sense of wonder about the world
- Experience and interpret the local environment

Grade 3

BIG IDEAS

Living things are diverse, can be grouped, and interact in their ecosystems.

CURRICULAR COMPETENCIES

- Make predictions based on prior knowledge
- Make observations about living and non-living things in the local environment
- Ask questions about familiar objects and events
- Demonstrate curiosity and a sense of wonder about the world
- Experience and interpret the local environment

CONTENT

- Biodiversity in the local environment

Preparing Students for their visit to a botanical garden

Visiting a botanical garden

A botanical garden is a place of beauty, where students will get to see and learn about a variety of plants. Have a discussion about what the students think a botanical garden is and what they might be able to see at a botanical garden. Refer to our General Pre-visit package for more information.

Garden Code of Conduct

Refer to our Code of Conduct sheet in our General Pre-visit Information package, and discuss with your students why it is important not to pick any living plants in the Garden:

- If you pick a living plant, it can no longer grow or be enjoyed by other visitors to the Garden
- Plants and parts of plants, such as seeds, cones and leaves are all food sources for wildlife.

Preparing Students for the Program

Types of seeds and how they are dispersed

Seed dispersal:

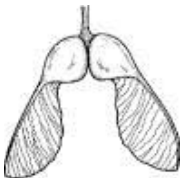
- Ensures propagation of species
- Prevents growing too close to mother plant as it will shade the seedlings
- Prevents overcrowding
- Promotes plant biodiversity

Seeds are dispersed by:

- wind
- water
- animals (including humans)
- propulsion

Hitchhiker or Passenger – *dispersed by animals*
A seed with barbs or hooks which travels by attaching itself to things like animal fur. Velcro is modelled on this seed. Examples are: burrs, astilbe, spirea, rudbeckia, horse chestnut, grasses and coreopsis.

Parachute - *dispersed by wind*
A seed which floats through the air. It is shaped like a sky-diving parachute with many light hairs at one end (the 'parachute') and a seed below (the 'parachuter'). Examples: dandelion, thistle, milkweed, fireweed, clematis, cottonwood.

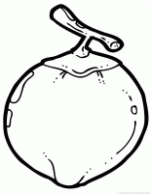


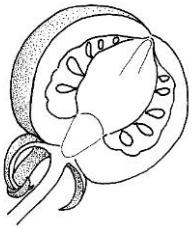
Helicopter - *dispersed by wind*
A seed with blades that allow it to spin through the air. The seed is at one end or the middle of the blades (the 'helicopter') and the blades rise above the seed. Examples: maple, ash, linden, box elder and elm.

Shaker - *dispersed by wind*
Small seeds in a dry receptacle with an opening. When the wind blows or something brushes past these receptacles on stalks, the tiny seeds shake out. Examples are: poppies, primulas, geraniums, fennel and agapanthus.

Popper - *dispersed by propulsion*
These seeds are often pea-shaped. Two or more sides cup together with the seeds inside. The sides are held together under tension. When ripe, the sides split and twist, catapulting the seeds away from the plant. Examples are: Scotch broom, vetch, and impatiens, honey locust, acacia, cleome, catalpa and lily.

Floater - *dispersed by water*
These seeds float on water. They have a protective, waterproof covering. Water currents and wind push them along the top of the water. Examples: irises, lotus, water lily and coconuts.





Fruits or Berries - *dispersed by animals*
These seeds are often eaten by animals such as birds and squirrels. Many of these seeds require a passage through an animal's acidic stomach in order to remove the seeds' protective coverings. When the seeds as excreted, they are sitting in ready-made fertilizer. Examples: blueberries, tomatoes, apples, kiwi, holly, conifers, acorns, chestnut, salal, beech and mountain-ash.

Activities for discovering the Fall Season

These interdisciplinary activities are designed to integrate, science, math, language arts and art in preparation or as a follow up to your visit to VanDusen.

1) Investigating the school grounds

Objectives:

- To begin to consider the themes of the Seed Secrets program through a study of the school grounds (what is happening outside at this time of year?)
- Begin a seasonal study of the school grounds

Which season are we in?
Go out into the school grounds and get your students to take a good look around them. Ask them, which season are we in? How do we know? What signs can we see that tell us that it is fall? Give your students opportunity to make a coloured sketch of the school grounds in fall.

2) Mathematics: How far do seeds travel - outside on a dry day?

Materials: A chair, some winged trees seeds like maple and ash seeds; dandelion heads, or another fluffy-headed seed head; a long tape measure.

Procedure:
- Stand on the chair and throw a winged seed into the air. Watch it as it sails through the air. Notice where it comes down.
- Use a tape measure to find out how far it travelled.
- Try it with other seeds and find out which ones travel the farthest.
- Tear the wings off one or two of the seeds and throw the seeds up. How far did they go this time?
- Count the seeds on a dandelion head. Now blow on the head. How many blows does it take to blow away all of the seeds?
- Use the tape measure to find out how far the seeds travel.
- Record and compare your results.

3) Bean comparison and germination

Materials: Different sorts of bean seeds – pinto, black, kidney, mung, lima, pole; paper towels, plastic cups

Part 1 - Classification:

1. Divide students into small groups (three to four students/group) and distribute an assortment of different types of beans.
2. Have students sort their pile into classification groups based on some characteristic that is logical to them.
3. Have students re-sort their pile using different characteristics. For example, they may initially sort by size, and then by colour or shape.
4. Call on several groups to share with the class what characteristics they used to classify their objects, as different groups may have used different criteria.

Part 2 - Germination:

1. Ask students what part of the plant the beans are. (Beans are seeds.)
2. Try to germinate the seeds by placing them in around the outside of a clear, plastic cup lined on the inside with a wet paper towel.
3. Make predictions on which beans will germinate first. You may wish to presoak some beans overnight, and see if these ones germinate more quickly.
4. Extension possibilities: beans can be measured daily, and a chart kept on their growth.
5. Beans could be grown with different variables to determine optimal conditions for growth (variations in moisture, light conditions, temperature, using water vs juice or rubbing alcohol)

4) Language Arts: A Sticky Adventure

Materials: Pencil, paper, imagination.

Procedure: Suppose you are a burr. You attach yourself to a passing rabbit or dog, or maybe to a person. Make up a story about your travels. Write about your adventure, turn it into a comic strip, draw a picture, make a video, or tell the story to someone.

5) Art: Seedy Posters

Materials:
seeds, glue, construction paper or other stiff paper.

Procedure:

- Collect seeds from around the school grounds, or the neighbourhood, or purchase some different ones from bulk food stores.
- Draw an image on the paper
- “colour it” (fill it in) with seeds.

6) Studying seed parts

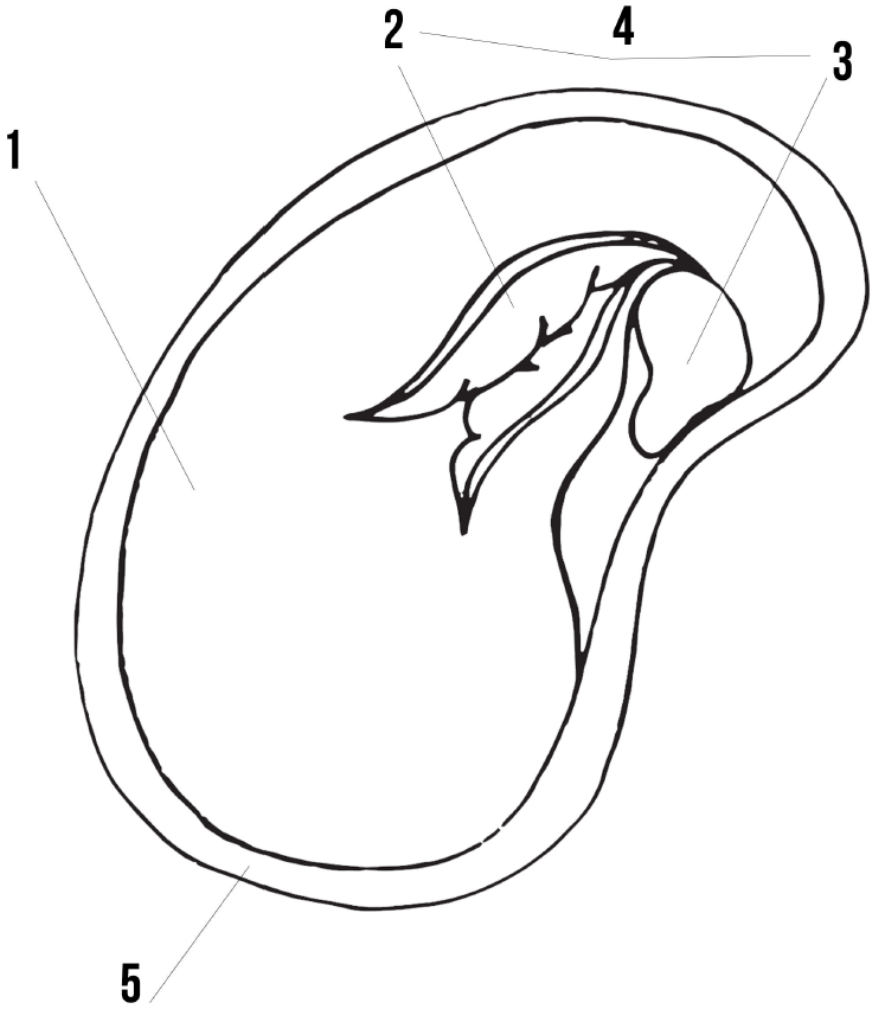
Materials:
Blank worksheets, markers/pencil crayons

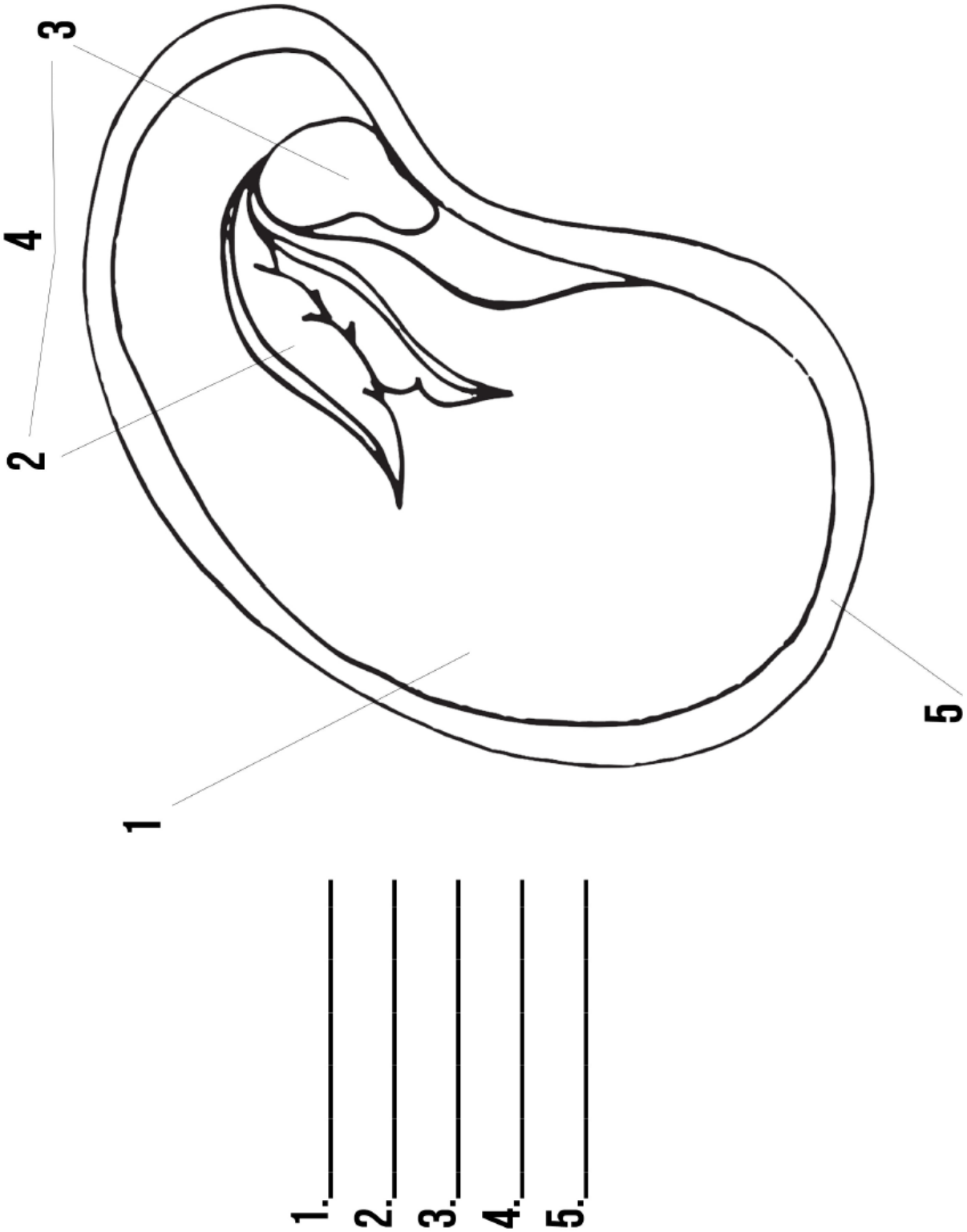
Procedure: Discuss the different parts of a seed, and their function. Have the students color in their seed, and label each part correctly.

Seed Parts Worksheet Answer Key

1. FOOD STORAGE
2. FIRST LEAVES
3. EMBRYONIC ROOT
4. EMBRYO
5. SEED COAT

1. COTYLEDON
2. EPICOTYL
3. RADICLE
4. EMBRYO
5. SEED COAT

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Fall Wordsearch

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Wordsearch answer key