

3rd Grade Life Science Curriculum Map Growth & Change in Plants

The lessons fall under seven topics that relate to aspects of life systems: Growth and Change in Plants.

In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted.

Suggestions for differentiation are also included so that all students can be successful in the learning environment.

Seven Topics Include:

Lesson One: Plants

Students will learn about what a plant is, and about their physical characteristics.

Lesson Two: Plant Parts

Students will learn about how the main parts of a plant work to help it survive.

Lesson Three: What Do Plants Need?

Students will learn about the basic needs of plants in order to grow healthy.

Lesson Four: How Plants Grow

Students will learn about seed germination, how plants grow to maturity, and special adaptations that help plants to survive.

Lesson Five: Importance of Plants

Students will learn about the importance of plants to people and other living things, and about the harmful effects plants face and how to minimize these effects.

Lesson Six: Aboriginal People and Plants

Students will learn about the importance of some plants and their usage by First Nation's people.

Lesson Seven: Growing Plants for Food

Students will learn about the ways in which plants are grown for food, the advantages and disadvantages of organically grown and produced food, and harvesting methods of plants.

PLANT PARTS

LEARNING INTENTION:

Students will learn about how the main parts of a plant work to help it survive.

SUCCESS CRITERIA:

- describe the function of the root of a plant
- examine and identify plant roots as either tap or fibrous
- describe the function of the stem of a plant
- identify some edible plant stems
- describe the process of photosynthesis
- determine the different colours inside green leaves
- make observations and conclusions using written descriptions and illustrations
- identify the parts of a flower
- describe the ways the seeds of plants are distributed in nature
- identify some edible plant seeds
- label the parts of a tree plant and describe their purpose

MATERIALS NEEDED:

- a copy of “At the Root of It!” worksheet 1 and 2 for each student
- a copy of “Where It Stems From!” worksheet 3 and 4 for each student
- a copy of “Plant Leaves” worksheet 5 and 6 for each student
- a copy of “Discover the Colour!” worksheet 7, 8, and 9 for each student
- a copy of “The Flower” worksheet 10 for each student
- a copy of “The Seeds” worksheet 11 and 12 for each student
- a copy of “A Tree” worksheet 13 for each student

- about a dozen magnifying glasses
- four different plants with root systems exposed (a set for each group of students)
- 3 glass jars, a coffee filter, 3 labels, a shallow baking pan, a wooden spoon, a collection of three types of green leaves (for each group of students)
- water, a kettle, about 4 bottles of rubbing alcohol
- access to the internet, or local library
- scissors, chart paper, markers, pencils, pencil crayons
- sheets of white art paper, crayons, differently shaped leaves (*optional materials*)

PROCEDURE:

***This lesson can be done as one long lesson, or can be done in five or six shorter lessons.**

1. Using worksheet 1, do a shared reading activity with the students. This will allow for reading practice and learning how to break down word parts in order to read the larger words in the text. Along with the content, discussion of certain vocabulary words would be of benefit for students to fully understand the passage.

Some interesting vocabulary words to focus on are:

- | | | |
|-------------|-----------|----------------|
| • anchor | • support | • absorb |
| • tap root | • starch | • tropical |
| • nutrients | • storage | • fibrous root |
| • strands | | |

2. Divide students into small groups, and give each of them worksheet 2, four different plants with roots exposed, and magnifying glasses. Students will name and draw each plant, and determine if each plant has a tap or fibrous root system.

3. Give students worksheet 3. Read through as a large group to ensure students' understanding. Give students worksheet 4 to complete. They may need to visit a local library or access the internet to gather information about edible plant stems.
4. Using worksheets 5 and 6, do a shared reading activity with the students. This will allow for reading practice and learning how to break down word parts in order to read the larger words in the text. Along with the content, discussion of certain vocabulary words would be of benefit for students to fully understand the passage.

Some interesting vocabulary words to focus on are:

- trigger
- broad
- deciduous
- evergreen
- carbon dioxide
- transpiration
- chlorophyll
- jagged
- coniferous
- function
- oxygen
- photosynthesis

5. Take students outside to collect 3 different types of green leaves (about a handful of each type). Upon returning to the classroom, divide students into small groups, and give each of them worksheets 7, 8, and 9, and the materials to conduct the investigation.
*This investigation needs extended time to be completed, so starting early in the day is recommended. Students should conclude that the rubbing alcohol worked to break down the chlorophyll in the leaves so that their hidden colours could be revealed. This is relative to the reduction of warmth and sunlight in autumn, which results in a breakdown of the chlorophyll in nature's green leaves, to reveal their hidden colours before they die and fall from the deciduous trees.
6. Using worksheets 10 and 11, do a shared reading activity with the students. This will allow for reading practice and learning how to break down word parts in order to read the larger words in the text. Along with the content, discussion of certain vocabulary words would be of benefit for students to fully understand the passage.

Some interesting vocabulary words to focus on are:

- reproductive
- petals
- pistil
- scatter
- scent
- stamen
- nectar
- waterlogged
- producing
- anther
- fertilized
- excrement
- attract
- pollen
- distribute
- explode

7. Give students worksheet 12 to complete. They may need to visit a local library or access the internet to gather information about edible plant seeds.
8. Give students worksheet 13 to complete.

DIFFERENTIATION:

Slower learners may benefit by:

- working in a small group with teacher direction to complete worksheets 7, 8, and 9.
- working with a strong peer to conduct the research on edible stems and seeds on worksheets 4 and 12
- reducing the expectation to only finding two examples of edible plant stems and seeds on worksheets 4 and 12

For enrichment, faster learners could do a leaf rubbing art activity. Lay a leaf under a sheet of white art paper (on a flat surface). Using the side of a crayon, lightly rub the crayon over the paper so that a pattern of the leaf can be seen. Repeat with other leaves to create a design. Red, yellow, orange, brown, and green crayons could be used as a display of the colours that are seen in autumn. An additional step would be for these students to provide a short written explanation of why these colours appear in the leaves on some deciduous trees in autumn. Then, attach it to their art work.



At the Root of It!

The roots of a plant anchor it to the ground. Roots are mostly underground and grow down into the soil. But, for some tropical trees, like the mangrove tree, some roots grow above the ground and help to support the tree.

Roots do not have leaves, but they often have root hairs which grow out into the soil to help absorb water and nutrients that a plant needs to grow. Did you know that some roots are storage areas and food for the plant? For example, the roots of beets, radishes, and carrots store food for the plant in the form of **starch**.

Roots are either tap or fibrous. **Tap roots** are roots that have one root that is longer than the rest. This larger root grows straight down. **Fibrous roots** have many strands of roots of similar size that spread out in all directions.



Beets, radishes, and carrots are examples of plants with tap roots.



Examples of plants with fibrous roots are lettuce and grass plants.

Examine the roots of four different plants. During your examination:

- name the plant
- draw the plant's root system
- determine its root system (circle tap or fibrous)

Name: _____

tap **fibrous**

Name: _____

tap **fibrous**

Name: _____

tap **fibrous**

Name: _____

tap **fibrous**



Where It Stems From!

The stem of a plant is the part that usually has buds and leaves. Stems usually grow upwards and straight, but there are some plants like the strawberry plant, which have stems that grow along the ground. The upper part of a stem of a plant can bear branches, leaves, flowers, and fruit.



Stems have four main jobs:

1. They support the plant.
2. They grow leaves.
3. They carry water and nutrients from the roots to the leaves.
4. They provide food storage from some plants.

Did you know that some stems, like tree trunks, grow a new layer every year? The new layer becomes the outside of the stem. This new layer grows underneath the bark of the tree.

The new layer is the part of the stem that brings the food and water from the roots to the leaves.

As each year passes, the stem gets thicker and thicker as new layers are added.



Did you know that some stems of plants are edible? If stems of plants provide food storage, water, and nutrients for itself, then some of those plants must be good for us to eat too!

Research It!

Find out the name of some edible plant stems. Draw and label them.



Plant Leaves

There are many different kinds of leaves that come in many different shapes and sizes. Some leaves are long and thin, while others are broad and round.

Some leaves have downy hairs on their underside. Some leaves have jagged edges, while others have smooth edges. Some leaves even have a particular smell.

Leaves are often green in colour because they have **chlorophyll** in them, but these leaves have hidden colours in them too!



In autumn, the chlorophyll in these leaves breaks down and exposes the hidden colours in the leaves, such as yellow, orange, and red. The leaves then die and soon fall off. These leaves can be found on **deciduous** trees.

Coniferous trees, such as pine trees, have needle like leaves that remain green year round. Coniferous trees are also known as evergreens.

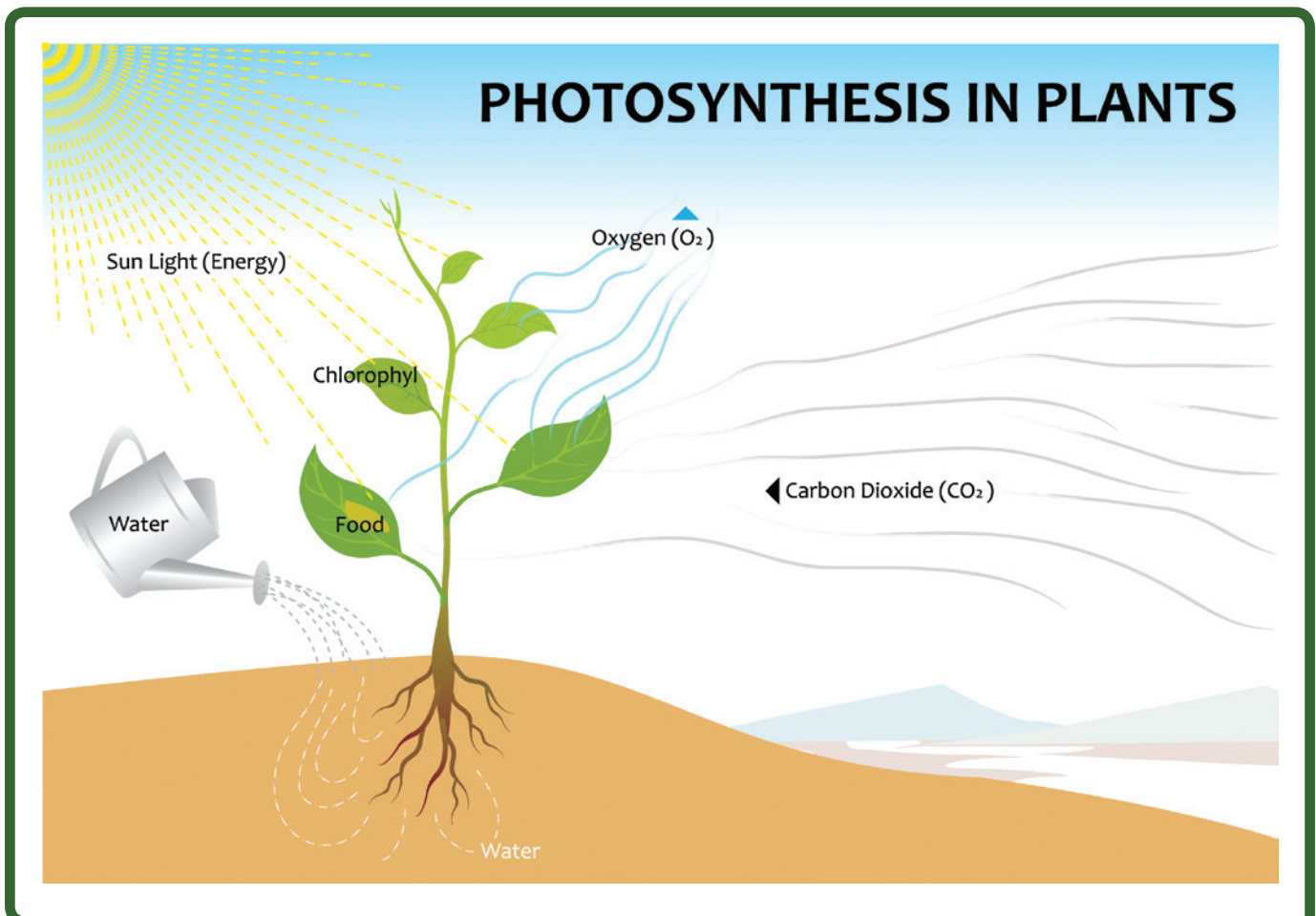


The leaves on a Venus Fly Trap plant have stiff hairs called trigger hairs. Its trigger hairs sense insects that land on its leaves. The leaf snaps shut and traps the insect inside. It becomes food for the plant.



Leaves take in sunlight. They have openings that let water and air in and out. Leaves breathe in **carbon dioxide** and breathe out **oxygen**. This is very important to humans. We need the oxygen that the plants provide. Leaves also pass water vapor into the air, this is called **transpiration**.

The leaves on a plant have an important function for the plant. The leaves produce food for it. This food making process is called **photosynthesis**. During photosynthesis, leaves get energy from the sun, and they use their chlorophyll to create a simple sugar from the air. The sugar and the water that the plant takes in make food for the plant.



Discover the Colour!

What hidden colours are in those leaves outside? Collect some green leaves and try this!

Materials Needed:

- 3 glass jars
- water
- a wooden spoon
- a pair of scissors
- a collection of three types of green leaves
- a shallow baking pan
- rubbing alcohol
- a kettle
- a marker
- a coffee filter
- 3 labels

What To Do:

1. Tear up each type of leaf into small pieces and place each type into its own jar. Label the jars with the type of leaf that is in it.
2. Carefully pour some rubbing alcohol into each of the jars, so that it just covers the leaves that are in it.
3. Using the wooden spoon, mix and grind up the leaves in the jars.
4. Place the glass jars into a shallow baking pan. **Your teacher will pour boiling water into the pan so that it covers the jars half way up.**
5. After 30 minutes, remove the jars from the hot water bath. Remove the leaves from the jars. Compare the shades of chlorophyll in the different leaf types. Record your observations on worksheet 8.
6. Cut the coffee filter into long strips. Place one strip into each glass jar so that it stands tall out of the water. Let it sit for 2 hours.
7. Pull out the strips. What do you notice? Record your observations on worksheets 8 and 9.
8. Make conclusions about the hidden colours in green leaves. Record them on worksheet 9.

Let's Observe

Part One

Describe the shades of chlorophyll in each of the jars.

Jar 1 - _____ leaves

Jar 2 - _____ leaves

Jar 3 - _____ leaves

Part Two

What did you observe after you let the coffee filter paper sit in the rubbing alcohol for 2 hours?



Illustrate the colours that you saw.

<u>Jar 1</u>	<u>Jar 2</u>	<u>Jar 3</u>

Let's Conclude

What did the rubbing alcohol do to the leaves?

Explain what you have learned about the colours inside green leaves.

The Flower

Flowers are the prettiest parts of plants. They come in all shades and colours, and most of them smell very nice. Flowers also have an important job in helping a plant to survive. Let's learn more about this!



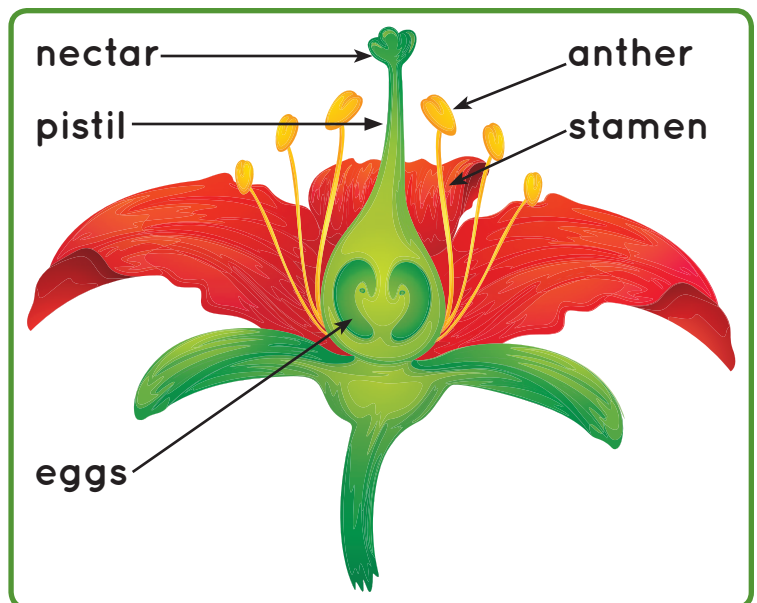
The flowers on most plants are the reproductive part. Flowers become pollinated and produce fruit, which creates the seeds to start a new plant. Some flowers go straight to seed without producing fruit, like the dandelion plant.

The petals on a plant are usually its largest part. The petals are colourful and attract animals and insects that help to pollinate the flower. The petals on a flower have a scent. The scent comes from a type of oil in the petals. The scent also attracts insects.

Inside the **petals** are the **stamens**. The stamens are long and thin. At the end of the stamen is the **anther** which produces the **pollen**.

In the very center of the flower is the **pistil**. This bottle shaped part of the flower contains **nectar** at the top and eggs at the bottom.

The **eggs** need to be fertilized by the pollen to produce **fruit** or **seeds**.



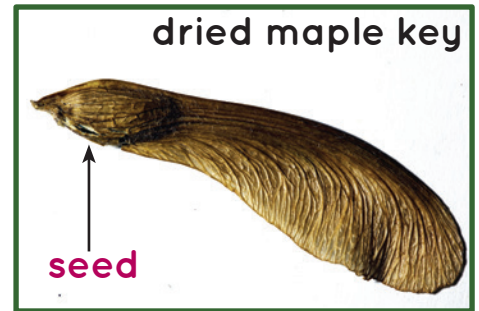
The Seeds

Plants reproduce themselves using seeds. Seeds come in all shapes and sizes, from the smallest, which are like the head of a pin, to the largest, which can be the size of your hand.

Seeds contain an egg that needs to be fertilized to create a new plant. Once the egg is fertilized, the plant gets the seeds ready for travel. Plants distribute many seeds, sometimes several hundred. Yet most do not take root and grow a new plant. They may get broken, or get waterlogged, or rot. Some plants even get eaten, so the seeds get destroyed.

Plants distribute their seeds in different ways. Some seeds fly with the wind, like maple keys and dandelion seeds. Some seeds have hooks and bristles that attach themselves to animals and people who walk past them. Burrs are an example of seeds that travel this way.

Other seeds travel by floating on lakes, rivers, streams, or oceans. The coconut is a fruit that often falls into the ocean. It may travel to a new shore where it breaks open and the seed within takes root.



This is a seed of a rubber tree plant.

Some seeds are distributed by animals that eat the fruit of some plants. They pass the seeds as excrement.

There are plants, such as impatiens, that have seed pods which explode, causing their seeds to spray in all directions. Another example of an exploding seed pod is found on the rubber tree plant. Did you know that the fruit on the rubber tree will burst open when it is ripe, and scatter many seeds, up to about 30 meters from the tree?

Research It!

Did you know that the seeds of some plants are edible? Access the internet or visit your local library to help you find out the name of some edible seeds. Draw and label them.









Have you eaten any of these seeds? Which ones?



A Tree

Use the words in the Word Box as labels to create a diagram of a tree.

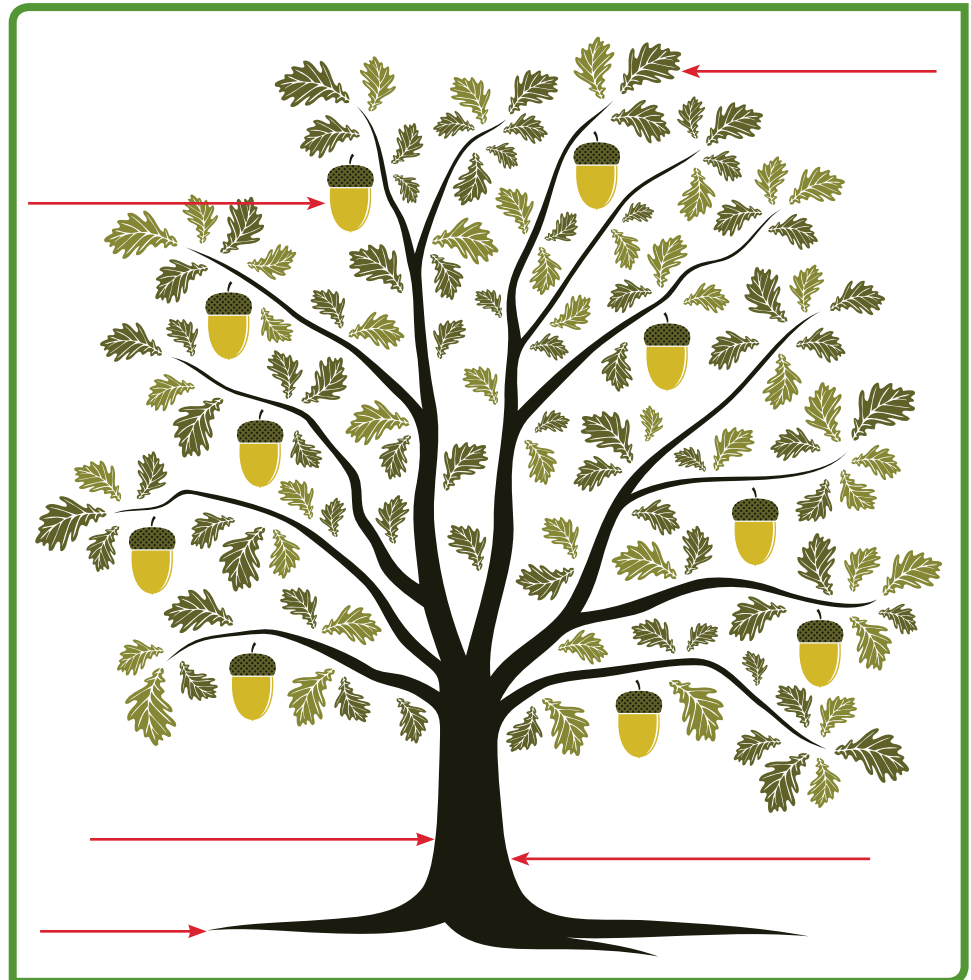
roots

trunk

bark

leaves

seeds



Match the parts of a tree in column A to its purpose in column B.

Column A

Leaves
Trunk
Roots
Bark
Seeds

Column B

- bring water and nutrients from the ground
- holds up the leaves, fruit, and seeds
- will grow to be new trees
- make food for the tree
- protects the tree from disease and animals