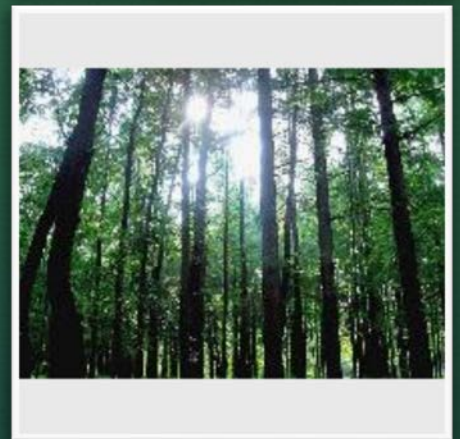




Trees and Forests

Focus Questions

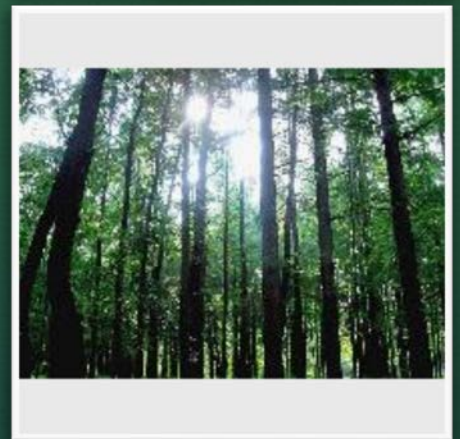
- What is a forest?
- Are trees the only living things in a forest?
- What kinds of non-living things are a part of a forest?
- How are trees and forests important?



Task

- On a sheet of looseleaf in your duotang you will create a web.
- Write “Trees and Forests” in the center and branch out with all of the things that you know about trees and forests and why they are important.

Trees and
Forests



Value of Trees and Forests

- They produce oxygen and use carbon dioxide from the air. Carbon dioxide is a greenhouse gas that affects greenhouse gases. These gases may cause global warming.
- They filter out harmful pollution in the air.
- They produce food we eat and ingredients for medicine we use
- They produce food and homes for animals
- They can protect against strong winds
- They can protect against direct sunlight and give shade
- They provide materials for building and paper products
- The roots of a tree hold soil in place which helps prevent soil erosion
- When dead leaves decompose they give the soil nutrients
- Humans can use for recreational use like camping

Why Study Trees & Forests?

To Understand:

- A forest ecosystem
- The contributions of trees and forests to the environment
- Characteristics of trees
- Human uses of the forest
- How to protect our forests



What is a Forest?

- A forest is a community of living and non-living things where the predominant (main) species is trees.
- Everything in a forest is connected.
- Everything affects everything else.



Discussion

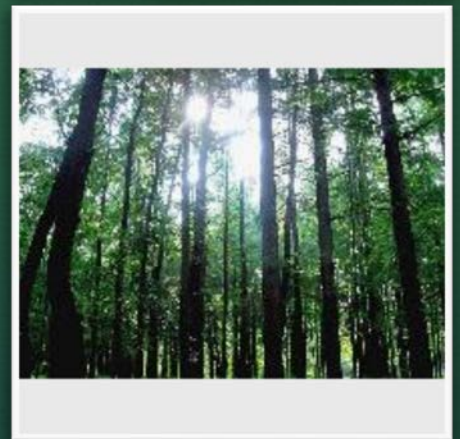
- Are all forests the same?
- How are they different?
- Why is a forest made up of so many different types and ages of trees?



What is a Forest?

- A forest is not a community that grows old together.
- A variety of change agents cause parts of the forest to change.
These include:

- Fire
- Floods
- Storms
- Insects
- Disease
- Human Activity



What is a Forest?

- As a result, the forest is made up of small and large areas of different aged trees, often with a mixture of different species.
- A forest with many trees of different ages and types supports a variety of wildlife.



What is a Forest?

- Some species of wildlife are best supported by a young forest; others need a more mature forest to survive. Some prefer leafy trees; others prefer trees with needles.
- Without a variety of trees in the forest the variety of animal life would be greatly decreased.





Focus Question



What are the components
of a forest ecosystem?

Vocabulary

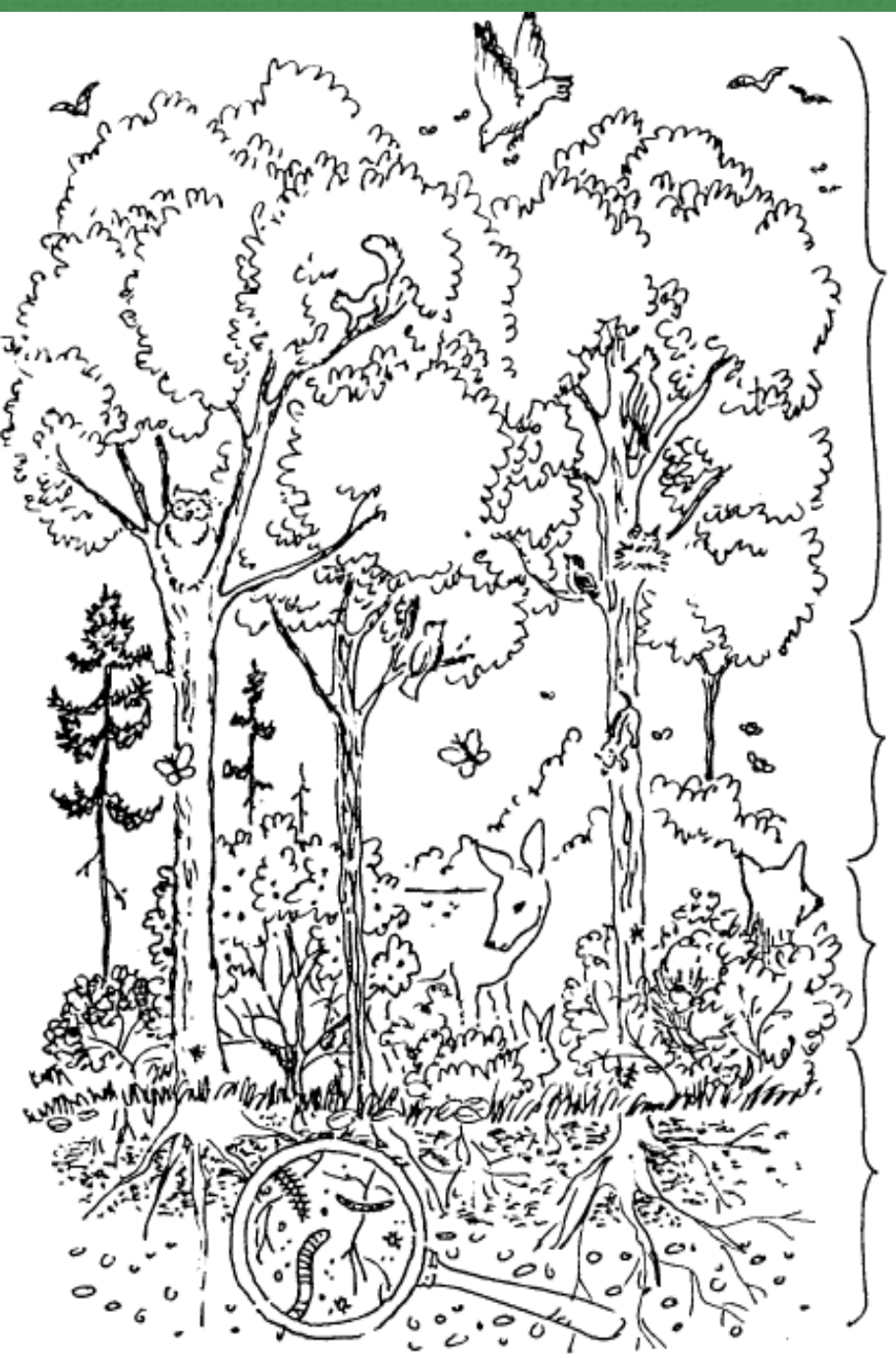
- **Ecosystem:** a community of living and non-living components in relationship with each other and their environment.
- **Producers:** any organism that uses energy from the sun to produce it's own food.
- **Consumers:** an organism that feeds on other organisms in an ecosystem.
- **Decomposers:** an organism that breaks down material and litter.

Vocabulary

- Canopy- First layer of the forest floor. (Big thick treetops)
- Understory- Second Layer of the forest. (Small trees, large bushes)
- Shrubbery- Third layer of the forest. (Flowers, grass)
- Forest Floor -Forth and final layer. It is dark and damp.
- Habitat- The environment where an organism or ecological community lives or exists.

Vocabulary

- Carnivores- Type of consumer. Animals that eat other animals (lynx and wolves)
- Omnivores-Type of consumer. Animals that eat both plants and animals . (bears and foxes)
- Herbivores - Type of consumer. Animals that eat only plants. (Deer and squirrels)



Level: Upper Canopy

Plant:

Animal:

Level: Middle Level or Understory

Plant:

Animal:

Level: Underbrush or Shrubbery Layer

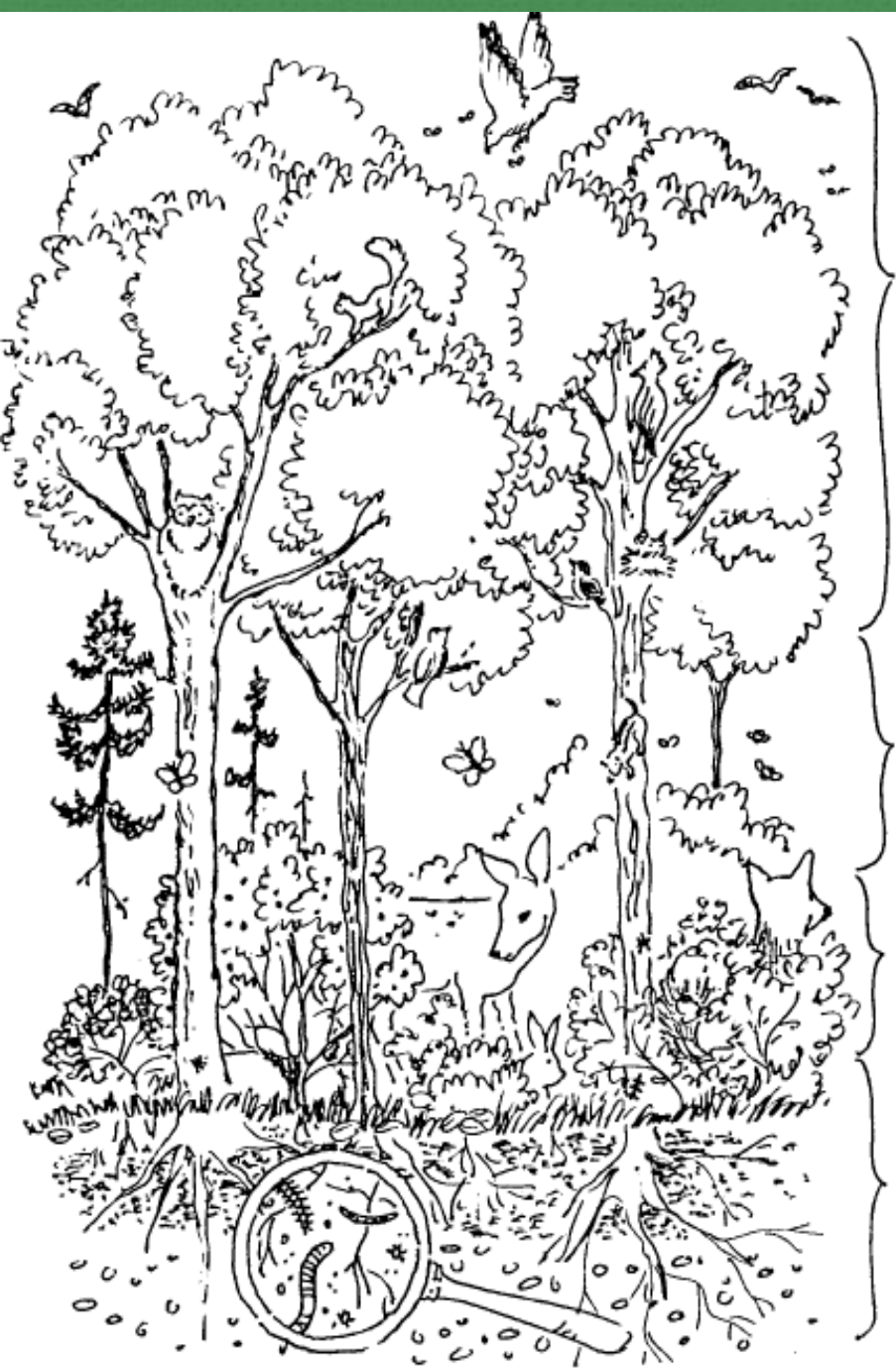
Plant:

Animal:

Level: Forest Floor

Plant:

Animal:



Level: Upper Canopy

Plant: Top level of the forest formed by leaves & branches of the tallest trees.

Animal: Different birds (owls etc.) and insects (aphids, tent caterpillars)

Level: Middle Level or Understory

Plant: Smaller trees & shrubs

Animal: Insects, lichens, squirrels, woodpeckers and many other birds

Level: Underbrush or Shrubbery Layer

Plant: Ferns, wildflowers and other soft stem plants, tree seedlings.

Animal: Butterflies, dragonflies, mice, weasels, deer, porcupine, skunks, rabbits.

Level: Forest Floor

Plant: Ground cover & soil; leaf litter, mushrooms, moss, flowers.

Animals: Toads, salamanders, worms, bacteria, spiders, millipedes, centipedes.

Vocabulary

- **Biotic**: living components of the environment.
- **Abiotic**: non-living components of the environment.

Activity

Create a T-Chart in your notebook like the one below. Make sure that you use a ruler!

Living Things
(Biotic)

Non-Living Things
(Abiotic)

Living Things (Biotic)	Non-Living Things (Abiotic)

Work with your elbow partner to list all of the living and non-living things that make up a forest ecosystem.



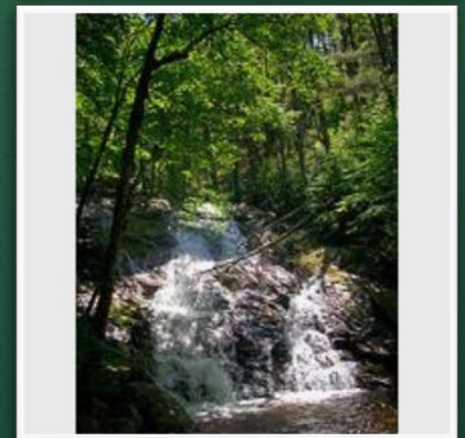
Did You Come Up With The Same Things?

Living Things (Biotic)

Plants and Algae
Animals
Fungus
Bacteria

Non-Living Things (Abiotic)

Rocks
Water
Air
Soil
Dead Organisms



Stressors

Biotic Stress: Harm that comes from dangerous actions from living organisms like insects, disease causing fungi, and over eating animals like cattle and deer.

Abiotic Stress: Harm that comes from natural forces that are not living. Things like snow, ice, wind, hail, and fire. The worst abiotic stressors are drought, extreme heat or cold, and pollution. They cause a decline of forests.

Activity

- Copy the following Forest Ecosystem Target into your notebook.
- Sort all of the items from your t-chart into your Forest Ecosystem Target.

Non-Living Components

The diagram consists of four concentric yellow circles on a dark green background. The circles are arranged in a vertical stack, with the largest circle at the top and the smallest at the bottom. Each circle contains a text label in bold black font, centered horizontally. The labels, from top to bottom, are: 'Non-Living Components', 'Producers', 'Consumers', and 'Decomposers'.

Producers

Consumers

Decomposers

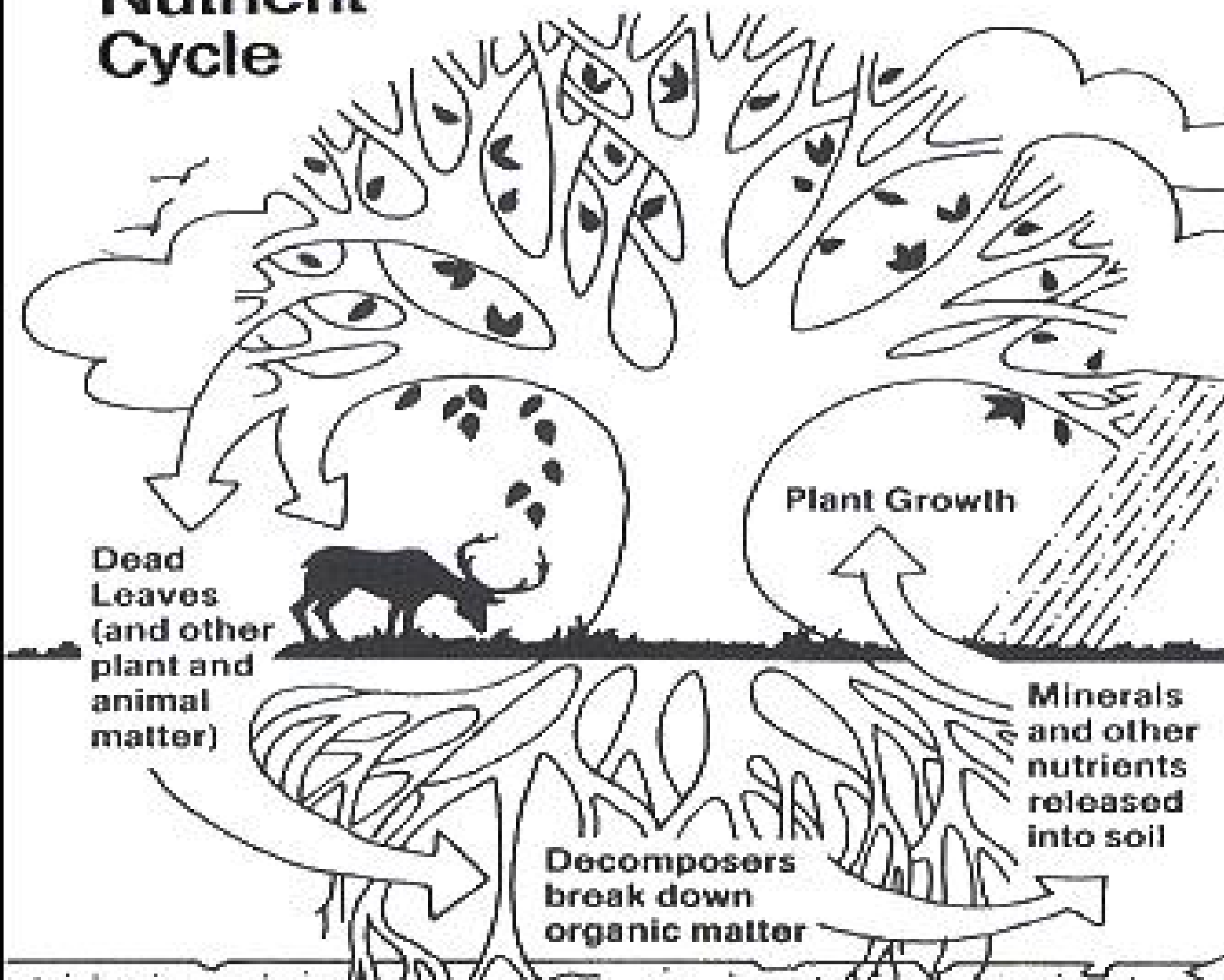
The role of trees

- Plants make food for themselves and others (that's why they're called producers.)
- Plants energy sources: Sun, Water, and gases
- Plants need chemicals and/or minerals to grow
- Animals use food to get their mineral nutrients that they need. But, they can't eat the soil they must eat the plants to get it. (Or if they're carnivores eat animals that have eaten plants)

The role of trees

- Animals are consumers
- Plants and animals die and decompose. Their bodies return back to the earth and soil.
- Decomposers- are bacteria and fungi that break down dead matter putting minerals and chemicals back into the soil

Nutrient Cycle



Dead Leaves
(and other
plant and
animal
matter)

Plant Growth

Minerals and other
nutrients
released
into soil

Decomposers
break down
organic matter

The role of trees

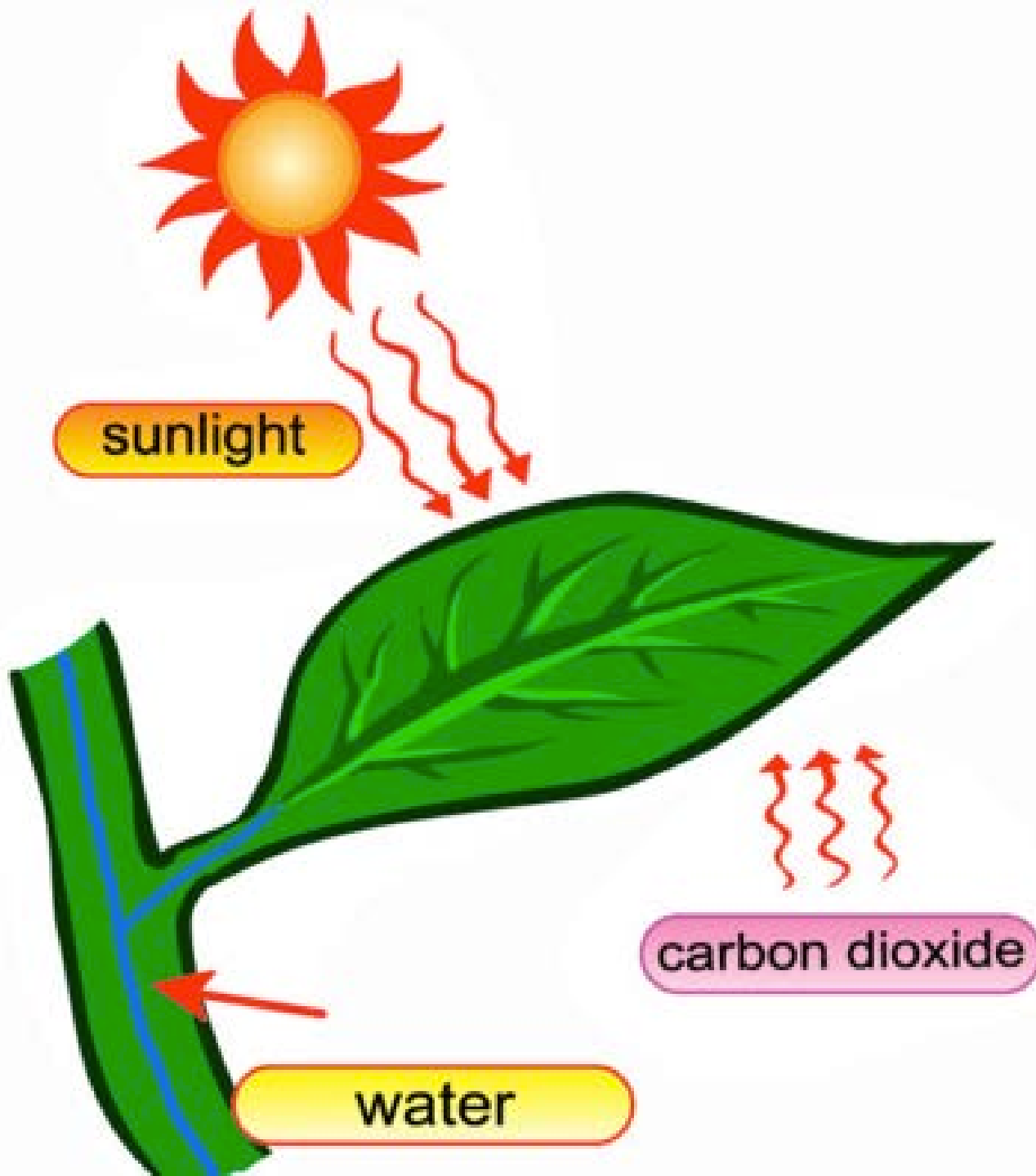
- Carbon dioxide and oxygen are cycled on earth through plants and animals.
- Animals need oxygen to breath. We breath in oxygen and breath out carbon dioxide
- Plants need carbon dioxide to make their food (photosynthesis) and they release oxygen as We need each other to survive
- Plants use oxygen as well but they create enough to share with animals

Photosynthesis YouTube Videos

What is Photosynthesis?

- Carbon dioxide + water + chlorophyll + sun = sugar + oxygen
- Trees take in carbon dioxide and water and combine them to make sugars and starches. To make sugars and starches, the tree requires energy which the plant gets by trapping solar energy (from the sun) in the green pigment called chlorophyll.
- This energy is then used in photosynthesis and becomes trapped in the sugar molecules.
- Chlorophyll is used over and over again to trap light energy for making food.

- The process by which trees make sugars is called photosynthesis.
- “Photo” refers to the light that is required and “synthesis” means “to make.”
- The food (carbohydrates) is used to grow leaves, stems, roots, woody tissue, fruits and nuts.
- The oxygen produced is a by-product (something extra), is put back into the atmosphere and used by organisms, in the process of cellular respiration, to produce energy for their own use.



sunlight

carbon dioxide

water

Trees and Water

- The under side of a leaf have tiny opening called stomata
- The stomata absorbs the carbon dioxide and also releases water vapour (transpiration) during the photosynthesis process
- Plants get water from their roots, which transports the water up the stem to the leaves
- Big leaves have bigger surface area (more stomata) than needle leaves (less stomata)

Trees and Water

- Broad (big) leaves lose more water during photosynthesis than needle leaves
- A fully grown tree could transpire 450L of water
- Release water acts as an air conditioner, that's why big leaf trees lose their leaves so the tree doesn't freeze to death.
- Why doesn't evergreens (needle leaf trees) lose their leaves?

Parts of a Tree

- Most trees have the same parts:

Roots: Absorb water and nutrients from soil, anchor the tree, and store sugar

Trunk/stem: Gives tree shape and strength, support the crown. It has a network of tubes that run between the roots and leaves. They are used to carry water or food.

Crown: Leaves and branches. Leaves are the food factories. They contain a green pigment called chlorophyll that take energy from the sun to use for photosynthesis.

Parts of a Tree

Outer bark: acts as protection from bugs, insects, disease, storms, and extreme temperatures

Inner bark/phloem: carries food and nutrients from the leaves to the rest of the tree (Sap)

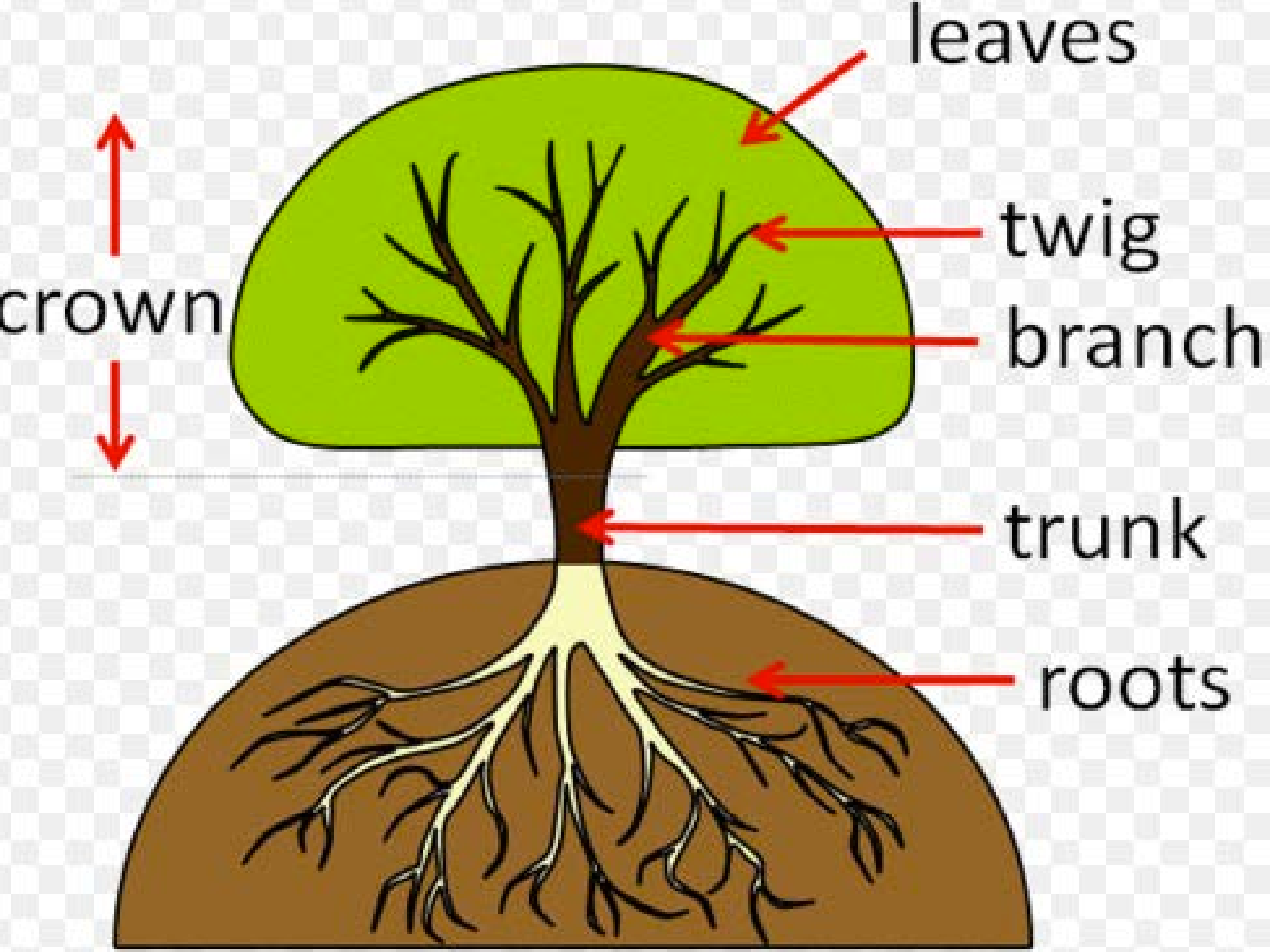
Cambium: is found between the two barks. It is a growing tissue that produces new growth of cambium, phloem, and xylem

Sapwood/xylem: is a network of cells that bring water and nutrients up from the roots. As the tree grows xylem will die and new xylem will take it's place

Parts of a Tree

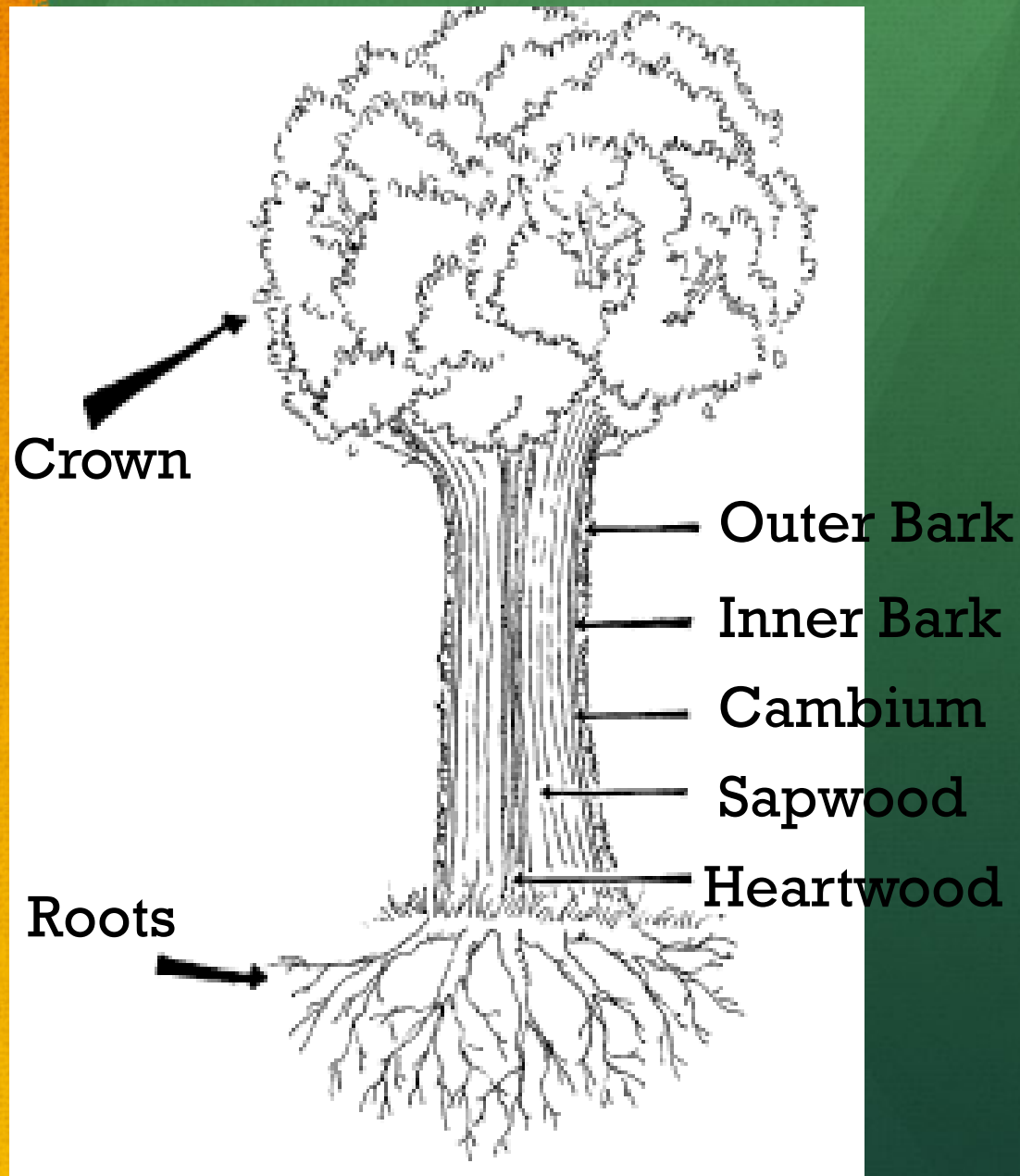
Heartwood: Takes all the dead xylem and stores it, and sugar, dyes, and oil

Leaves: flat or needle-like structures containing most of the chlorophyll and are the main sites of photosynthesis.



Parts of a Tree

Label the parts of a tree
on your diagram



Did You Know?

- Trees are the largest of all plants.
- The tallest trees grow higher than 30-story buildings.
- Many trees also live longer than other plants. Some live for hundreds or even thousands of years.
- They are the oldest known living things.

Did You Know?

- Trees continue to grow as long as they live.
- Each year a new layer of wood is added to the trunk of the tree.
- Trees rest during the winter months. Trees in this state are called *dormant*.

What's the difference?

- Trees and shrubs have wooded stems (sunflowers do not)
- Trees are perennial plants, this means they continue to grow year after year.
- Trees usually have 1 wooded stem called a trunk
- Trees grow bigger than 4m (baby trees are called saplings)
- Shrubs are perennial
- Shrubs usually have more than one wooded stem
- Shrubs don't grow bigger than 4 m

Types of Trees

Coniferous:

- Have needle shaped leaves and have cones.
- They are green all year long. (EVERGREEN)
- They lose their needles slowly rather than all at once during fall.
- Less moisture loss.
- Various shapes.

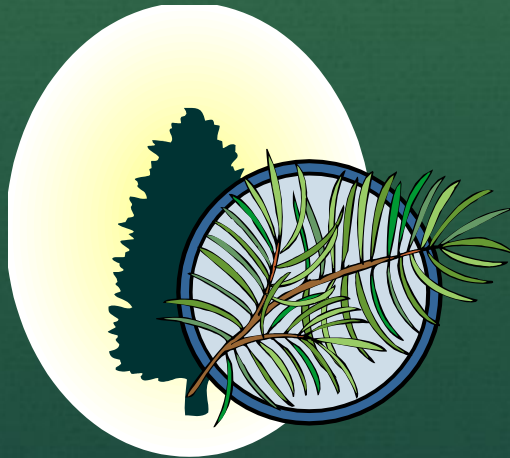
No leaves, Oh No!



Coniferous trees do not have leaves like a Deciduous tree.

They have needles and scales instead.

The needles and scales are sticky and have a scent. Don't eat them because they are poisonous!



Where are the seeds?

In Pinecones!

The pinecone is a protection for the seeds that hide deep inside them.

You probably have eaten their seeds. They are called pine nuts.



Yummy!