



Name: _____

Date: - - - (dd/mm/yyyy)



Topic E Trees and Forest

Overview:

Students learn about trees as individual plants and as part of a forest ecosystem. By examining local species, they learn to recognize the characteristics of different trees and develop skill in describing and interpreting the structural features of trees. As part of their studies, students learn about a broad range of living things found on, under and around trees and study the complex interaction between trees and the larger environment. In examining human use of forests, they become aware of a broad range of environmental issues and develop an awareness of the need for responsible use.

General Learner Expectations

Students will:

6-6 Construct devices that move through air, and identify adaptations for controlling flight.

Classroom assessment is divided into three types: assessment/or learning (Diagnostic Assessment: **D**), assessment of learning (Summative Assessment: **S**), assessment as learning (**F**).

Lesson #	Curriculum Specific Learner Expectations	Lesson (s) Title	Agenda**	Done
1	1	Introductory Activities: Why trees and forests are valued?	<input type="checkbox"/> WS: KLEW chart (D) <input type="checkbox"/> Introductory Activity: Introduction to a forest (Master 1) (F) <input type="checkbox"/> Trees and Forests - PowerPoint (Throughout the unit) -+ Interactive PowerPoint notes	
2	1 and 2	Make up a forest	<input type="checkbox"/> Activity: The Forest Ecosystems (Master#. -2) (F)	
3	2 and 3	-+ Understanding of Nutrient Cycle	<input type="checkbox"/> Activity: Nutrient Cycle (Master #5) - Lab book record (F)	
4	4	Distinguish characteristics of a tree	Activity: What is a Tree? (Master #9) <input type="checkbox"/> Activity: Cross-Section of Tree Stem (Master# 10)	
5	7	-+ Growth pattern of a tree	Activity: Life of a Tree? (Master #24 - 26)	
6	1 and 8	-+ Human uses of forests	Activity: The forest in my home (Master #29) - Lab book record (F)	
7	9 and 10	An issue in regarding forest use	Activity: Managing the Forest (Master 31 :a-g) - Lab book record (F)	
8	2, 3, 4, 5, 6 and 7	-+ Various layers of the forests	Activity: A Walk in The Forest (Master 33:a-c; Master 34) - Lab book record (F)	
9		Unit Tasks:	Task: (S) -+ Mind Map: Trees and Forests -+ Reflection on Learning: KWEL, I Can Statement, and How Did You Do? Unit Portfolio: Trees and Forests Unit Test	

** If the class work is not completed during class time, must be done for homework.

I have read and went over this "Trees and Forest - Unit Plan" with my child. JazakAllahu khayran

Parent/Guardian name (print)

Parent/Guardian signature

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Grade 6A & 6B: Science



Topic E: Trees and Forest

K What We Think We Know	L What We Learned	E What Evidence We Have	W What We Still Wonder

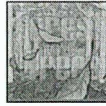
- Glossary-

Abiotic:	Non-living components of an environment.
Adaptation:	Modification of an organism so that it adjusts to a new or altered environment.
Allowable Cut:	The amount of trees which can be taken from the forest annually without significantly altering the balance.
Bark:	The visible outer covering of a tree which protects the inside.
Biodiversity:	Many different species living in balance with their environment.
Biotic:	Living components of an environment.
Cambium:	The growing part of the tree where cells form wood.
Canopy:	The top branches and leaves of the trees in a forest.
Carbon Dioxide:	A gas composed of carbon and oxygen, produced during respiration.
Carnivore:	A meat eating organism.
Cellular Respiration (aerobic):	The chemical process of releasing energy from sugar and other organic molecules by combining it with oxygen to produce carbon dioxide and water as wastes.
Chlorophyll:	Green substance in the leaves of plants that traps light energy used in photosynthesis.
Clearcutting:	A method of harvesting trees where all standing trees are removed from a section of forest at one time.
Cones:	Small, woody structure of coniferous trees which produce the seeds.
Conifer:	A tree which bears cones and has needles or scale-like leaves. Examples are pine, spruce, fir or cedars. Often referred to as evergreens or softwoods.

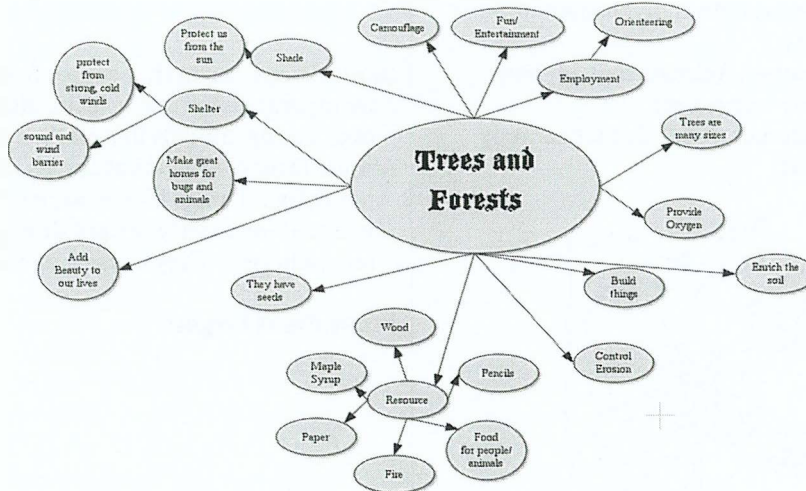
Consumer:	<i>An organism which feeds on other organisms in an ecosystem. Herbivores, carnivores and omnivores are consumers.</i>
Crown:	The top of a tree which forms the canopy.
Deciduous:	Trees and plants which lose their leaves annually every autumn.
Decomposer:	An organism which breaks down material and litter.
Direct Seeding:	Putting seeds directly into the forest floor rather than planting seedlings.
Ecosystem:	An area of living and non-living components which form an environment.
Evergreen Tree:	A tree which does not lose its leaves.
Food Chain:	A representation of "who eats who" in an ecosystem (these do not really exist but serve as a simplistic view of a part of a food web).
Food Web:	Feeding relationships in an ecosystem, the transfer of energy throughout an ecosystem. It is an inter-related network of food chains.
Forest:	A group of trees.
Forest Floor:	The area around the base of the trees, usually covered with leaves, moss and other plants.
Forest Management:	The care and use of forests. Forest management works to protect the forests.
Forest Products:	Products produced from trees.
Forestry:	The practice of managing, conserving and creating forests.
Growth Ring:	Rings which are present on a cross-section of a tree trunk which represent and determine the age of a tree.
Habitat:	A preferred place where an animal or plant lives.

Hardwood:	Wood made by broad-leaved, deciduous trees (aspen, birch and poplar).
Harvesting:	The removal of trees for a variety of uses.
Heartwood:	The non-living wood making up most of a tree stem which gives the stem strength.
Herbivore:	A plant eating organism.
Inner Bark:	The inner layer which serves to take food from the leaves to parts of the tree.
Interdependence:	The state of being dependent upon each other; interconnected.
Lichens:	The organism resulting from the relationship between an alga and a fungus.
Log:	The stem of the tree after it has been felled.
Logging:	The cutting and transporting of trees to the mill to make products.
Omnivore:	An organism which eats both plants and animals.
Park:	Forested area used for recreation.
Phloem:	The inner bark tissue that transports nutrients down to the roots and back up.
Photosynthesis:	The process by which a tree produces its own food (sugar).
Producer:	Any organism which uses energy from the sun to produce its own food.
Pulp:	The soft, moist, soupy mass of wood fibres which paper is made from.
Recreation:	Activities which are done for leisure.
Reforestation:	The building of a new forest by planting or reseeding.

Regeneration:	The process of growing back what has been lost. Forests regenerate after a fire with growth of new seedlings.
Respiration:	The process of exchanging gases with the environment.
Sap:	The fluid part of a plant rich in sugar and starch which moves up and down the plant in the phloem tissue of the bark.
Sapling:	A young tree.
Sapwood:	The softer outer layer of the wood in the stem between the cambium and heartwood, responsible for the nutrient transportation.
Seedling:	A very young tree.
Seedtree Method:	Method of harvesting forests where a few scattered trees are left standing in order to seed new trees.
Selective Harvesting:	A method of harvesting where certain trees are selected for cutting. Only these trees are taken.
Shrub:	A low growing perennial plant.
Snags:	A standing tree which has begun to decay or a tree which has been felled but has caught itself on the way down.
Stand:	A group of trees in a given area.
Stomata:	Little holes on the underside of leaves which allow gases to pass.
Strip-cutting:	Method of harvesting forest in strip like sections, trees left standing are intended to reside.
Transpiration:	The loss of water through the pores (stomata) in the leaves.
Tree:	A perennial woody plant having a well-defined stem at least 3 m high.
Xylem:	Microscopic tubes running the length of a plant's trunk that conduct water and minerals upward from the roots. Xylem makes up the wood of the stem.



Topic E Trees and Forest Interactive PowerPoint Notes



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

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.
- 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
- 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.
- 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.

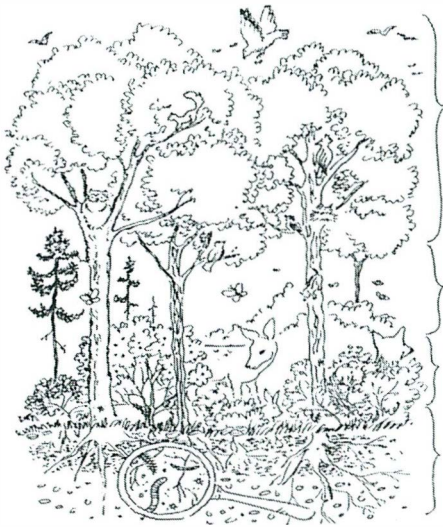
Ecosystems Vocabulary:

- 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.

Biotic and Abiotic

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

- Consumers: an organism that feeds on other organisms in an ecosystem.
- Decomposers: an organism that breaks down material and litter.
- 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 -Fourth and final layer. It is dark and damp.
- Habitat- The environment where an organism or ecological community lives or exists.
- 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)



Make a T-Chart:

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.

Ecosystems target:

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)
- Plants and 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

Draw the Nutrient Cycle:

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.
 - ▶ 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 its place
 - ▶ 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.

- 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 waste
- We need each other to survive
- Plants use oxygen as well but they create enough to share with animals

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)
- Broad (big) leafs 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) loose their leaves?

Draw a picture and label the parts of a tree:

More on Trees

- 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.
- 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*.
- 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 that one wooded stem
- Shrubs don't grow bigger that 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.
- 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!
- The pinecone is a protection for the seeds that hide deep inside them.
- You probably have eaten their seeds. They are called pine nuts.

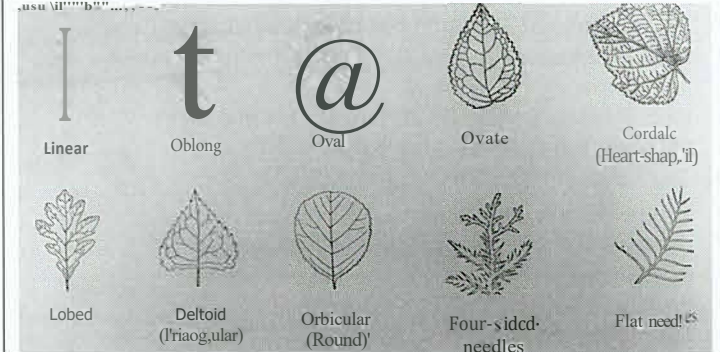
Deciduous

- These trees shed their leaves in cold or dry seasons
- The leafs usually change colour before they shed
- New leaves appear in spring
- Usually have wide shaped leaves
- Many different types

Leaves, Branches, and Shapes

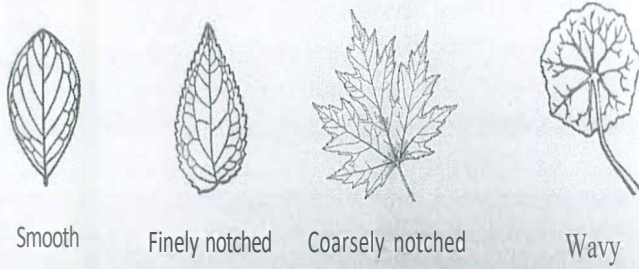
Leaves

- The most common feature for identifying the type of tree
- The surface of the leaf is called the Blade
- The stem of the leaf is called the Petiole
- The tip of the leaf is called the Apex
- The edge of the leaf is called the Margin
- The main lines in the middle is called the Midrib/Midvein
- The lines that branch out from the midvein are called the Vein
- Examining the different parts of the leaf can help you to determine the type of tree
- There are 10 different types of leaf shapes:
Linear, Oblong, Oval, Ovate, Cordate/heart shaped, lobed, deltoid/triangle, orbicular/round, four-sided needles, flat needles

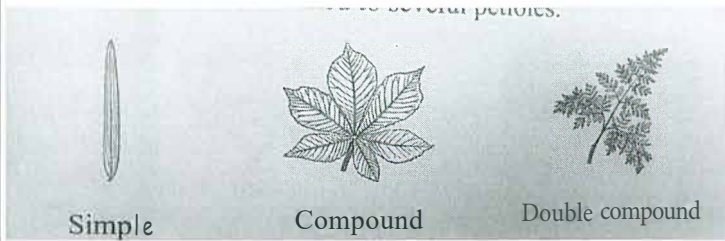


You can use the margins to label leaves and identify trees. Margins can be: Smooth, Finely Notched, Coarsely Notched, or Wavy.

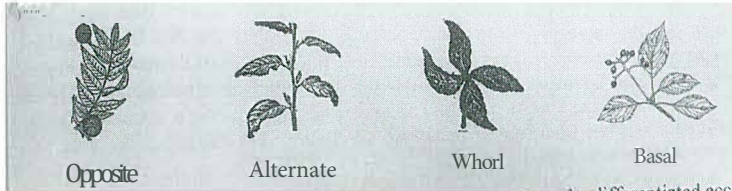
led, coarsely notched, or wavy.



Leaves can be classified by three basic shape structure. Simple, Compound, and Double Compound



Leaves are arranged differently on different trees. Some may be right across from another leaf on a branch or they may alternate sides. They can be classified by: Opposite, Alternate, Whorl, Basal

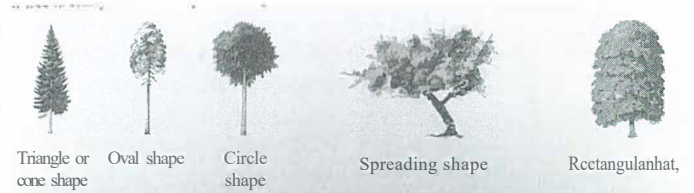


Bark:

Trees can also be identified by their bark. Tree bark can be different colours (reddish brown/grey/white), textures (smooth or rough), and patterns (scaly, horizontal, horizontal and wavy, vertical, vertical and scaly.) Tree bark changes colour, texture, usually thickens with age.

Tree Shapes:

You can use the overall shape of a tree to help you identify a difference in tree species.



Branch Patterns:

Like the way leaves grow on a branch, branches grow differently on different trees. Branches can be organized in: whorl, opposite, alternate, and spiral

Excurrent Branches: the branches go all the way up the trunk from the bottom to the top

Decurrent Branches: the branches start midway or higher up the trunk

Columnar Pattern: all the branches are clumped together at the top of the trunk.



What can be found in Alberta:

White Birch:

- Small-Med
- Many Stems
- They usually have narrow, oval shaped crowns with slender trunks
- Leaves are simple, round, and have a fine tooth margin
- Bark is smooth, thin, and has brown horizontal lines
- Bark is light, strong, and flexible but peels off paper like strips
- First Nations would use the tree to build canoes
- They are not cone-bearing trees

Poplar Tree

- Very common in Canada
- Used for paper, firewood, and natural medicine
- Oval shaped leaves with a fine-toothed margin
- Bark is yellowish and smooth
- Two types: Aspen Poplar and Balsam Poplar

Aspen Poplar:

- Also known as white poplar, trembling aspen, white cottonwood, quivering/quaking aspen
- Leaves easily move in the breeze
- Leaves are simple and heart shaped with long flat stalks, margins are fine-toothed
- The tops of the leaves are dark green while the underside is light green
- Slender tree
- Greenish- white smooth bark that does not peel away
- Seeds are in green capsules that have cotton fluff in them

Balsam Poplar:

- Also called black poplar
- Straight trunks
- Greenish grey bark when young and brown with grooves when mature
- Has buds that contain sticky substance that has a nice smell
- Leaves are simple oval or wedge shaped with fine tooth margins
- Top of the leaf is dark green and the bottom is pale with rust like coloured marks

Spruce Trees

- Large with narrow cones
- Coniferous (CONES)
- Cones are light brown and scaly
- Has needles
- Needles are four sided, stiff, and sharp
- Needles grow in a spiral on the twig
- Bark is scaly and greyish brown
- Used for building
- Two types: White Spruce and Black Spruce

White Spruce:

- Found all over Alberta
- They grow in burned-out pine and aspen poplar forests

Black Spruce:

- Found in most forests especially northern parts of Canada
- Grows well in wetland areas (like bogs)

Pine Trees

- Most common in Canada
- Cone-bearing
- Needles that appear in pairs
- Bark is thin and scaly
- Used for plywood, paneling, and furniture
- First Nations use them to build teepees
- They are the first tree to grow back after a forest fire
- Different types of Pine trees: Jack Pine and Lodgepole Pine

Jack Pine:

- Grows in areas with sandy soil
- Very common in the Boreal forest

Lodgepole Pine:

- Tall and slim
- Grows 30m or more
- Used for power line pole, lodges, buildings
- Found in the Rocky Mountain/Foothills areas
- Provincial tree of Alberta

Cultivated trees: These are trees that are not naturally from the area, someone brought them in and planted them. They have learned/adapted to live in the new area.

In Alberta you'll find these two cultivated trees:

Elm Tree

- Deciduous
- Broad-leaved
- Leaf is elliptical shape with serrated margins
- Leaves grow staggered on branch
- Calgary and Edmonton streets are lined with Elm trees
- Common danger for Elm trees is Dutch Elm disease

Crab Apple

- Deciduous
- Broad leaved
- Can have white or pink flowers
- multi-stemmed
- apples are ready for harvest late summer or early autumn
- leaf is dark green
- Leaf is oval or egg shaped with finely notched margin

Growth Patterns in Trees:

- When you examine the inner rings of a tree you can understand its life cycle in greater detail.
- The way the rings appear can tell the person how the tree was growing and whether or not the tree had any environmental factors that affected it.
- The rings of the tree can be called: cross sections, disks, or tree cookies.
- The tree cookies can tell the examiner whether the tree was affected by a fire, or went through a drought, or had something leaning against it.
- The study of tree cookies is called dendrochronology.
- Trees form new wood in the spring and summer only
- Wood in the spring is lighter in colour than the wood in the summer
- The growth shows up in light (spring) and dark (summer) annual rings
- These rings vary in size depending on the growing season
- Many things influence the size and shape of the annual rings. Such as: Weather, amounting of growing space, soil conditions, insect attacks, fire, and side force (slope, something leaning against the tree)
- The center of the ring is the tree's birth
- Evenly spaced rings show us the tree had rapid growth
- Rings that are wider apart on one side can indicate that the tree was growing out of a slope or it had something leaning against it.
- Narrow rings could mean overpopulation (not enough space) or lack of water. Several narrow rings might prove a few drought seasons in a row.
- A dark black area with the following rings growing inward toward the black area could suggest fire damage (the black area is only one growth period)
- A dark black area that continues for a few growth seasons could suggest a branch that was broken off or died. (the black area can be found in multiple growth periods)

Growth Pattern in Branches:

- Another way to determine the age of the tree but is less reliable is looking at the growth pattern of the branches. This can only be done on broad leaf trees or by counting the whorls on an evergreen tree.
- Buds: They are the bump found on branches of a tree
- Buds become leaf, flower, or stem that will grow in the next season
- Buds form in late summer or early fall and remain on the tree during the winter
- When the bud opens the scale (like a shell) usually falls off leaving a tiny scar/groove
- Every year the tree grows there is a little scar made
- You can figure out the age of the branch by counting the scars

This doesn't always work because as the branches grow they become thicker and since the scars can't stretch, they disappear

Growth Pattern in Evergreens:

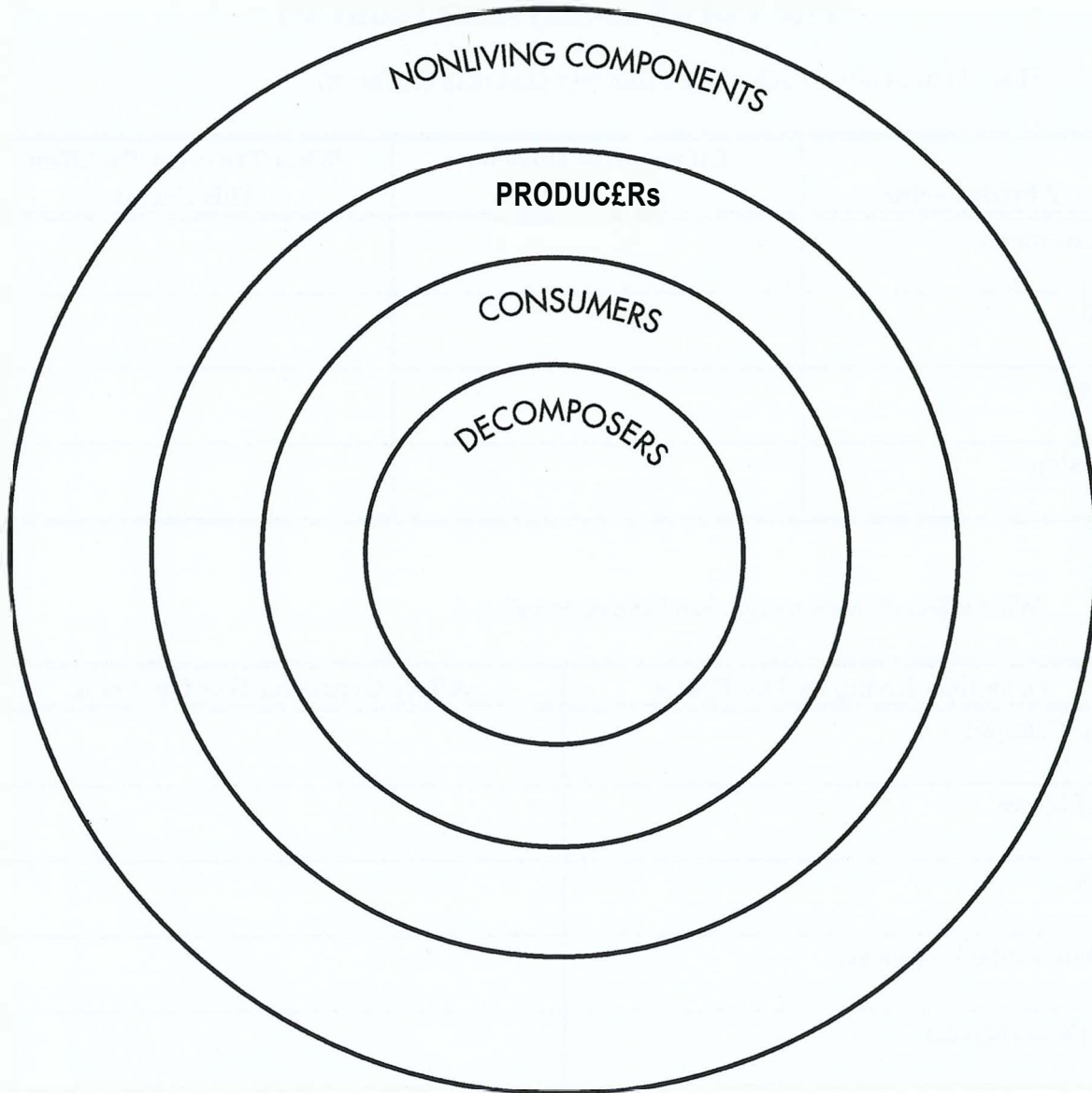
- On Evergreens (white spruce) the branches are arranged in whorls.
- You can count the whorls to determine the age
- This method is unreliable as Evergreen trees branches can break off and die

Name: _____

Master#1

Date: _____

The Forest Ecosystem



Name:

Master#2

Date: _____

The Forest Ecosystem (cont'd)

1. How do trees affect each of the following factors in the forest?

Abiotic Factor	Effect Trees Have on The Factor	What Trees Do To Affect This Factor
Temperature		
Soil		
Wind		
Moisture		

2. What affect does each organism have on trees?

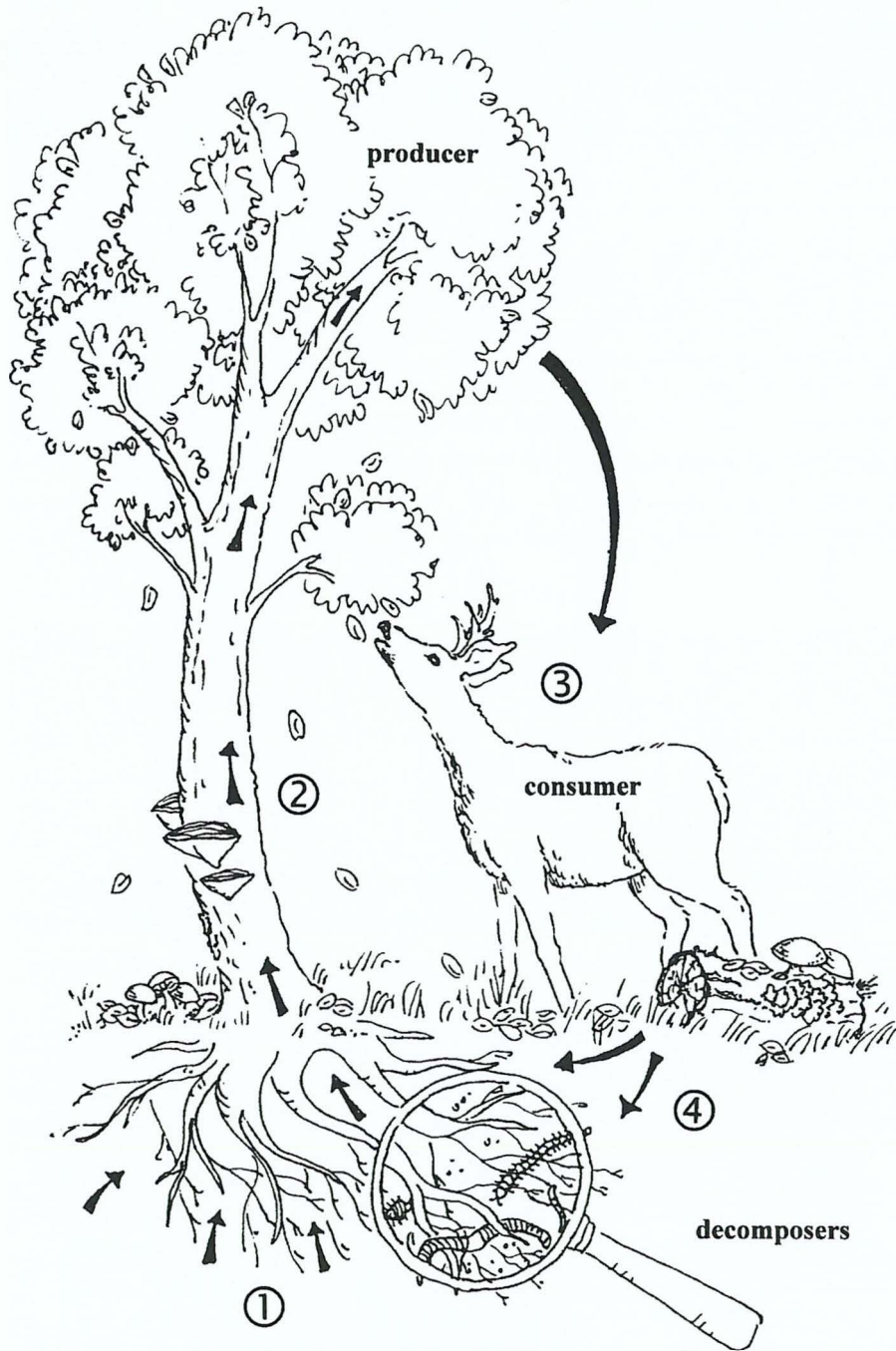
Organism Living In The Forest	Affect Organism Has On Trees
Tent Caterpillar	
Leaf Miner	
Deer	
Yellow Bellied Sapsucker	
Blight (on leaves)	

Name: _____

Master#!i

Date: _____

The Nutrient Cycle



Name: _____

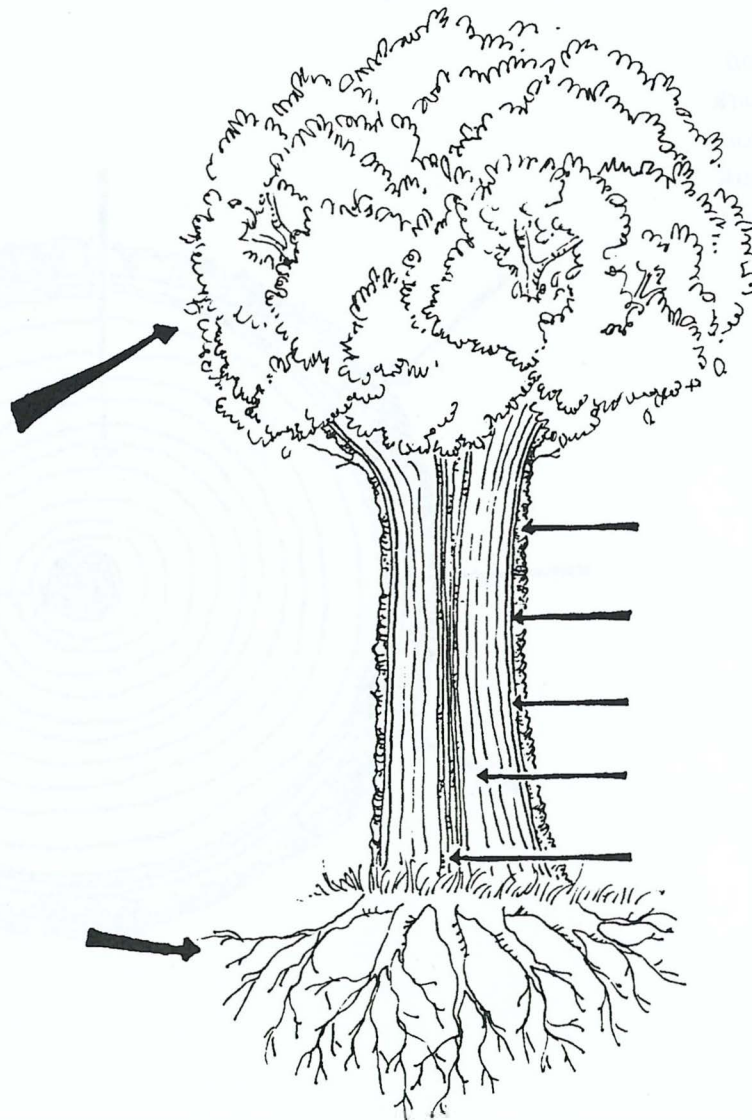
Master#9

Date: _____

What is a Tree?

Label the parts of the tree using the following terms:

- sapwood
- innerbark
- heartwood
- outerbark
- cambium
- roots
- crown



Name: -----

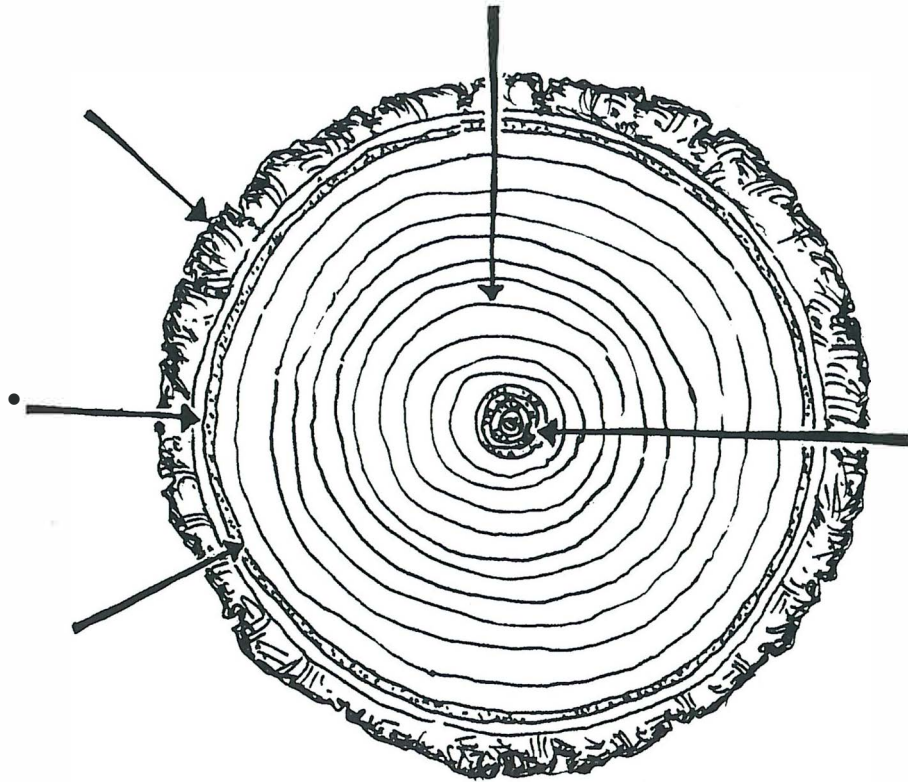
Master#10

Date: _____

Cross-Section of Tree Stem

Label the tree cookie using the following terms:

- sapwood
- inner bark
- heartwood
- outerbark
- cambium



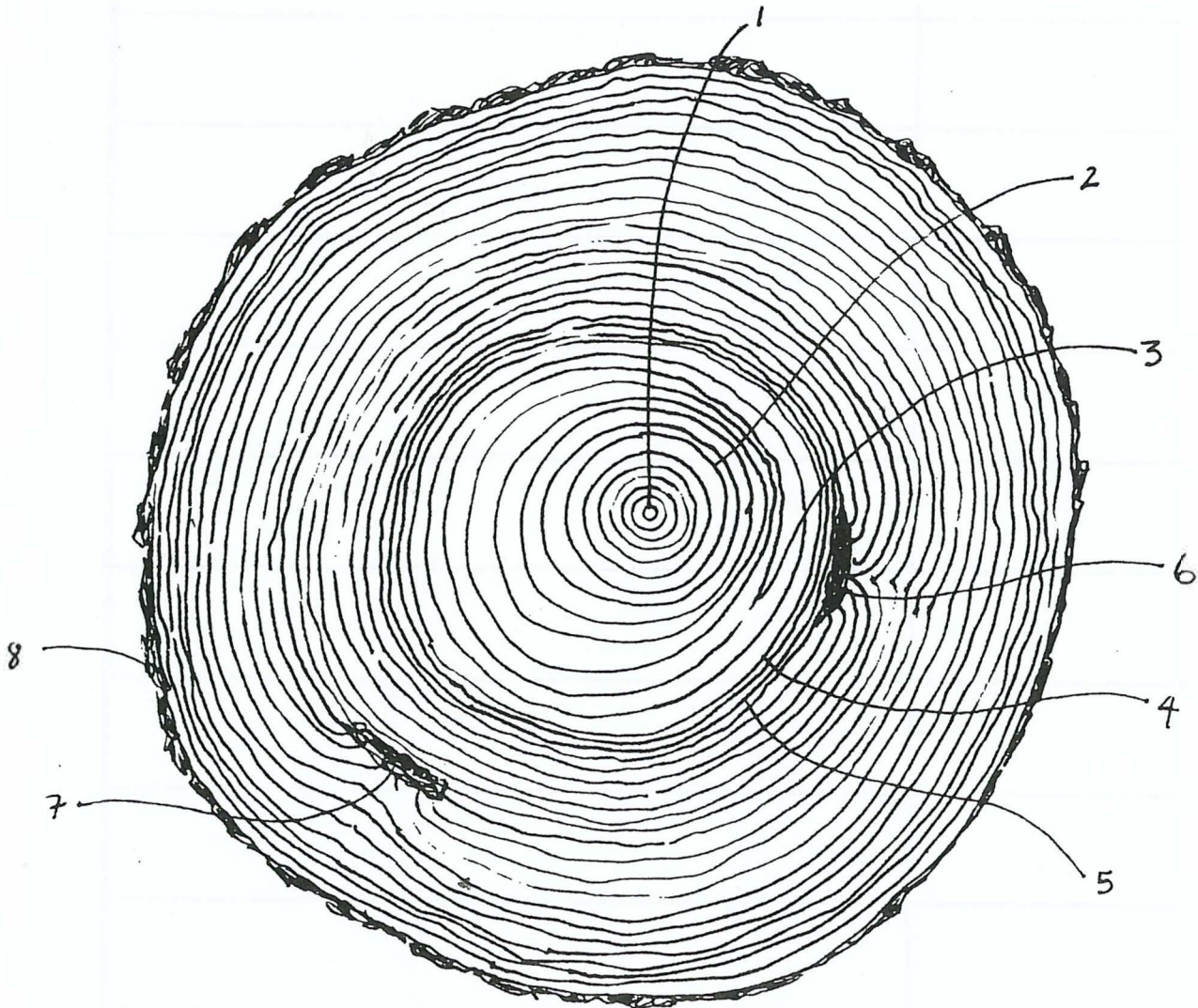
Name: -----

Master#24

Date: _____

Life of a Tree

Observe the numbered tree rings carefully and record your observations accurately on Master #25. Infer a possible reason for the tree to have grown this way.



Name: -----

Master#25

Date: _____

Recording the Life of a Tree

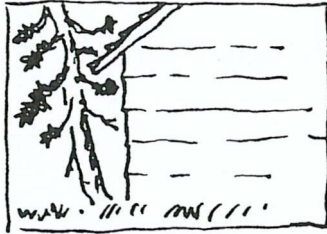
Observations	Inference (Probable Reason)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Name: _____

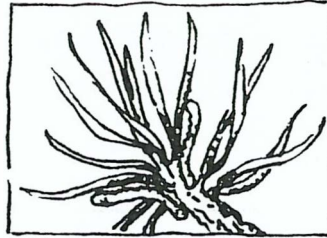
Master#26

Date: _____

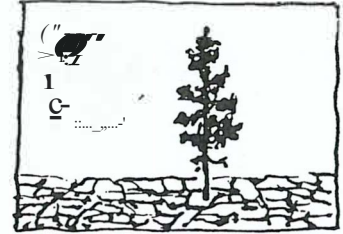
Determining the Life of a Tree



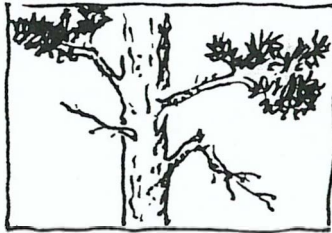
Construction



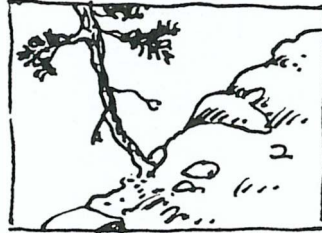
Insect Attack



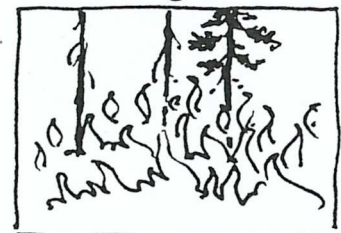
Drought



Dead Branch

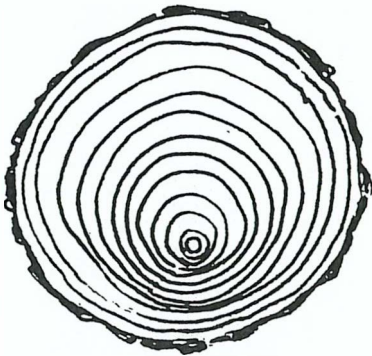


Growing On A Slope

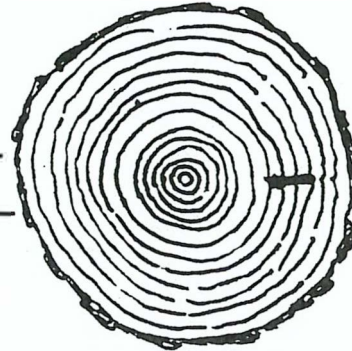


Fire

From the situations illustrated above, list 2 possible incidents which may have caused each of the following variations in tree rings.



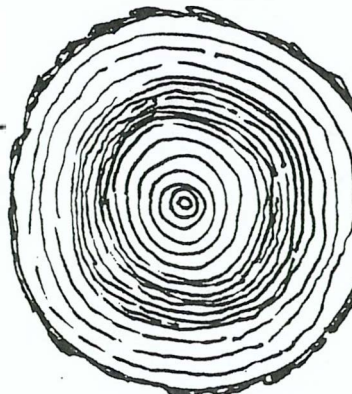
A.



B.



C.



D.

Name: -----

Master#29

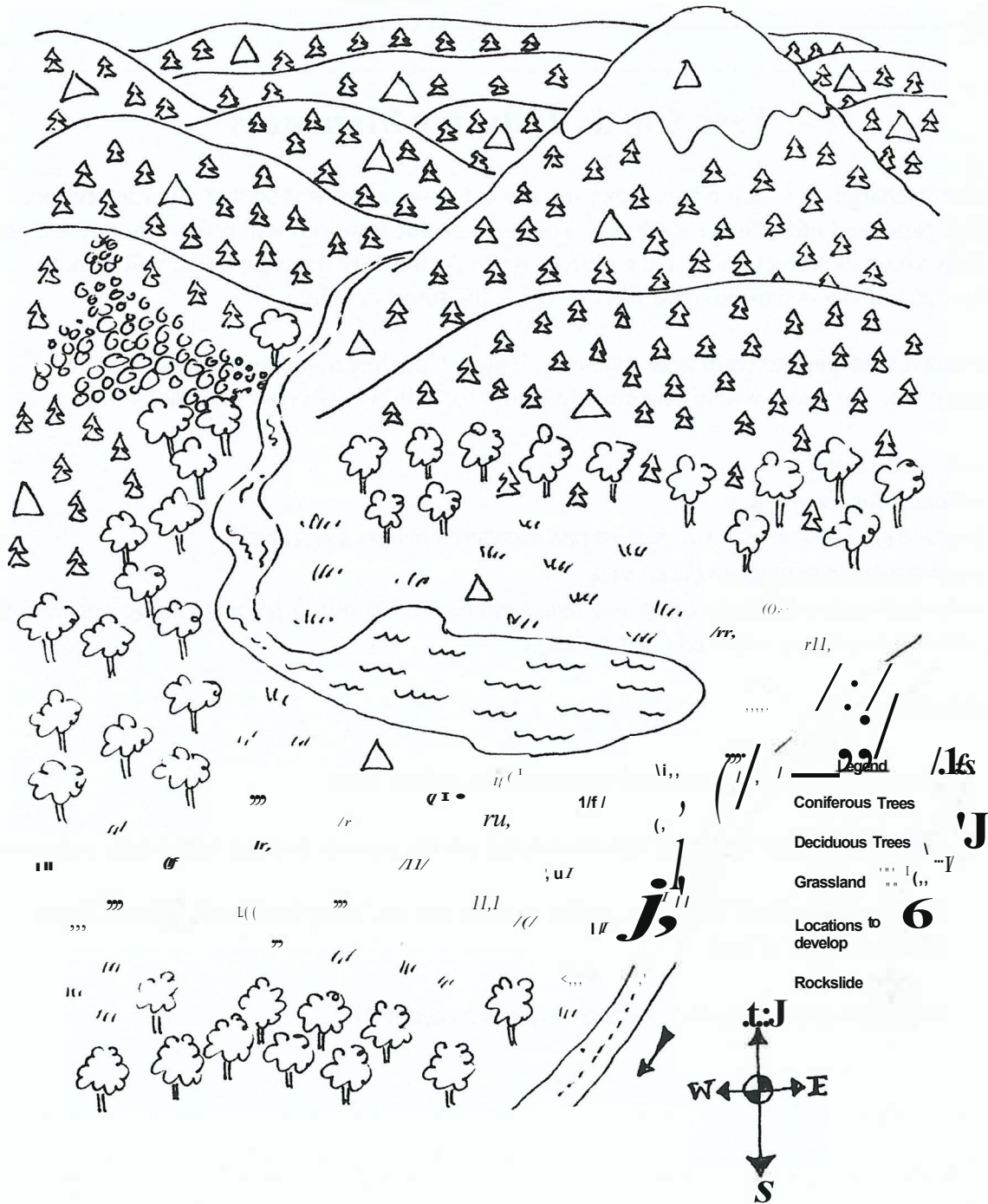
Date: -----

The Forest In My Home

What tree products can you find in this picture?



Managing the Forest: Map



Name: _____

Master#31/J

Date: _____

Task Card: Industry Managers

You are in charge of deciding how many trees to cut down or harvest so that you can produce lumber, paper and other forest products. You must decide how you will reforest any forest you cut, how you will protect it and make it grow well. As industry managers, you will want to produce as much wood as possible while keeping the forest healthy.

Your forest management team must plan one change to the forest, related to your area of management. Discuss possible changes and record the following in your notebooks:

- *proposed change*
- *rationale for the change*
- *location of changes, using directions and numbered areas as reference*
- *steps needed to implement the change*
- *record all materials needed, any new structures needed (roads, bridges, buildings, etc.), any jobs and machinery required for the change.*

Possible changes:

- a. Clearcut 5 areas of mature and overmature stands of trees.
- b. Thin out younger stands of trees by taking out the poorest trees so better ones can grow.
- c. Build a road system that gives access to areas that are being harvested. Roads should follow contour of land.
- d. Replant 4 areas of the forest which will not reseed itself.

You may also need to consider some of the following questions:

- *How will you prepare the land for the change?*
- *Will you be cutting down any trees? How? Clearcutting? Selective harvesting?*
- *What trees will you cut? How many?*
- *How will you use them? Replace them? Dispose of them?*
- *Will you be doing any planting? How? What seeding techniques will you use?*
- *What raw materials will you be removing?*
- *How will the raw materials be processed? Disposed of!*
- *Will you be building new structures?*
- *What jobs will be needed to make the change happen?*
- *Do you require outside resources, such as machinery?*
- *How will you care for and protect the wilderness?*
- *How will you care for and protect the wildlife?*
- *How will you plan impact the work of other forest management teams?*
- *How will your change enhance or threaten the forest?*

Name: -----

Master#31c

Date: _____

Task Card: Wildlife Managers

You are in charge of deciding which different animals live in this forest. Don't forget the waterlife. As a wildlife manager you are responsible for protecting the habitats of the animals in the forest and monitoring the numbers and health of their populations.

You are going to create a forest which will improve the wildlife value.

Your forest management team must plan on one change to the forest, related to your area of management. Discuss possible changes and record the following in your notebooks:

- *proposed change*
- *rationale for the change*
- *location of changes, using directions and numbered areas as reference*
- *steps needed to implement the change*
- *record all materials needed, any new structures needed (roads, bridges, buildings, etc.), any jobs and machinery required for the change*

Possible changes may include:

- a. Harvesting of patches of trees so more plants will grow. Game such as deer like to live at the edges of openings so they can find food and cover.
- b. Building a road system that will allow hunters and fishermen to spread evenly through the forest.
- c. Deciding which areas will be allowed for hunting or fishing versus protected areas.
- d. Include areas that will be used as food plots (eating areas for wildlife).

Master#31ccont'd

You may also need to consider some of the following questions:

- *How will you prepare the land for the change?*
- *Will you be cutting down any trees? How? Clearcutting? Selective harvesting?*
- *What trees will you cut? How many?*
- *How will you use them? Replace them? Dispose of them?*
- *Will you be doing any planting? How? What seeding techniques will you use?*
- *What raw materials will you be removing?*
- *How will the raw materials be processed? Disposed of?*
- *Will you be building new structures?*
- *What jobs will be needed to make the change happen?*
- *Do you require outside resources, such as machinery?*
- *How will you care for and protect the wilderness?*
- *How will you care for and protect the wildlife?*
- *How will you plan impact the work of other forest management teams?*
- *How will your change enhance or threaten the forest?*

Name: _____

Master#31d

Date: _____

Task Card: Recreation Managers

You are in charge of helping people to enjoy the forest. People will come to enjoy the many recreation activities which are common to the forest. You may wish to provide campgrounds, information booths, picnic tables, boat ramps. As recreation manager, you will want to ensure that all of the people who visit the forest enjoy themselves and want to come back.

You are going to create a forest which has recreational value.

Your forest management team must plan one change to the forest, related to your area of management. Discuss possible changes and record the following in your notebooks:

- *proposed change*
- *rationale for the change*
- *location of changes, using directions and numbered areas as reference*
- *steps needed to implement the change*
- *record all materials needed, any new structures needed (roads, bridges, buildings, etc.), any jobs and machinery required for the change.*

Possible changes may include:

- a. Build roads and trails so families can go into the forest to camp, picnic, hike and do other outdoor activities.
- b. Build picnic areas and campgrounds at locations where water is available.
- c. Keep some areas undisturbed for hikers and nature lovers.

You may also need to consider some of the following questions:

- *How will you prepare the land for the change?*
- *Will you be cutting down any trees? How? Clearcutting? Selective harvesting?*
- *What trees will you cut? How many?*
- *How will you use them? Replace them? Dispose of them?*
- *Will you be doing any planting? How? What seeding techniques will you use?*
- *What raw materials will you be removing?*
- *How will the raw materials be processed? Disposed of?*
- *Will you be building new structures?*
- *What jobs will be needed to make the change happen?*
- *Do you require outside resources, such as machinery?*
- *How will you care for and protect the wilderness?*
- *How will you care for and protect the wildlife?*
- *How will you plan impact the work of other forest management teams?*
- *How will your change enhance or threaten the forest?*

Name: -----

Master#31e

Date: _____

Task Card: Wilderness Managers

You are in charge of ensuring that the forest remains wild and protected and it is not abused. On your map you are responsible for deciding what areas will be designated as a protected wilderness site.

Your forest management team must plan one change to the forest, related to your area of management. Discuss possible changes and record the following in your notebooks:

- *proposed change*
- *rationale for the change*
- *location of changes, using directions and numbered areas as reference*
- *steps needed to implement the change*
- *record all materials needed, any new structures needed (roads, bridges, buildings, etc.), any jobs and machinery required for the change.*

Possible changes may include:

- a. Designate a protected site. e.g. waterfall, bat cave, bird sanctuary.
- b. Build a buffer zone around a designated area to eliminate noise or outside interference.
- c. Design a plan of action to clean up a polluted area in case of an emergency.

Master#31econt'l

You may also need to consider some of the following questions:

- *How will you prepare the land for the change?*
- *Will you be cutting down any trees? How? Clearcutting? Selective harvesting?*
- *What trees will you cut? How many?*
- *How will you use them? Replace them? Dispose of them?*
- *Will you be doing any planting? How? What seeding techniques will you use?*
- *What raw materials will you be removing?*
- *How will the raw materials be processed? Disposed of?*
- *Will you be building new structures?*
- *What jobs will be needed to make the change happen?*
- *Do you require outside resources, such as machinery?*
- *How will you care for and protect the wilderness?*
- *How will you care for and protect the wildlife?*
- *How will you plan impact the work of other forest management teams?*
- *How will your change enhance or threaten the forest?*

Name: -----

Master#31t

Date: _____

Task Card: Watershed Managers

You are in charge of protecting the streams in the forest. When trees are cut around the streams, it will influence the size and direction of the stream. You will need to decide where on your stream you will allow wood to be cut and where it will not be cut.

You are going to create a forest which protects the forest watershed.

Your forest management team must plan one change to the forest, related to your area of management. Discuss possible changes and record the following in your notebooks:

- *proposed change*
- *rationale for the change*
- *location of changes, using directions and numbered areas as reference*
- *steps needed to implement the change*
- *record all materials needed, any new structures needed (roads, bridges, buildings, etc.), any jobs and machinery required for the change.*

Possible changes:

- a. Design and create a reservoir for municipal water supply.
- b. Restrict people from various areas to ensure that you have clean water.
- c. Harvest patches of trees or thin out areas of dense forest so trees can absorb more water.

You may also need to consider some of the following questions:

- *How will you prepare the land for the change?*
- *Will you be cutting down any trees? How? Clearcutting? Selective harvesting?*
- *What trees will you cut? How many?*
- *How will you use them? Replace them? Dispose of them?*
- *Will you be doing any planting? How? What seeding techniques will you use?*
- *What raw materials will you be removing?*
- *How will the raw materials be processed? Disposed of?*
- *Will you be building new structures?*
- *What jobs will be needed to make the change happen?*
- *Do you require outside resources, such as machinery?*
- *How will you care for and protect the wilderness?*
- *How will you care for and protect the wildlife?*
- *How will you plan impact the work of other forest management teams?*
- *How will your change enhance or threaten the forest?*

Name: _____

Master#31g

Date: _____

Task Card: Fire, Insect, and Disease Managers

You are in charge of deciding how the forest is to be protected from fire, insects, and disease.

Your forest management team must plan one change to the forest, related to your area of management. Discuss possible changes and record the following in your notebooks:

- *proposed change*
- *rationale for the change*
- *location of changes, using directions and numbered areas as reference*
- *steps needed to implement the change*
- *record all materials needed, any new structures needed (roads, bridges, buildings, etc.), any jobs and machinery required for the change.*

Possible changes:

- a. Build roads so that firefighters can reach an area.
- b. Build lookout towers so that the whole forest can be seen.
- c. Cut down dead trees on ridges in areas that have had fires.
- d. Indicate where barriers can be located to help stop fires
- e. Arrange to spray the forest with an insecticide or pesticide.

Master#31gcont'd

You may also need to consider some of the following questions:

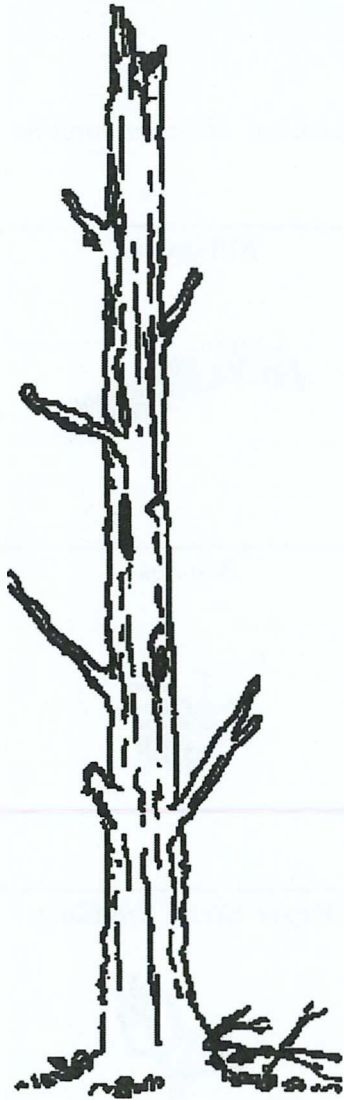
- *How will you prepare the land for the change?*
- *Will you be cutting down any trees? How? Clearcutting? Selective harvesting?*
- *What trees will you cut? How many?*
- *How will you use them? Replace them? Dispose of them?*
- *Will you be doing any planting? How? What seeding techniques will you use?*
- *What raw materials will you be removing?*
- *How will the raw materials be processed? Disposed of?*
- *Will you be building new structures?*
- *What jobs will be needed to make the change happen?*
- *Do you require outside resources, such as machinery?*
- *How will you care for and protect the wilderness?*
- *How will you care for and protect the wildlife?*
- *How will you plan impact the work of other forest management teams?*
- *How will your change enhance or threaten the forest?*

Name: -----

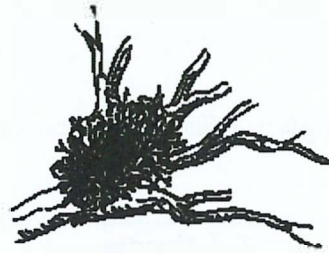
Master#33a

Date: _____

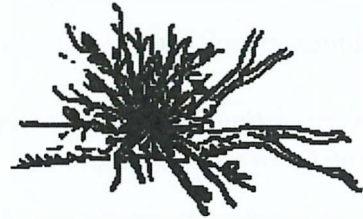
Forest Field Guide



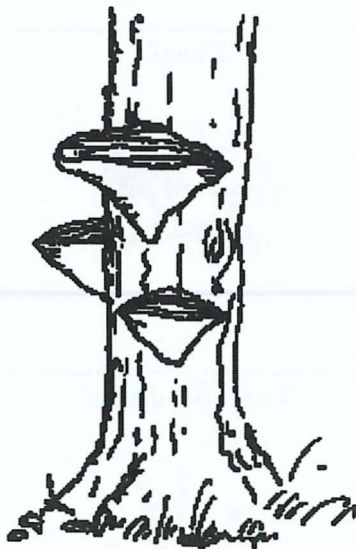
Snag
(standing dead trees)



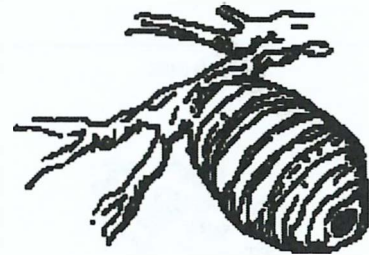
Witches Broom
(buds on branches that are attacked by insects, fungi and viruses)



Squirrel's Nest



Conk
(fungi)



Wasp's Nest

Name: -----

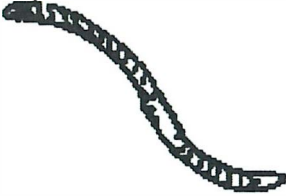





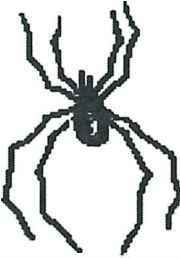
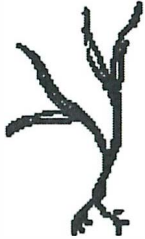

Master#33/J

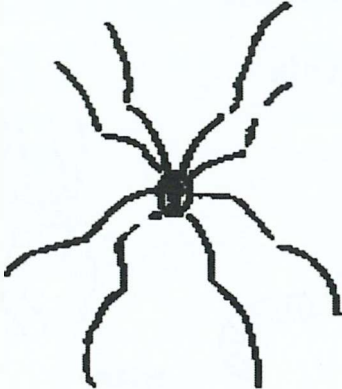










Date: _____

Rotten Log Organisms

Things to look for:

Even a rotting log will be home to a slightly different community of organisms. Here are some to look for in your log habitat.

Earthworms 	Centipedes 	Millipedes 
Lichens 	Fungi 	Mosses 
Spiders 	Tree Seedlings 	Paper Birch Seedlings 

Daddy Long Legs 		Snails 
Slugs 	Moth Cocoons 	Carpenter Ants 
Sowbeetles 	Butterfly Chrysalises 	Bark Beetle 
Click Beetles 	Bristle Tails 	Termites 

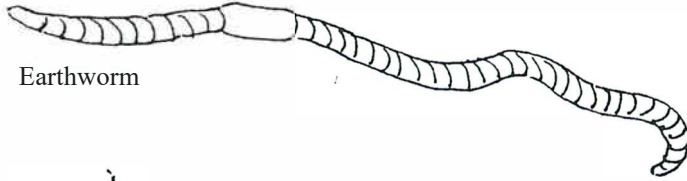
Name: -----

Master#33c

Date: _____

Soil Animals

Some insect-like animals you may find in soil:



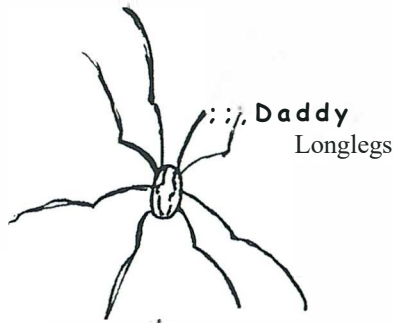
Earthworm



Spider



Sowbug



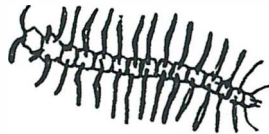
Daddy Longlegs



Centipede



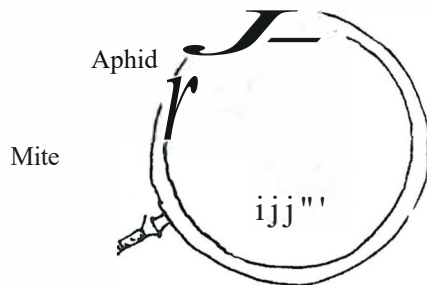
Millipede



Underside of a Centipede



Underside of a Millipede



Mite

Aphid



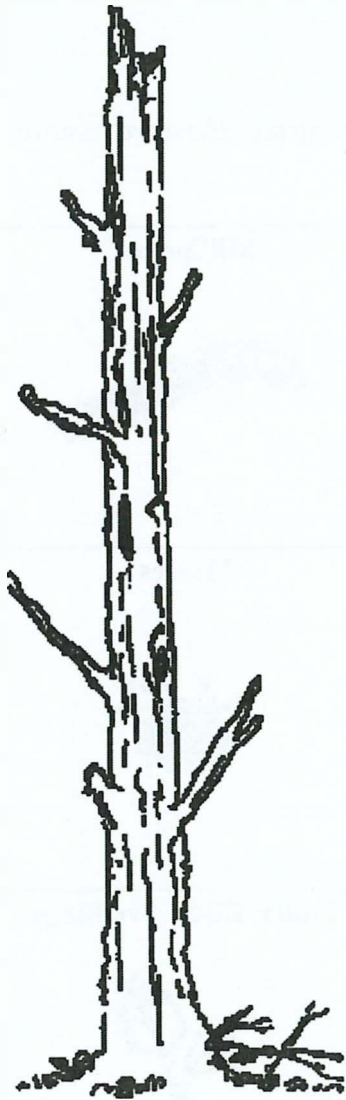
Wireworm

Name: -----

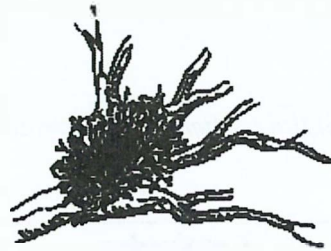
Master#33a

Date: _____

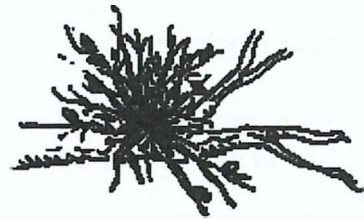
Forest Field Guide



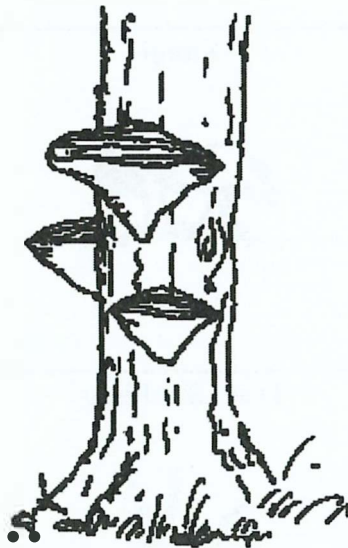
Snag
(standing dead trees)



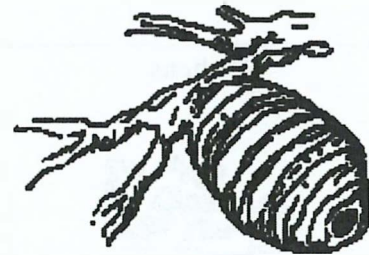
Witches Broom
(buds on branches that are attacked by insects, fungi and viruses)



Squirrel's Nest



Conk
(fungi)



Wasp's Nest

Name:

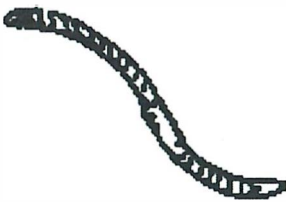





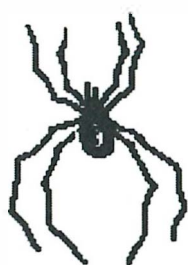


Master#33/J

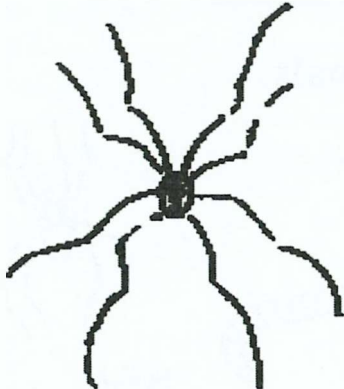










Date: _____

Rotten Log Organisms

Things to look for:

Every rotting log will be home to a slightly different community of organisms. Here are some to look/or in your log habitat.

Earthworms 	Centipedes 	Millipedes 
Lichens 	Fungi 	Mosses 
Spiders 	Tree Seedlings 	Paper Birch Seedlings 

Daddy Long Legs 		Snails 
Slugs 	Moth Cocoons 	Carpenter Ants 
Sowbeetles 	Butterfly Chrysalises 	Bark Beetle 
Click Beetles 	Bristle Tails 	Termites 

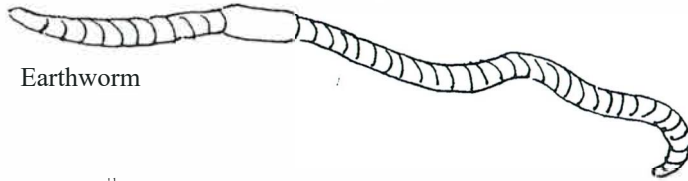
Name: _____

Master#33c

Date: _____

Soil Animals

Some insect-like animals you may find in soil:



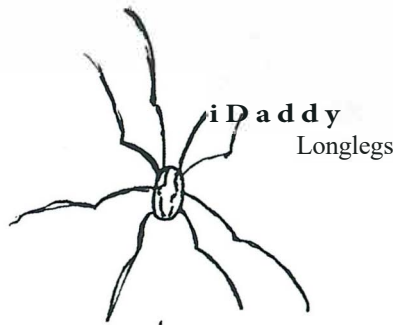
Earthworm



Spider



Sowbug



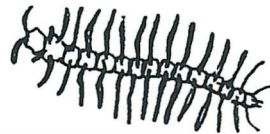
i D a d d y
Longlegs



Centipede



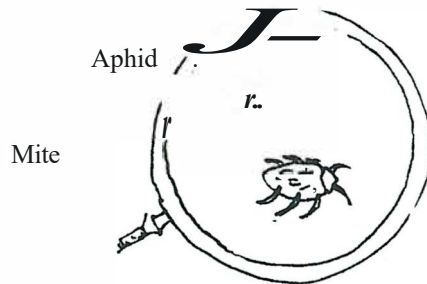
Millipede



Underside of a
Centipede



Underside of a
Millipede



Mite

Aphid



Wireworm

- Agents of Change -

Master#34a

Place a check mark beside any of these items you observe in the forest.

- rocks split by tree root
- bracket fungi
- evidence of fire (lightening)
- partly eaten leaf
- gnawed trees
- berries on the ground
- hollow tree
- rotting log
- cut down tree

2. Pick any two items you observed and explain how this change was caused and explain how this change will affect the rest of the area around it.

A Walk in the Forest

Log Book

Name: _____

Date: _____

Coniferous or Deciduous?

Master#34b

By looking at the forest around you, what is the majority of the forest made of, coniferous or deciduous trees?

This is mostly a _____ forest.

Describe the wind level or air movement in the forest as compared to an open area: _____

The Forest Floor (Ground Level)

Temperature: Place the thermometer on the ground and wait 3 minutes. The temperature is _____ °C.

Light: The ground level is mostly covered with (circle one):
shade partial shade moderate light very bright light

Describe the forest floor. This level of the forest is mostly:

Write a poem or your thoughts about forests or trees.

Choose a **coniferous** tree and record the following information:

Needle type: _____ -

Needle shape: _____ -

Needle at Tangement: _____

Branching pattern: _____ -

Other branching information (location, condition, direction):

Bark pattern and color: _____

Presence of animals or plants on the tree: _____ -

Sketch and/or leaf or bark rubbing:

Dirty Work ...

You will need:

- | | |
|---------------------------------|-------------------------------|
| <i>1 trowel or spoon</i> | <i>magnifying glass</i> |
| <i>1 cup and spoon</i> | <i>1 thermometer</i> |
| <i>piece of white paper</i> | <i>2 litmus papers (1 red</i> |
| <i>distilled water (2 tsp.)</i> | <i>paper, 1 blue paper)</i> |

First: Push the sleuthing tool straight into the ground about 8 to 13 centimeters anywhere in your area. Push the tool back so that you can see a cross-section of the soil.

Place the thermometer in this hole, with the bulb touching the bottom. Cover with dirt and leave for 3 minutes. (Do the next part.) Record the temperature of the dili below.

The temperature under the ground is ____ °C.

Place I cup of soil on a piece of white paper and look at it with your magnifying glass. Can you identify and describe some of the organisms you see?

Examine the soil and circle the correct type.

Squeeze the dirt ...

- *dry soil* - falls apart and sifts between the fingers
- *slightly moist soil* - appears moist, but does not stick together when squeezed
- *moist soil* - sticks in a clump when squeezed
- *wet soil* - water drips

Touch the dirt ...

- *Silly soil* - very coarse, grainy and loose; made up of large particles
- *organic* - loose, but not grainy; dark colored; contains decaying plants & animal bits
- *clay* - tends to be clumpy & hard; very tiny particles
- *loam* - looser than clay, finer than sand, lighter color than organic, made up of sand, silt, clay

Color of the dirt ... light, grey or dark?

- *dark soil* - often means more decayed plant and animal remains ... do you see any plant or animal bits?

Do you see rocks? What color are they? Are they smooth or sharp, small or large? _____

Now *Smell* the dirt! !. Push the dirt back when you finish.

Choose a **deciduous** tree and record the following information:

Leaf type: _____

Leaf shape: _____

Leaf margins: _____

Branching pattern: _____

Other branching information (location, condition, direction.): _____

Bark pattern and color: _____

Presence of animals or plants on the tree: _____

Sketch and/or leaf or bark rubbing:

Sketch a "Macro" scene found in the forest.



Master#34e

Have your teacher show you a dead or rotten log in the forest. Use your magnifiers to examine more closely what is happening on the log.

1. Draw and label the organisms you can see.

2. Can you observe any different organisms in the dead tree as compared to the live trees? What are they? Draw and label them below.

3. Of what importance are dead trees to a forest ecosystem?

The Herb, Shrub or Underbrush Layer

Master#34t

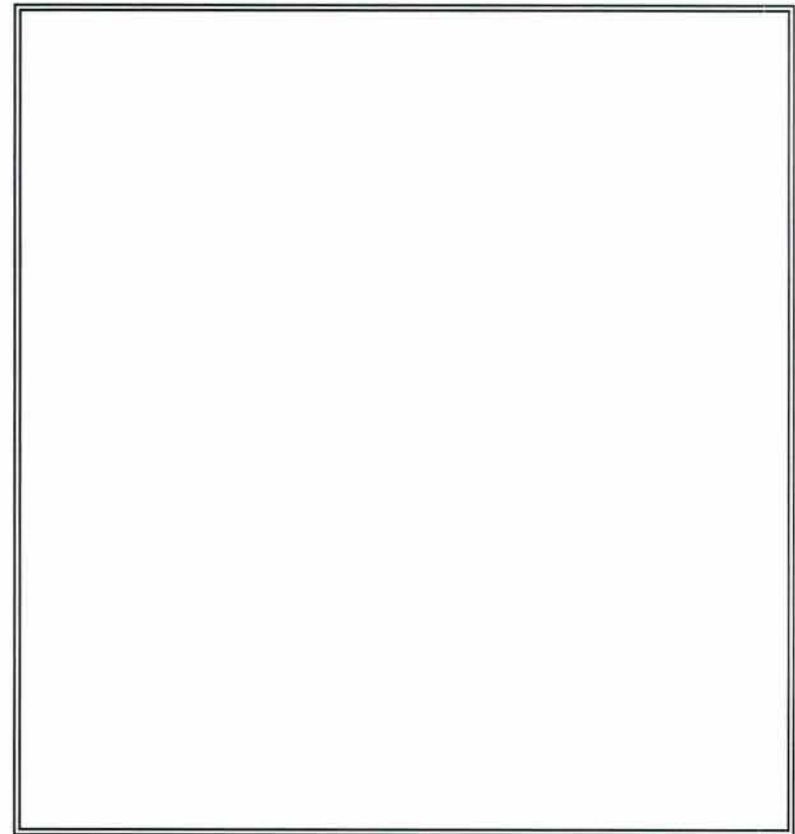
Temperature at waist level is _____oc.
(Wait 3 minutes.)

Light Conditions (circle one):

shade partial shade moderate light very bright light

Draw and label 2 different seedlings or saplings that you can see.

Sketch a "Micro" scene found in the forest. Make a view finder with your 2 hands, 1 hand , or a paper tube.



Canopy Level

Master#34g

Light Conditions (circle one):

shade partial shade moderate Light very bright Light

Look up to the canopy level. Record all the living things you see. (Look for birds, squirrels, insects.)

Do the living things you have identified seem to be helping or harming the trees? Why do you think this?

Do you think these creatures only stay in the canopy level or do they spend time at different levels of the forest? Give evidence or reasons for your answer.

What effects do you think life on the lower levels have on these living things?

Do the living things you have identified seem to be helping or harming the trees? Why do you think this?

How did the young trees get there? -----

Are seedlings in the direct sunlight larger than those in shaded areas? Why? -----

Name and describe any specific animals or plants you can see, or any evidence of animal or plant tracks, eaten leaves, etc. -----

f.!

The Understory Level

Master#34h

Temperature - Tape a thermometer to a meter stick or other long stick and hold it as high as you can.

The temperature of the understory is __ °C.

Light Conditions (circle one):

shade partial shade moderate light very bright light

Name, describe and draw any specific plants and animals you can see. _____

Examine the tree trunks and lower branches. Describe any changes that you notice (cuts, broken parts, insect or disease damage, claw or teeth marks, holes for insect homes, etc.). _____

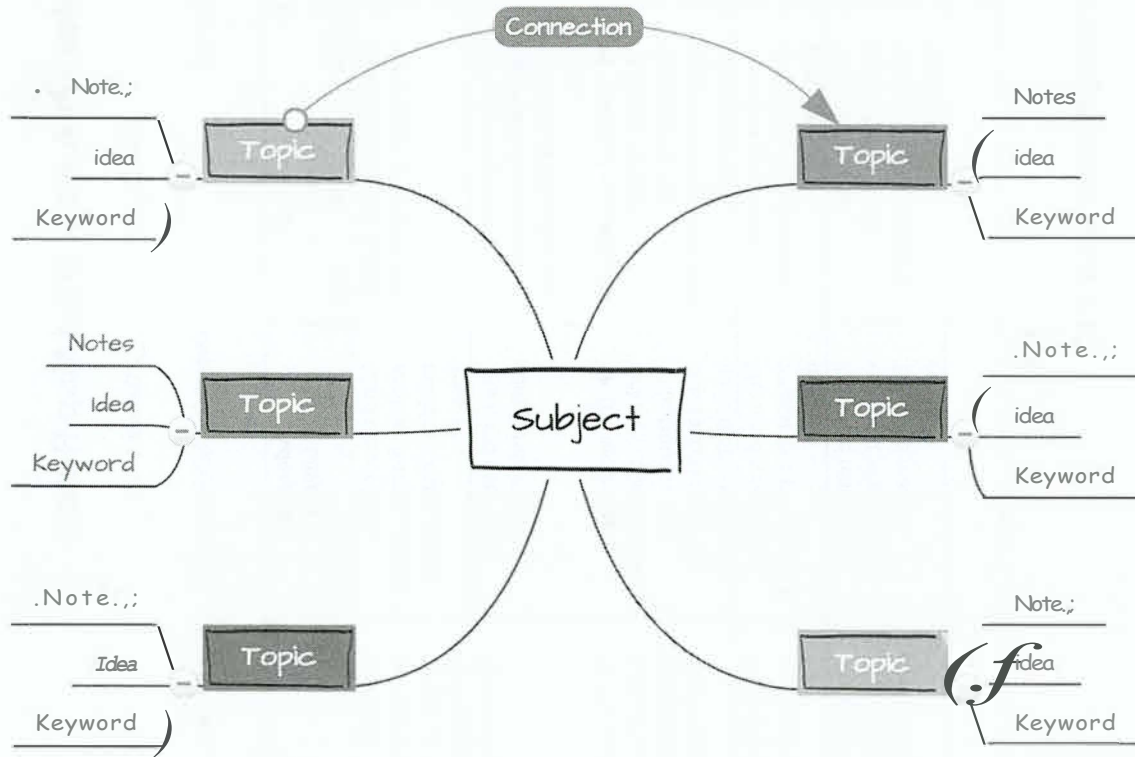
Describe any plants or fungus growing on the trunks or branches. Illustrate below. _____



Topic E: Trees and Forest

Mind Map

+ **Task:** You use the following information as guideline to create your mind map (*words and illustration*).



Making A Map: Mind Map Rubric

Date: ___/___/____(dd/mm/yyyy)

Unit: _____ ;Term:Itl 12

Name: _____

Assessment type: t Dt Ft S

Overall: Mark//Level: ___//___ ; Class Average: ___ Parent Signature: _____

	Level	Excellent Level4	Proficient Level3 79% 72% 65%	Adequate Level2	Limited* Level 1	Insufficient/ Blank*
Format (_)1	I	Mind map follows the branch or hook format.	Mind map partially follows the branch or hook format.	Mind map follows another format, such as bubbles, circles, boxes, lines, etc.	Mind map does not consistently follow any format or is chaotic and difficult to understand.	No score is awarded because there is insufficient evidence of student performance based on the requirements of the assessment task.
Color /Illustrations (_)2	I	The mind map uses a different color for each branch. The mind map is brightly colored. The mind map includes at least relevant 6 illustrations. The illustrations make the mind map memorable.	The mind map uses different colors for some branches or the colors are drab. The mind map includes at least 4 relevant illustrations. The illustrations make the mind map memorable.	The mind map is not completely colored. The mind map includes at least relevant 2 illustrations. The illustrations make the mind map memorable	The mind map is not colored. The mind map includes no relevant illustrations or the illustrations do not make the mind map memorable.	
Content (_)4	I	The mind map includes the MAJOR points of the material.	The mind map misses some major points of the material.	The mind map misses most major points of the material.	The mind map presents no major point	
Neatness (_)2	I	The mind map is very neat and orderly. The mind map is clearly readable.	The mind map is somewhat neat and orderly. The mind map is clearly readable.	The mind map is not very neat and orderly. The mind map is readable.	The mind map is not readable. (This may affect other portions of the grade).	
Days Late (_)1	I	0	1	2	3++	
						--Not Hand In

Teacher's Comments -Area for Growth and Action Plans (if below "level 2"):

= Please use the given time in the classroom wisely by asking questions to further clarify the assignment or focus on the task at hand. Also, you need to follow the sample work shown in the class (if applicable) as a guideline to achieve level 3 in this rubric.

Name: _____

Date: - _;_ - _ - _ (dd/mm/yyyy)



Topic E Trees and Forest

Reflection: How Did You Do?

1. List three things you didn't know before this unit started.
2. Describe what you liked best in this unit.
3. Give yourself a pat on the back! What did you do well in this unit?
4. List three questions you still have about *trees and forests*.



Topic E Trees and Forest

I can...	4	3	2	1
I can conduct tests of model parachute designs and identify/explain design changes to improve the effectiveness of the design				
I can describe the design of a hot-air balloon and the principles by which its rising and falling are controlled.				
I can conduct tests of glider designs and modify a design so that a glider will go farther, stay up longer or fly in a desired way.				
I can recognize the importance of stability and control to aircraft flight and design, construct and test control surfaces.				
I can apply appropriate vocabulary in referring to control surfaces (pitch, roll/bank and yaw), and major components of an aircraft including wing, fuselage, vertical and horizontal stabilizers, elevators, ailerons, and rudder.				
I can construct and test propellers and other devices for propelling a model aircraft.				
I can identify 4 adaptations which enable birds and insects to fly.				
I can describe how flying animals and aircrafts propel				
I can describe what streamlining means and why it is necessary to overcome drag.				
I can describe difference in design between aircraft and spacecraft and identify reasons for the design differences.				

Please provide some sample evidence: