



THE WONDERFUL WORLD OF TREES

A Junior Arborist's guide to
native Michigan trees

girl scouts 
of michigan
shore to shore

Hello Future Arborist!

This packet has been created specifically for Girl Scouts to explore Michigan's natural environment and is designed to spark interest in becoming an eco-advocate and environmental steward.

Complete this packet **at your own pace** as you explore, discover, and learn more about your Michigan home. As you work through the activities and lessons, you will build knowledge about native trees, their importance to local ecosystems, and the role you can play in protecting Michigan's natural resources.

This packet contains information and activities to begin your journey as a native tree expert:

- What is an Arborist?
- What makes a tree special?
- Native Michigan trees
- Invasive species
- Deciduous and Evergreen trees
- Basic tree and twig Anatomy
- Plant reproduction
- Ways to Promote Sustainability and Environmental Stewardship

Learn about the importance of protecting native trees and discover steps you can take to continue being a junior arborist in your community. Through hands-on activities and exploration, you'll gain the skills and confidence to identify, appreciate, and advocate for the trees that make Michigan unique.



Trees make our world
healthier for people and
wildlife.

Join fellow Girl Scouts in
planting, protecting, and
honoring trees through the
Girl Scout Tree Promise.

About Trees

An **arborist** is a trained professional who manages the care of trees. They are also known as tree surgeons, arboriculturist, or tree experts.

Arborists protect the ecosystem by improving tree health, reducing pest and diseases and planting new trees. They also are strong advocates for trees in the community, teaching people why trees are important and how to take care of them.

Introduction: What is a Tree?

Put very simply, a tree is a tall plant that can live a long time. It consists of a trunk and branches to support leaves and a root system that anchors it to the ground and stores water and nutrients.

What makes a tree special?

A tree is different from other plants because it can live for a very long time- sometimes hundreds or thousands of years! They are the tallest plants on Earth, and give homes to birds, squirrels, and bugs.

Trees also provide clean air, give us oxygen to breathe, and help keep our planet healthy. It's important to practice ways to protect trees so they can continue to provide the many resources all living things need to survive.

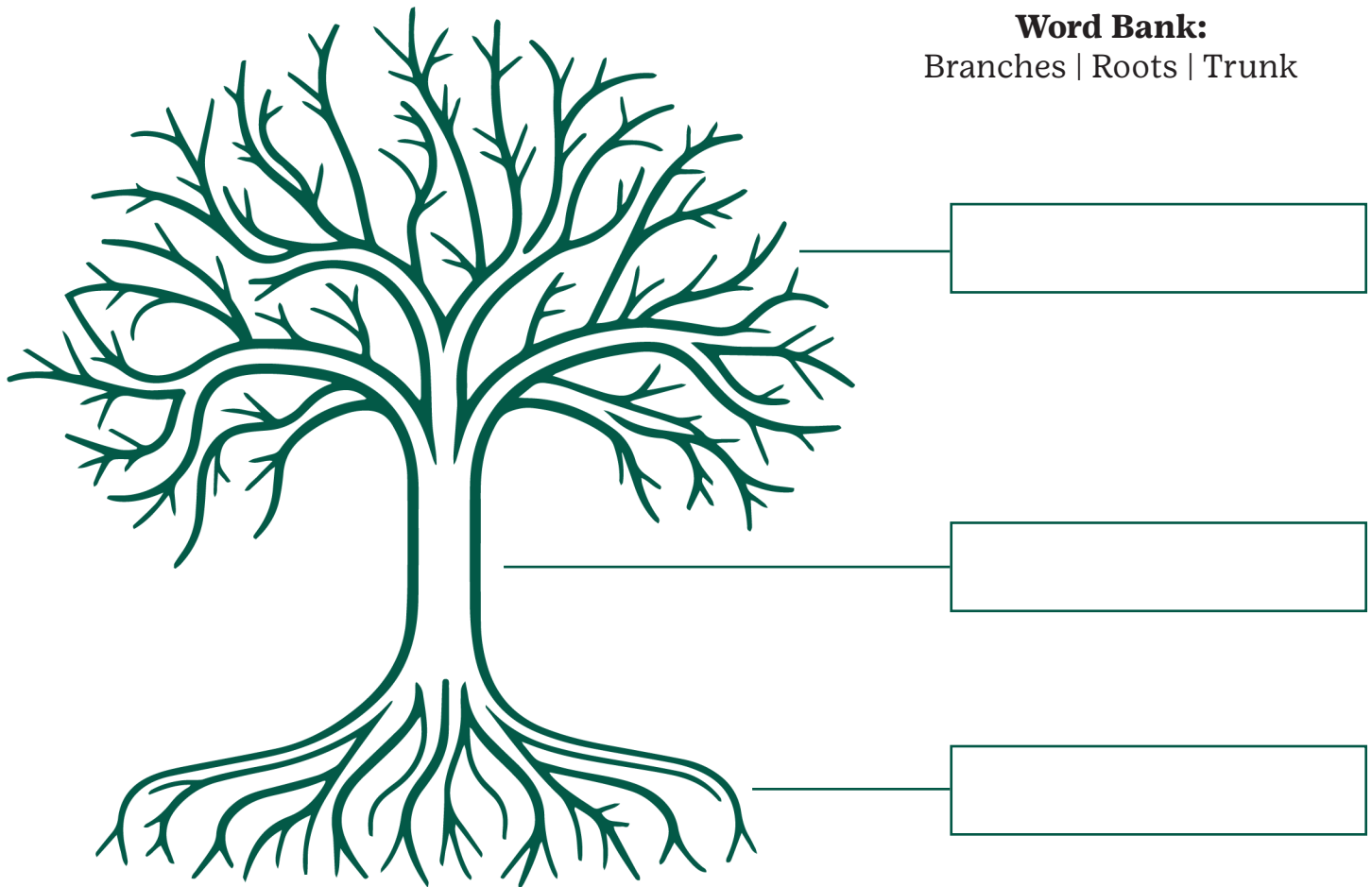
Here are some ways you can protect trees and your environment:

- Watering the trees, especially during hot or dry weather
- Mulching around the base of trees to keep the soil moist, make the soil healthy, and helps keep the ground from getting too hot or too cold. Mulch also helps stop weeds from growing and can protect trees from disease.
- Pick up litter that might be around the base of a tree
- Give them space! Avoid stepping on tree roots when possible
- Be gentle with trees and avoid damaging the tree bark or pulling on limbs



Label the Parts of a Tree

Directions: Use the word bank to label parts of the tree. Draw your own leaves and fruit to complete the diagram.



Native Michigan Trees

What is a native tree species? A native Michigan tree is a tree that naturally grows in our state and has been here a long time. Michigan is its home. Native trees provide essential food (nectar, seeds) and shelter for insects, birds, and other wildlife that live in the area. They also help keep nature balanced by growing in harmony with other plants. One well-known native tree is the Eastern White Pine. Which is also Michigan's state tree. Other native trees include Sugar Maple, and Red Oak which produces acorns that many animals eat.

Additional native trees of Michigan include: Black Cherry, Sassafras, American Basswood, Dogwood, Eastern White Pine, White Ash, Tulip Tree, Balsam Fir, cottonwood, and Red Pine.

Examine Leaves

One way an arborist can identify trees is by examining their leaves.

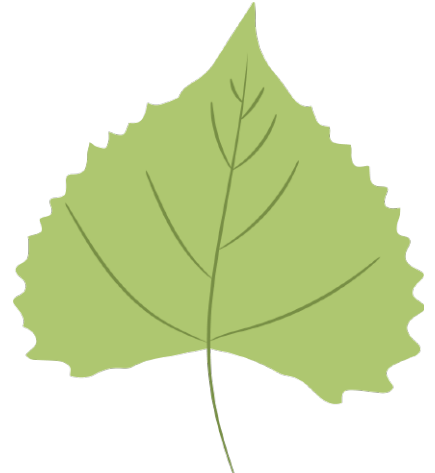
Directions: Use this chart to identify 3 or more native trees in your area.



White Oak



Sugar Maple



Cottonwood



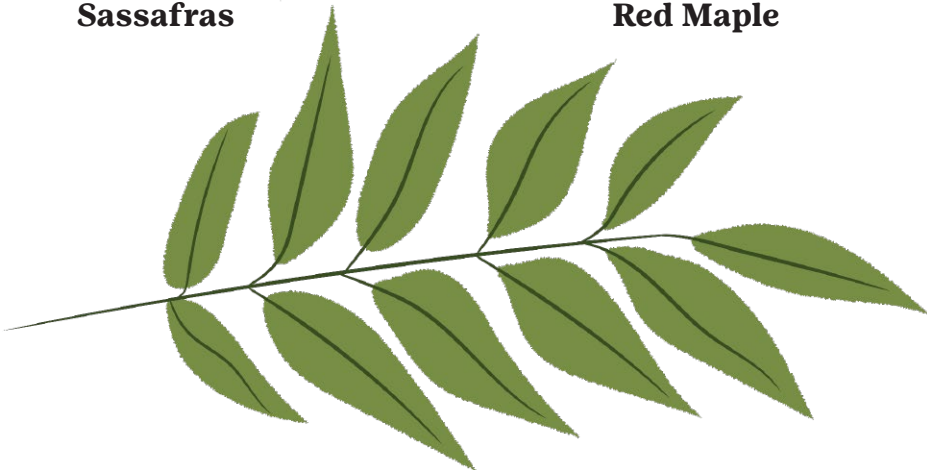
Sassafras



Red Maple



Red Oak



Black Ash



Basswood

Invasive Species

Invasive species are organisms that were never found in an area before and are not a natural part of the ecosystem.

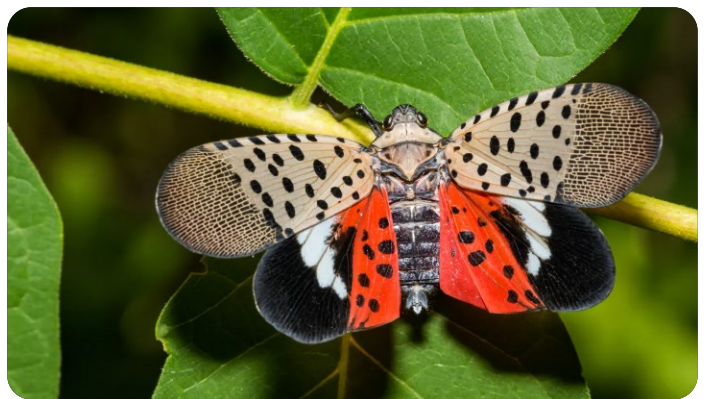
When they are introduced, often by people, they can throw off the balance of nature by competing with native plants and animals for resources. One example is Buckthorn, which was brought to North America from Europe.

Buckthorn spreads quickly, taking over forests and fields, crowding out native plants, and making it harder for wildlife to find food and shelter. Invasive species can cause big problems for the environment by changing habitats and reducing biodiversity.

Additional invasive species of Michigan include Spotted Lanternfly, Garlic Mustard, Beech Leaf Disease, Oriental Bittersweet, and Hemlock Woolly Adelgid



Buckhorn



Spotted lanternfly

Arborist Activity

Directions: Choose one of the following activities below to practice your skills as a junior arborist.

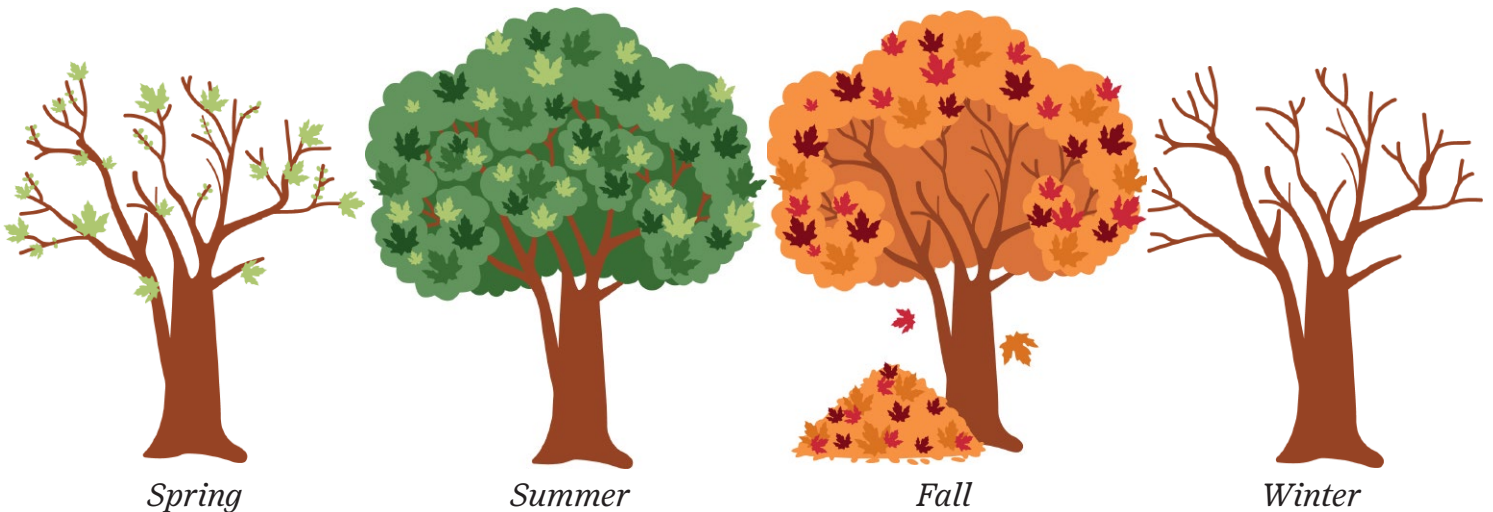
1. Create a “Wanted” Poster of an invasive species in Michigan. Include 3 characteristics about why it’s problematic to your local forestry.
2. Go on a scavenger hunt to locate invasive species in your area
3. Report an invasive species on the Midwest Invasive Species Information Network (MISIN) website. <https://www.misin.msu.edu/report/>

*Some invasive species need special processes for removal, so it is important to learn about how to do it the right way. Groups like the Land Conservancy of West Michigan and Friends of Grand Rapids Parks have events to teach you how to remove invasive species.

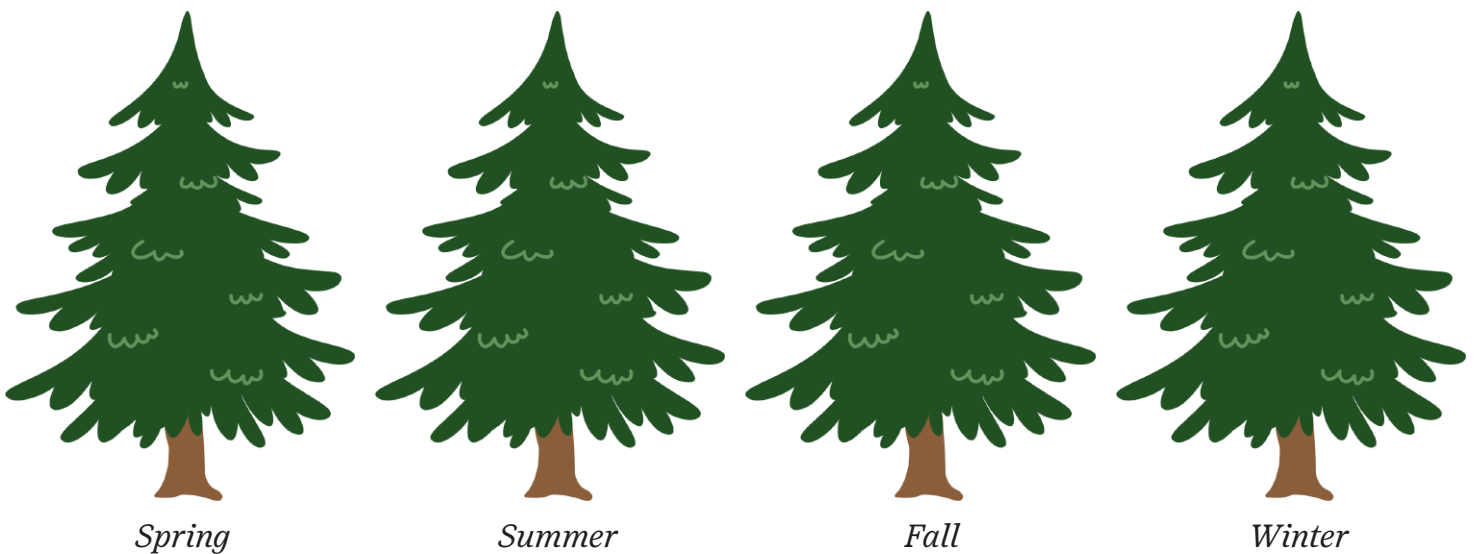
Deciduous vs. Evergreen Trees

A **deciduous tree** is a tree that loses all its leaves in the fall and grows new ones in the spring.

These trees go through seasonal changes, and their leaves turn bright colors like red, orange, and yellow before they fall. Common deciduous trees include maple, oak, and birch.



An **evergreen tree** keeps its leaves, usually in the form of needles, all year long. Unlike deciduous trees, evergreens do not lose all their leaves at once, so they stay green even in the winter. Examples of evergreen trees include pine, spruce, and fir.



Identify Native Deciduous Trees

Can you locate some of these native deciduous trees in your area? Refer to the examples of Bark, Leaves, Flowers, and Seeds pictured below.

Black Cherry



American Basswood



Cottonwood



Identify Native Evergreen Trees

Can you locate some of these native evergreen trees in your area? Refer to the examples of Bark, Needles, Pinecones, and Seeds pictured below.

Northern White-cedar



Red Pine



**Look for bundles of 2 in Red Pine needles*



Arborist Activity

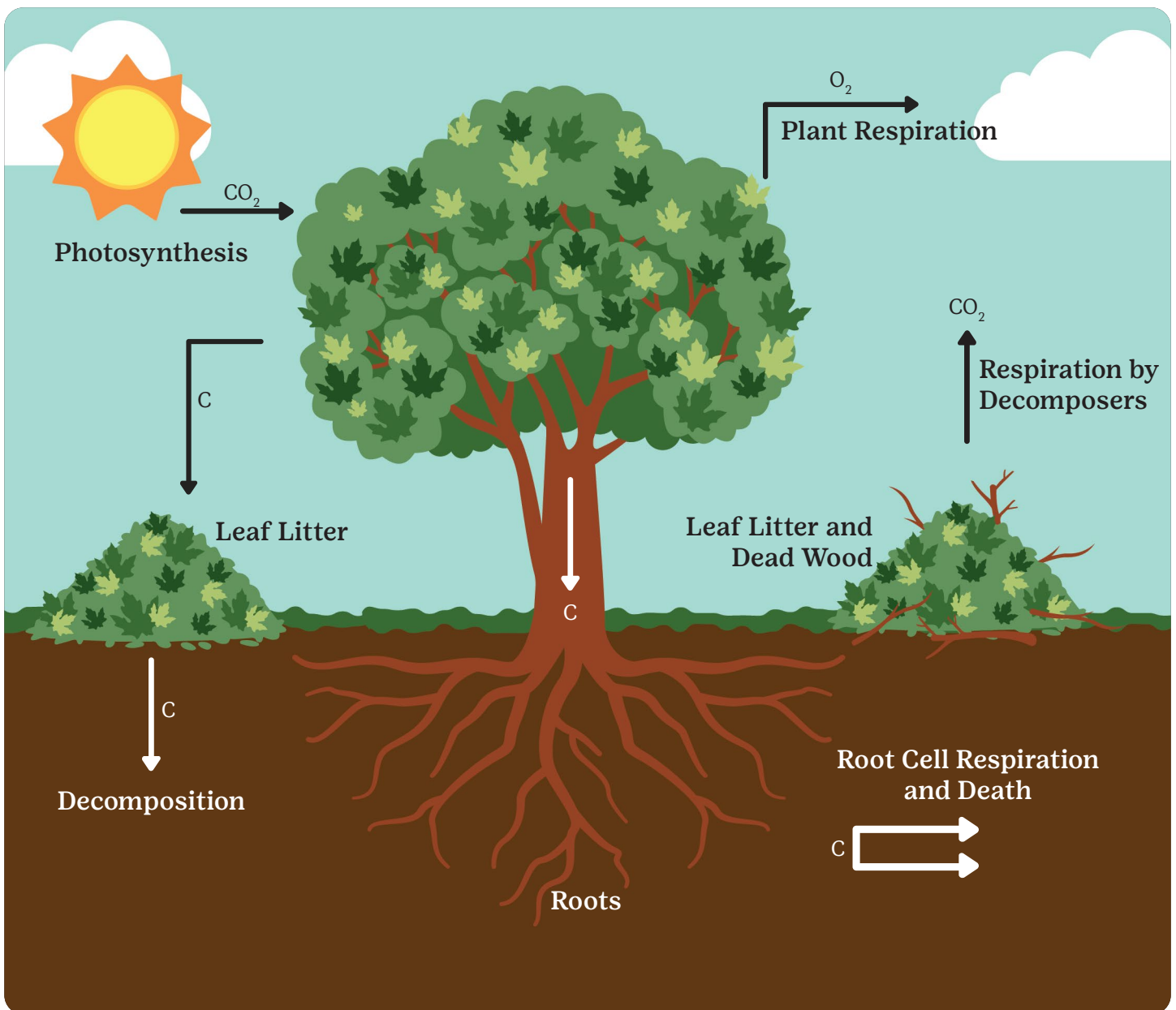
Directions: Choose one of the following activities below to practice your skills as a junior arborist.

1. Make seasonal tree art depicting deciduous trees during the spring, summer, fall, and winter.
2. Research on why deciduous trees shed their leaves while evergreen trees don't shed theirs.

The Carbon Cycle

Trees take in **carbon dioxide** and store that carbon in complex sugar molecules. These sugar molecules might be used in the tree's own cellular respiration process (providing energy) but much of that sugar is further transformed and stored in the tissues of the plant, both above and below ground.

This means that trees are also important **carbon sinks**, meaning that trees absorb a lot of carbon to keep our air healthy. Maintaining and protecting trees and forests contribute to keeping the Earth healthy and help stabilize the climate. This is why it's important to continue to take care of our planet by planting trees and recycling.



Here are some ways you can contribute to keeping our planet healthy!

1. Recycle paper and cardboard:

- Mail and office paper
- Cereal and cracker boxes (paperboard)
- Magazines and newspapers
- Paper bags
- Clean Toilet paper/paper towel rolls
- Flattened cardboard

2. Reducing Paper Use:

- Use a whiteboard, washable notebook, or tablet to do schoolwork
- Draw or write on the back of scrap paper instead of using a new piece of paper
- Use old magazines, mail, and newspapers for art projects
- When buying school supplies, choose paper that has a high recycled content.

Relationships with Other Organisms

Not only do trees contribute to cleaning our air, but trees also form key relationships with other organisms.

Trees, like beech and maples in Michigan forests or oaks often provide food source of their seeds for small animals including mammals, birds, and insects. Many trees also serve as nesting sites for birds and small mammals or provide shelter and protection for animals of all sizes.

Trees even provide support (literally) for other plants like some Ferns and epiphytic orchids. Using the tree trunk for support these plants can grow higher up and have better access to sunlight. In many forests trees also have underground relationships with fungi and bacteria. Some trees even communicate among themselves using below ground fungal networks!

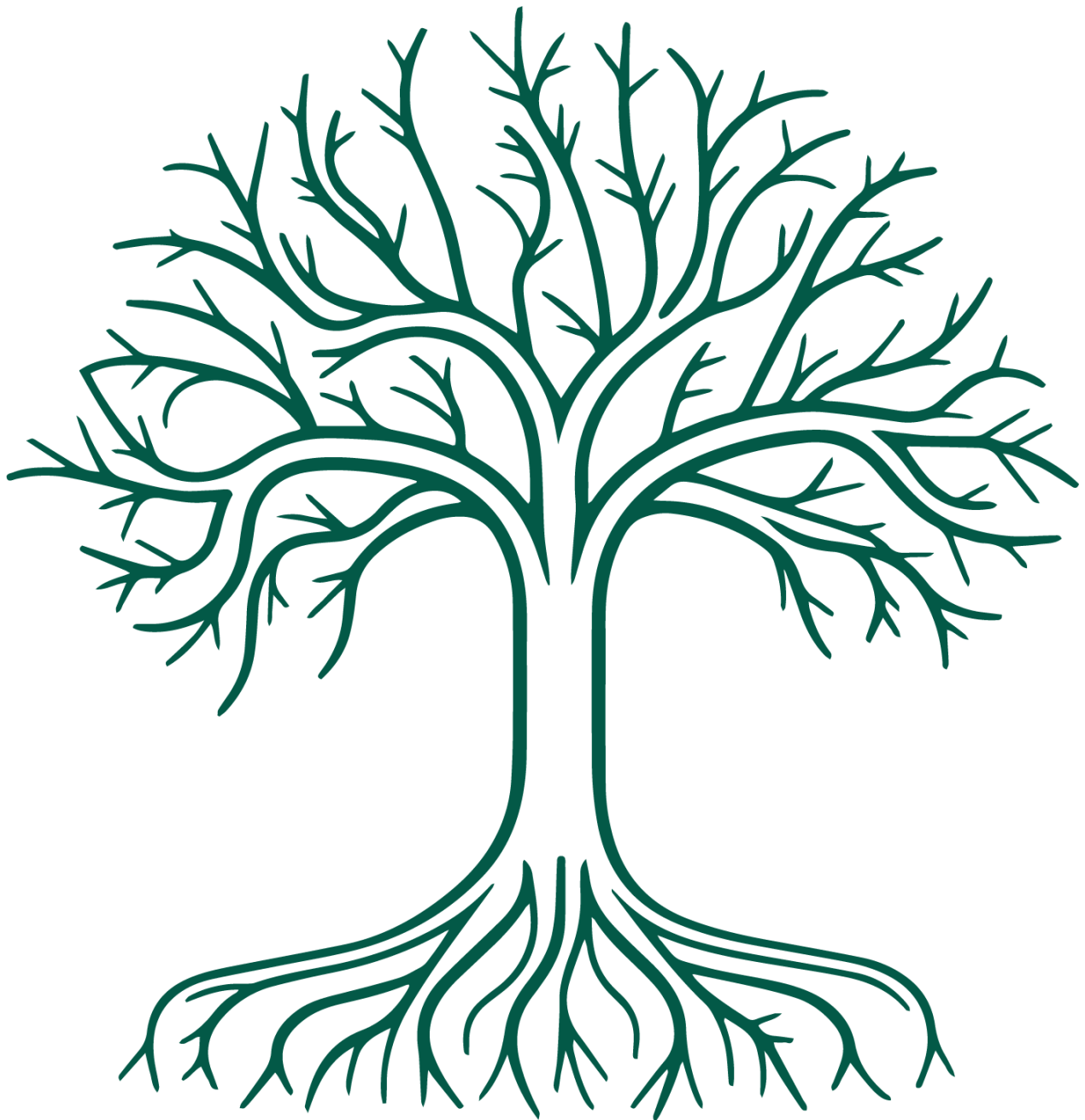


Arborist Activity

Name 3 reasons why animals depend on trees for survival:

1. _____
2. _____
3. _____

Complete the tree habitat by drawing where 3 insects, 3 animals, and 3 plants may live in or on the tree. How would these creatures build their homes? Research local animals that may also use trees for shelter.

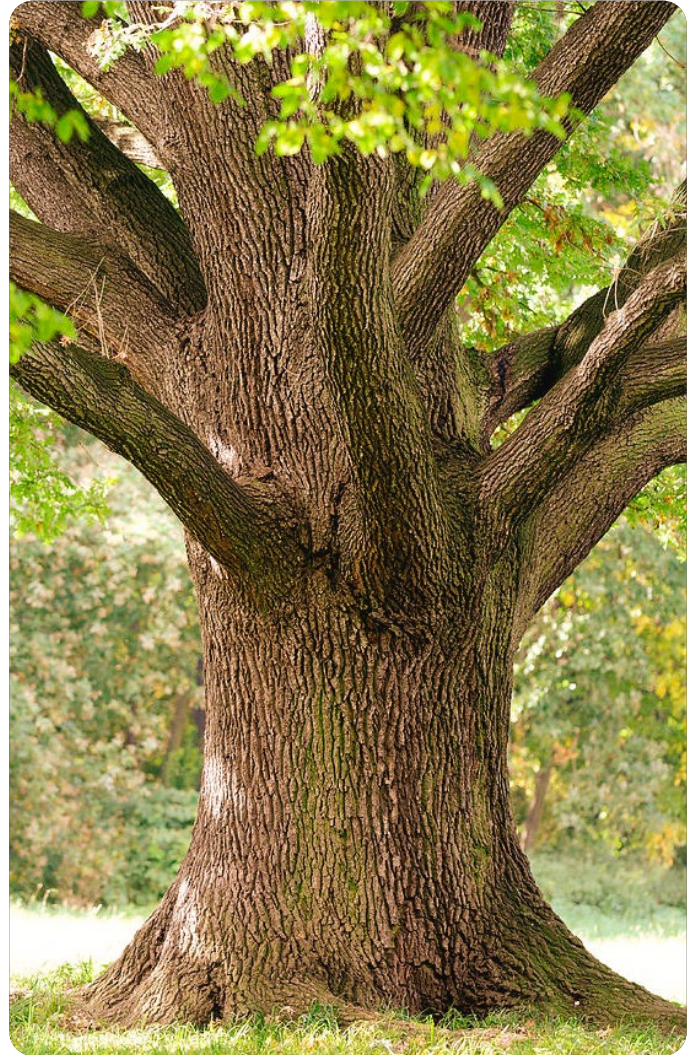


Tree Anatomy

Roots: For trees, roots absorb water and mineral nutrients and provide structural support. You can often assume that the roots stretch out and down to the same extent that the branches of a tree stretch upward and outward. Have you ever seen a tree uprooted by heavy winds?

Trunk and Branches: the trunk of the tree grows both upward and outward, increasing in length and girth over time. The trunk holds up the branches, and the branches hold the leaves. The leaves have cells that conduct photosynthesis. So, it is adaptive for the leaves to be stretched upward and outward, gaining as much sunlight as possible. Did you know that, through photosynthesis, plants essentially make their own food Pretty cool, right?

Bark: All but the newest Twigs on a tree are covered in bark. This is a dead outer layer that protects it from insects, disease and drying out. It functions a lot like your own skin.



Arborist Activity

Directions: Take a walk in a local forest or park and find the following:

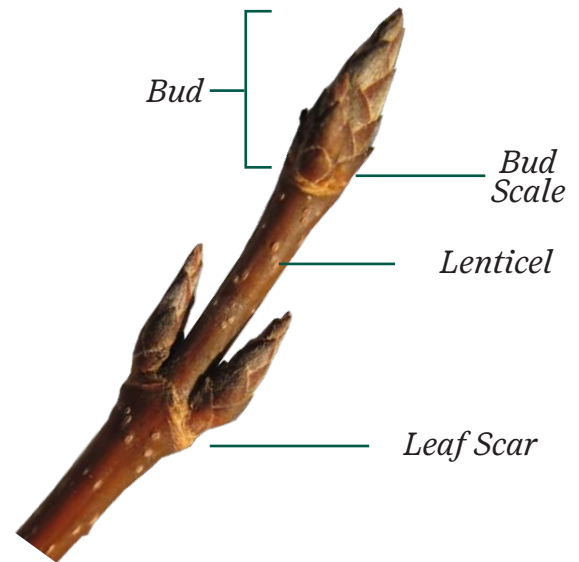
1. An up-rooted tree- observe the complex root system underneath. What insects do you think lived within the roots?
2. Compare trees' height, and size of the trunks and branches. How old do you think some of these trees are? Research the growth of trees.
3. Take a picture of 3 different types of barks, feel the texture, or sketch them in a journal.

Twig Anatomy

A twig is a small branch that grows on a tree. While twigs are seen as small, they play an important part in the function of a tree. Twigs are an important part of the growth of new branches, twigs, and grow the leaves you see each year.

The anatomy of a branch includes buds, leaf scars, lenticel, and bud scales. Each part of the twig serves an important function in a tree. Buds that grow into leaves will also have **alternate** or **opposite** arrangements.

- **Bud:** a bud grows not only new leaves but also support the growth of new branches and twigs.
- **Bud Scales:** protect the leaves before they grow in the spring.
- **Lenticels:** function as tiny openings that allow air to pass through.
- **Leaf Scars:** formed when a leaf is removed or falls off.



Opposite



Alternate



Arborist Activity

Directions: Choose one of the following activities below to learn more about the twigs of local trees in your area.

1. Compare and contrast two different twigs. Sketch them in a journal and label the parts. Take note of the bud color, bud count, and bud arrangement.
2. Find a twig and examine it closely to locate the following: Bark, Bud, Bud scale, Leaf scar, and Lenticel.
3. Look at some twigs in your area and identify whether the leaves or buds have an **alternate** or **opposite** arrangement.

Plant Reproduction

Many trees and plants reproduce via **seeds**. In flowering plants, seeds are produced within fruits, and nuts like acorns, walnuts, and chestnuts. One of the reasons fruits and nut seeds are produced inside is so new plants don't grow beside each other.

Can you name 5 fruits that contain seeds inside?

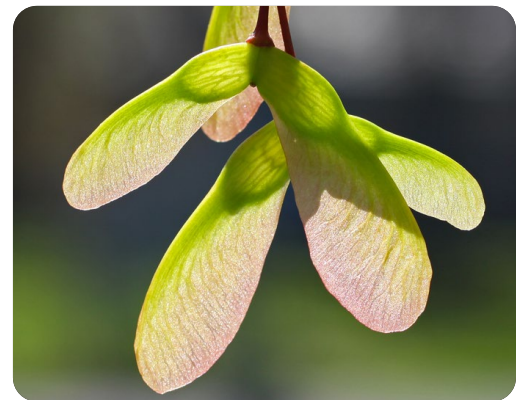
1. _____
2. _____
3. _____
4. _____
5. _____

Can you think of another reason why fruits and nut seeds are produced inside?

Pine trees or **Gymnosperms** produce seeds within a **pinecone**. Pinecones help protect the seed until it's ready to move around, some with wings that help them float through the air.

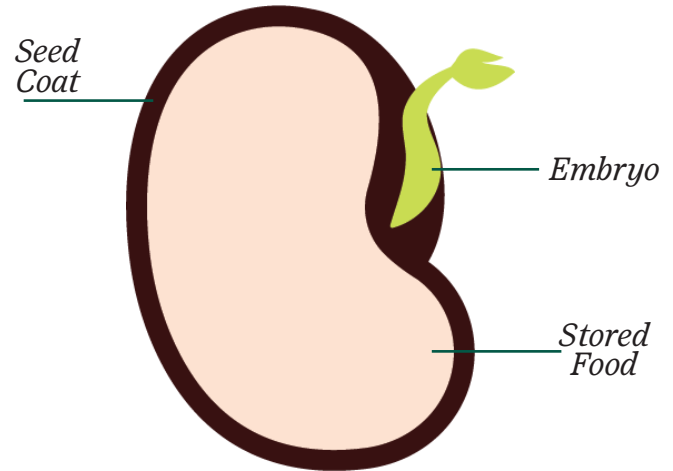
Fun Fact: Did you know you can make natural bird feeders using pinecones?

During the fall season, collect fallen pinecones, coat the edges with peanut butter or honey then, cover with birdseed. Tie a string to hang it on a tree or near a window. This is an eco- friendly way to use natural resources to feed your feathered friends.



Seed Characteristics

- **Embryo:** This is the “baby” plant with a tiny root, shoot, and leaves. The embryo is dormant, which means that it is alive but with very low activity.
- **Endosperm (Stored food):** This is the food for the growing plant; it feeds the growing embryo before it can make its own food. When the embryo encounters warmth and water, it starts to sprout into a baby plant (germination).
- **Seed coat:** this is a thin layer that protects the seed.



Arborist Activity

Directions: Choose one of the following activities to learn more about seeds.

1. Observe germination (sprouting of baby plant) by wrapping a raw black bean in a soaking wet paper towel, seal inside a plastic bag and tape on a window with lots of sunlight- in a few weeks watch the bean sprout.
2. Compare the seeds of fruits you eat- what do you notice about the shape, quantity, and size?
3. Soak beans overnight and carefully open them to see the tiny plant inside (Embryo).



Summary

With all of the information we learned about trees, you can see why it's important for us to conserve natural resources because they give us materials to live. Some natural resources, like trees and plants, are renewable, meaning we can make more of them.

Trees are renewable resources, but they take a really long time to grow. That's why we need to be careful about how much wood and paper we use so they don't run out. Trees are also very important for maintaining ecosystems. We need enough trees to provide a habitat and food for animals, insects, and plants.



Just like you, trees need water, mineral nutrients, and sugars.

- **Water:** Plants absorb water from the soil. It leaves their bodies through the leaf tissue and needs to be constantly absorbed to replace this loss. You get water by drinking it and through the foods you eat.
- **Mineral Nutrition:** Minerals are absorbed into the plant dissolved in water. You get minerals from the food you eat.
- **Sugars:** Sugars are a source of energy! Plants make their own sugar via photosynthesis. You get sugars in all the foods you eat...even if they don't taste sweet.

Continue your journey as a junior arborist by participating in opportunities to learn more about trees in your community and how they make positive impacts in your community and the environment.

Ways to Stay Rooted

1. Observe the different trees in your neighborhood or at school.
2. Keep a tree journey and take note of trees in your area: their leaves, branches, trunk and roots. How do they look? In what ways are they similar and how do they differ?
3. Share your favorite takeaway or activity from this packet with a friend or family member



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