



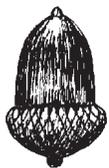
LEAF is a partnership program between
**Wisconsin Department of Natural Resources -
Division of Forestry**

and

Wisconsin Center for Environmental Education
College of Natural Resources
University of Wisconsin-Stevens Point.

Me as a Tree

This lesson is modified from the LEAF 5-6 Forestry Lesson Guide, Lesson 1. Discover more about LEAF at www.leafprogram.org



Nutshell

In this lesson, students learn how trees and humans are similar. Students use comparisons between humans and trees to understand a tree's functions and basic needs.

Big Ideas

- ✦ A tree is a perennial plant (lives more than one growing season) with a well-defined woody stem, crown, and roots.
- ✦ Trees have basic needs which include nutrients, sunlight, space, and water.
- ✦ As part of the forest community, trees have various roles (e.g., providing habitat, holding soil). The presence of trees alters the surrounding environment.

Objectives

Upon completion of this lesson, students will be able to:

- ✦ Draw and explain the parts of the tree and their functions.
- ✦ Compile a list of basic needs of a tree.
- ✦ Differentiate functions of a tree in a forest community.

Subject Areas

Arts, Science, Social Studies

Lesson/activity Time

- ✦ Total Lesson Time: 70 minutes
- ✦ Time Breakdown:

Introduction	10 minutes
Activity 1	15 minutes
Activity 2	25 minutes
Conclusion	20 minutes

Teaching Site

Classroom

Background

Words in **bold** can be used as vocabulary terms.

Parts of a Tree

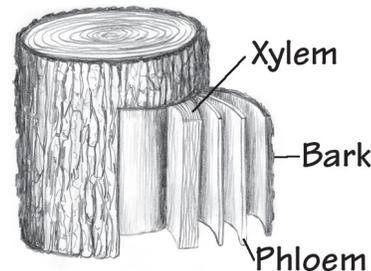
A tree is defined as a perennial plant with a well-defined woody stem, crown, and roots. Although trees are members of the plant kingdom, these tree features make them distinct from other plants. Each feature performs a different function for the tree.

Trunk

The woody stem, or trunk, sets trees apart from other plants. The trunk provides support for the branches and leaves. It also acts as the food and water connection between the leaves and roots.

Within the trunk are many layers. These layers perform functions for the tree.

- ✦ **Xylem** carries water and nutrients absorbed from the soil by the roots to the leaves. The word comes from the Greek *xulon* which means "wood."
- ✦ **Phloem** carries sugars (food energy) created during photosynthesis from the leaves to the rest of the tree. The word comes from the Greek *phloos* which means "bark."
- ✦ **Bark** is the outermost layer that protects the tree from injury.



Crown

The crown of a tree is composed of leaves and branches. It is where photosynthesis takes place. Leaves gather energy from sunlight and carbon dioxide from the air, and then combine them with water. Photosynthesis is the process trees use to make sugars, the energy for tree growth. The food energy created by the leaves in the crown is stored in the branches, trunk, and roots.



Roots

A tree's unseen root system may have more mass than the visible top portion of the tree. A tree's roots usually grow even farther out from the trunk than its branches. They lie just below the surface of the ground in the top nine inches of the soil. The structure of a root system is complex. Root systems consist of large, woody roots that grow out from the trunk and huge numbers of small roots growing out from the large ones. The large roots serve as anchors to keep the tree standing, provide energy storage for times when the tree isn't making sugars, and gather nutrients and water for the rest of the tree. The small roots that grow from the large roots are responsible for absorbing water and nutrients from the soil.

Additional parts not used in this lesson are defined on the Sugar Maple poster included with this booklet.

Basic Needs Of A Tree

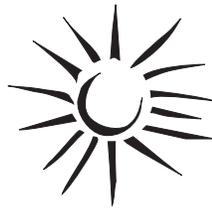
Trees and other plants have five things that they need in order to survive: nutrients, sunlight, water, air, and space.

Nutrients

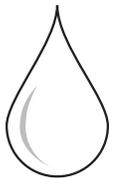
Trees use nutrients (minerals) from the soil to build the materials that make up the tree. These nutrients help the tree to survive, grow, and reproduce.

Sunlight

Sunlight is the form of energy that trees use to complete the process of photosynthesis. In order for trees to convert carbon dioxide and water into sugars (and other carbohydrates), they need energy from the sun.



Water



Water is key to photosynthesis. Water is also important to the tree for transportation of nutrients. It's water that makes up most of the tree's sap. Sap carries nutrients up the trunk and food back down to the roots.

Air

All plants need air to survive. It is from the air that plants get the carbon dioxide for photosynthesis. Without air in the soil, roots would "drown."

Space

Space is the least tangible of the basic needs. It is important for students to know that trees can't grow to their potential when they are crowded. Root systems need room to grow, as do branches, leaves, and stems.

Functions in the Community And Altering of Environment

Trees have various functions in their community. They absorb carbon dioxide and produce oxygen during photosynthesis. Since many trees live for

a long time, they act as "carbon sinks" to store carbon. Another function is **transpiration**. Trees absorb water from the soil and release water vapor into the atmosphere. Trees also provide habitat for animals and plants in their branches and in hollows in their trunks. The seeds, leaves, and bark of trees are also used as food by animals. The many roots of trees help hold soil and prevent erosion.

It's easy to see how people alter their environment, but trees can alter the environment too. The shade a tree casts will determine what plants are able to live beneath it. If a tree has dense shade, sun-loving plants will not grow under it. In turn, animals that rely on sun-loving plants will be absent as well. That same shade will also change the temperature in the community. Trees impact the moisture content of the soil, which also changes the types of plants able to grow there. Some trees have the ability to give off chemicals that discourage other plants from living near them. Black walnut is an example of a tree in Wisconsin that can control other species with chemicals.

Materials List

For Each Student

🍁 Copy of Student Page 📄 1, *Trees and Humans*

For The Teacher

🍁 Chalk/marker board

🍁 Overhead transparency markers

🍁 Overhead transparencies of:

- Student Page 📄 1, *Trees and Humans*
- Teacher Page 🍎 1, *Basic Needs of Trees and Humans*

🍁 Teacher Key 🍎 ➡ 1, *Trees and Humans Key*

🍁 Teacher Key 🍎 ➡ 3, *Basic Needs of Trees and Humans Key*

Teacher Preparation

Make overhead transparencies of Student Page 📄 1, *Trees and Humans* and Teacher Page 🍎 1 *Basic Needs of Trees and Humans*.

Procedure

Introduction

1. Begin by showing students pictures of trees or observing actual trees in the schoolyard. Ask students to make comparisons between different trees. (*One tree has dark brown bark and another has light brown; one tree has leaves and another has needles, etc.*)



- Next, ask students to compare trees with people and provide examples of what they have in common and why. (*Accept any reasonable responses. People have legs and arms, trees have branches.*) Ask what makes trees and people different. (*Trees can't move; trees have green leaves, etc., again accepting reasonable answers.*)
- Explain that, in the next activities, students will be comparing trees and humans.

Activity 1

- Tell students that they will be comparing the parts of a tree to the parts of a human and discussing how these parts have similar functions. Display the overhead transparency of the Student Page 1, *Trees and Humans*, and distribute a copy of the page to each student.
- Explain that all of the choices for the parts are listed at the bottom of the page and students should write them in the blanks. Each numbered part on the tree diagram corresponds with a numbered part on the human diagram with a similar function. The functions are listed at the bottom of the page as clues to determining what the parts are.
- Once students have completed their worksheets, have them help you fill in the blanks on the overhead transparency. As you fill in each pair of numbers, explain more about the function that corresponds with the number. (See Teacher Key 1, *Trees and Humans Key*.)

Activity 2

- Explain to students that trees and humans both have basic needs. Basic needs are things that an organism must have in order to survive. Display the overhead transparency of Teacher Page 1, *Basic Needs of Trees and Humans*. Ask students what the basic needs of humans are. Fill in their answers on the overhead in the triangle chart titled "Basic Needs of a Human." (See Teacher Key 3, *Basic Needs of Trees and Humans Key*.) Explain why nutrients and sunlight are not basic needs of humans if those answers are given. (*Although people need nutrients, we get those things from food, which is a basic need. Sunlight provides us with vitamin D but it is not the only source. Nutrients and sunlight become secondary to the basic need for food.*)
- Ask students what the basic needs of a tree are and fill in their answers on the overhead in the triangle chart titled "Basic Needs of a Tree." (See Teacher Key 3, *Basic Needs of Trees and Humans Key*.) Explain why things like food and shelter are not basic needs of trees if those answers are given. (*Trees create their own food and don't need shelter.*)
- Ask students to make comparisons between the two and write the similarities on the third triangle.

Conclusion

- Have students brainstorm their roles in the school community. (*Possible answers include: act as a role model to younger students, be a friend to others, be a good student – listen, etc., fill school responsibilities – hall monitor, cafeteria patrol, etc.*) Also, have students brainstorm a list of the roles others in the school play. (*Janitor, teacher, cook, principal.*)
- Have students study the *Sugar Maple* poster included in this activity booklet, or a picture of a forest. Explain that the picture shows examples of many roles trees have in the forest community. Have students study the picture and determine as many of these roles as possible. Make a list of the tree's roles on the board. (*Provide food, provide habitat, prevent erosion by holding soil, provide shade, produce oxygen.*)
- Have students think back to the roles they and the other people they listed play in the school community. Ask them what they think might happen if these roles weren't filled. (*If they were not good students, their grades would go down and they wouldn't learn. If they did not fill school responsibilities, someone else would have to do them or no one would do them and the school would run less smoothly, be less safe, etc. If the teachers weren't there, the students wouldn't learn. If the janitor wasn't there, the garbage would pile up and the halls wouldn't be swept.*) Now ask what they think might happen if trees did not fill their roles in the forest community. (*The animals would not have food or shelter. Water sources would become polluted and dirty. There would be less oxygen in the air. There would be less shade.*)

Standards

Language Arts C.8.3

Oral Language

Standard is: Participate effectively in discussion.

- Participate in discussion by listening attentively, demonstrating respect for the opinions of others, and responding responsibly and courteously to the remarks of others.
- Establish and maintain an open mind when listening to others' ideas and opinions.
- Display and maintain facial expressions, body language, and other response cues that indicate respect for the speaker and attention to the discussion.
- Participate in discussion without dominating. Students discuss their own ideas and listen to the ideas of others about the information they are learning throughout the lesson.

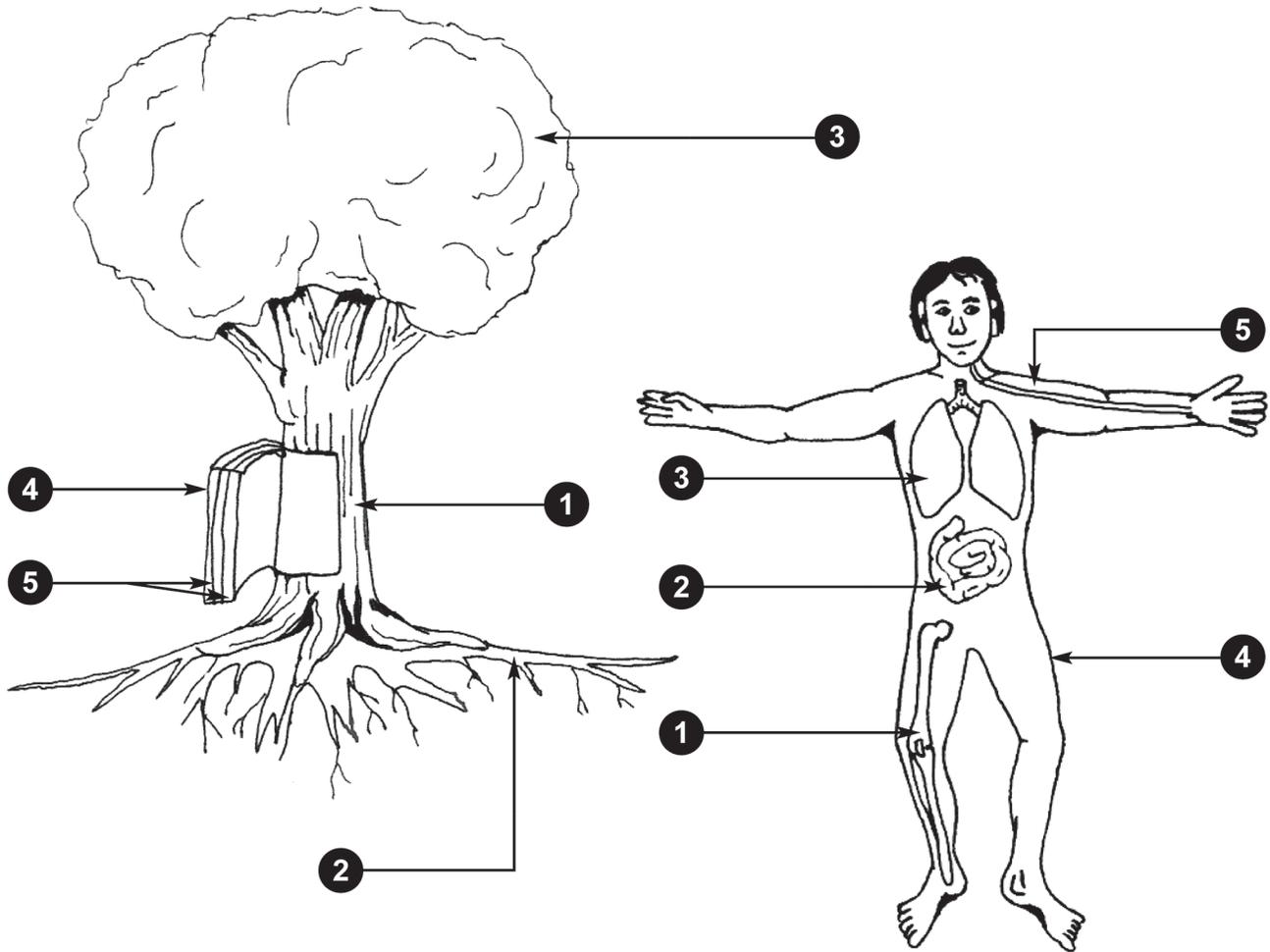
Science F.8.1

Structure and Function in Living Things

Standard is: Understand the structure and function of cells, organs, tissues, organ systems, and whole organisms. Students learn about the structure, function, and systems of trees and humans by labeling a diagram comparing the functions of tree parts and human parts.



TREES AND HUMANS



TREE/HUMAN PARTS

Write the tree/human parts in the appropriate blanks on the pictures above.

- | | | | | |
|---------|-------------------|-------------------|----------|------------------|
| • Trunk | • Xylem/Phloem | • Skin | • Bark | • Roots |
| • Lungs | • Small Intestine | • Skeletal System | • Leaves | • Veins/Arteries |

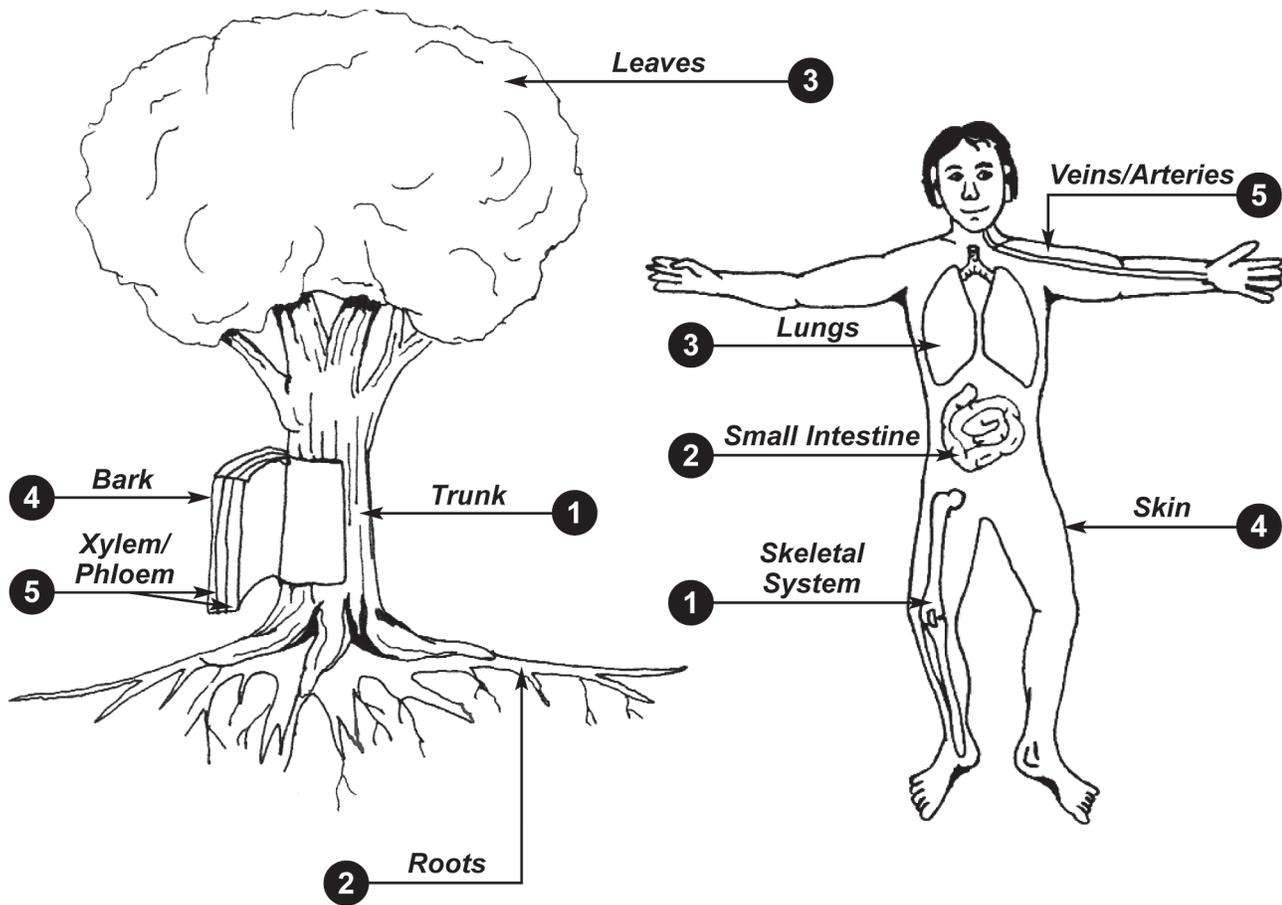
TREE/HUMAN FUNCTIONS

Match numbers 1 through 5 in the pictures above to the functions below.

- | | | |
|--------------------|---------------------------|-----------------|
| _____ Protection | _____ Support | _____ Transport |
| _____ Gas Exchange | _____ Nutrient Absorption | |



TREES AND HUMANS KEY



KEY

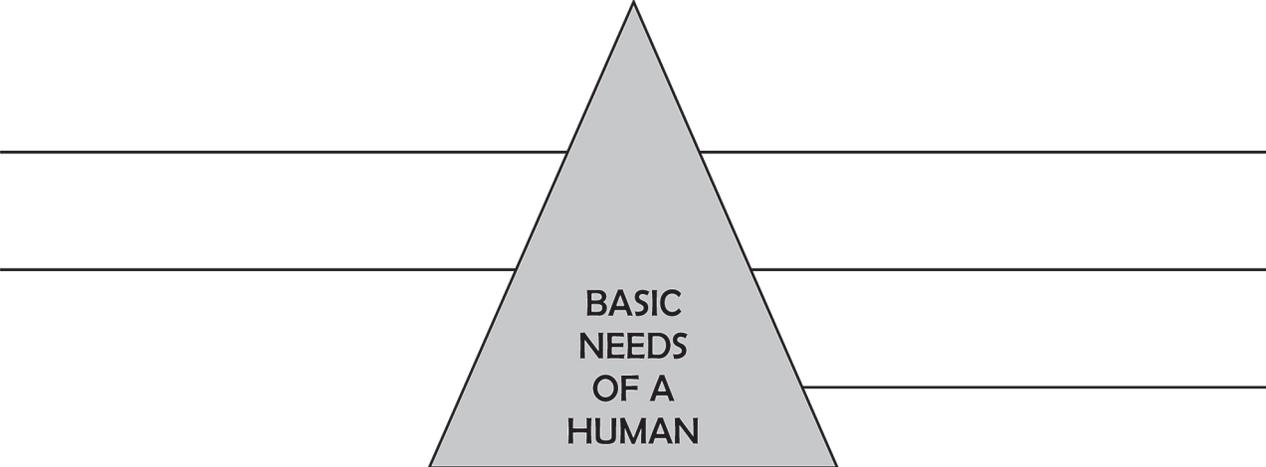
1. The **trunk** of a tree and the **skeletal system** of a human both provide support. Because the trunk of a tree is well-defined and woody, it sets trees apart from other plants. The trunk supports the branches and leaves of a tree and forms a connection between the leaves and the roots.
2. The **roots** of a tree and the **small intestine** of humans both absorb nutrients. Tree roots usually grow farther out than the tree's branches and lie just below the surface of the ground in the top nine inches of soil. Root systems consist of large, woody roots and huge numbers of small roots. The large roots serve as anchors to keep the tree standing, energy storage for times when the tree isn't producing sugars, and paths for nutrients and water to reach the rest of the tree. The small roots absorb water and nutrients from the soil.
3. The **leaves** of a tree and the **lungs** of a human are both places for gas exchange. Humans

take in oxygen and release carbon dioxide. Trees take in carbon dioxide and release oxygen. Leaves gather energy from sunlight along with the carbon dioxide and combine them with water. During this process called photosynthesis, sugars that are the food energy for the tree are produced.

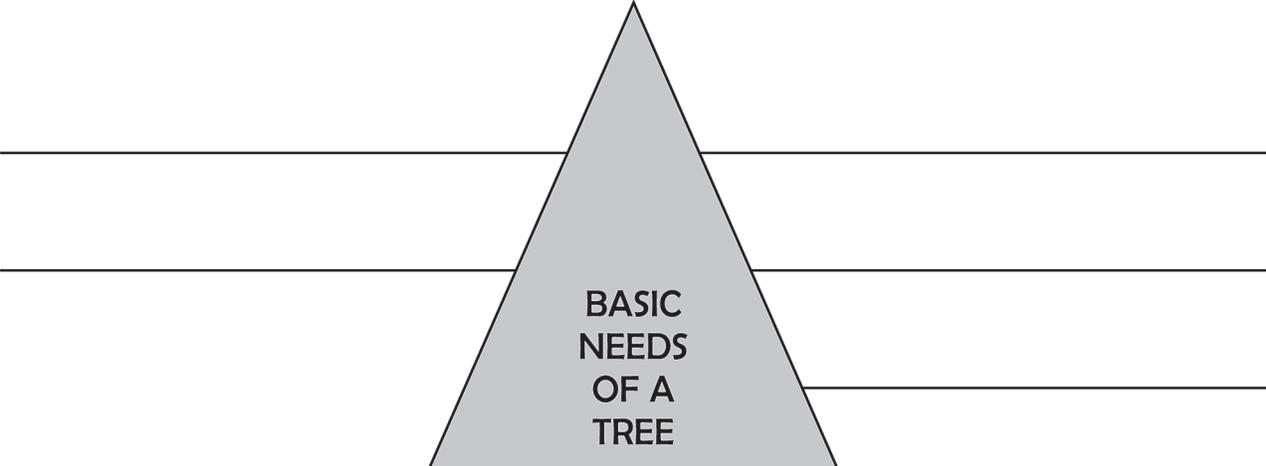
4. The **bark** of a tree and the **skin** of a human both provide protection. Bark protects the tree from injury caused by insects, animals, other plants, and fire. Bark characteristics vary from species to species.
5. The **xylem and phloem** of a tree and the **veins and arteries** of a human all transport materials. Water, nutrients, and sugar (food) must all be transported in a tree. The xylem and phloem are made of cells created by the tree each year. Old cells die and remain part of the trunk of the tree.



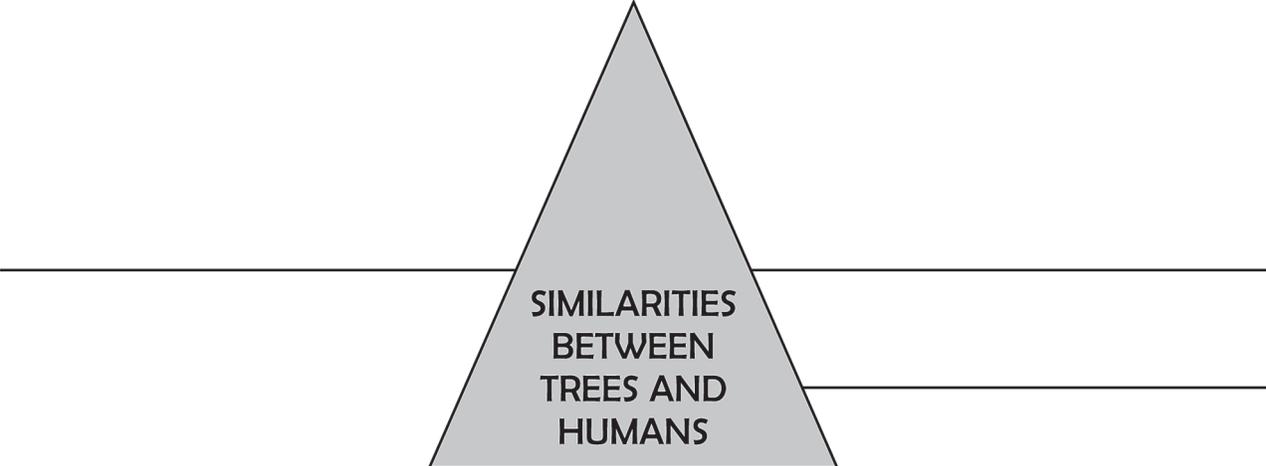
BASIC NEEDS OF TREES AND HUMANS



BASIC
NEEDS
OF A
HUMAN



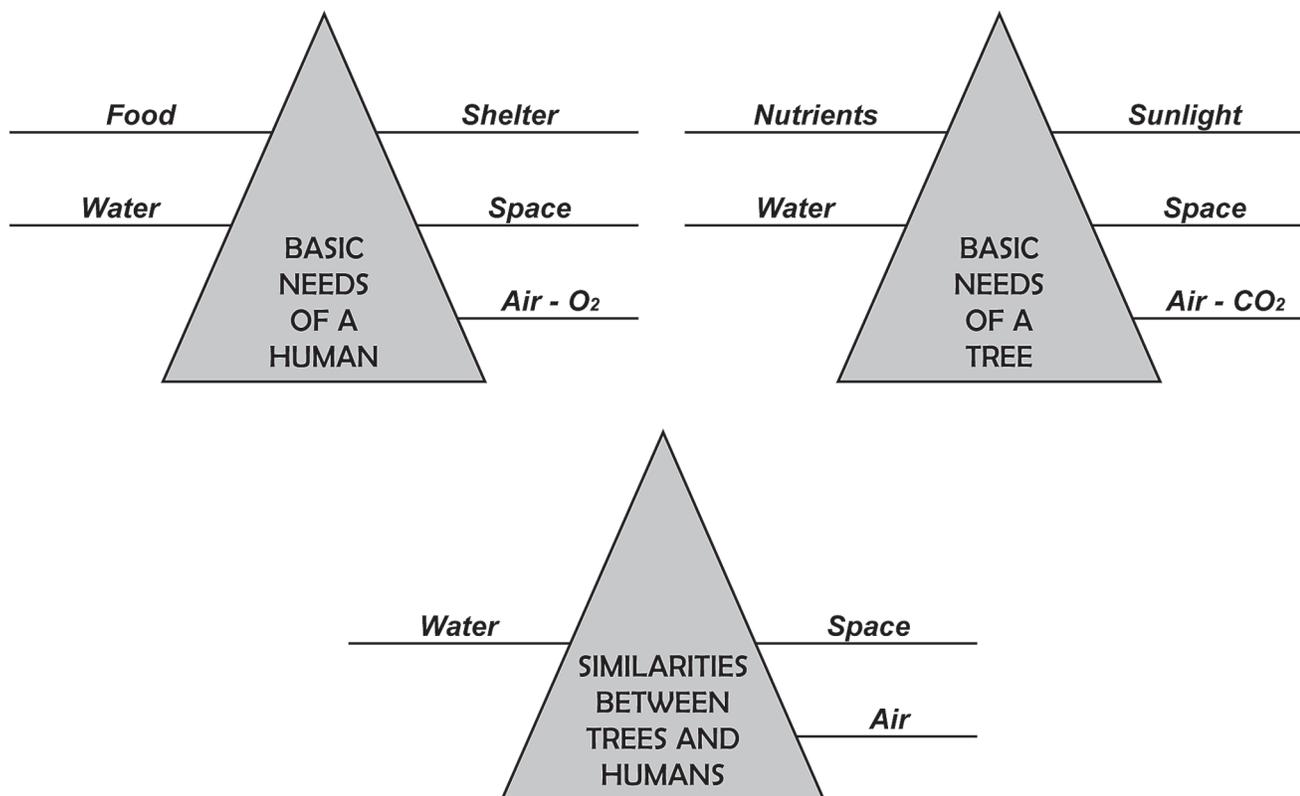
BASIC
NEEDS
OF A
TREE



SIMILARITIES
BETWEEN
TREES AND
HUMANS



BASIC NEEDS OF TREES AND HUMANS KEY



HUMANS' BASIC NEEDS

Food: Humans must find food; they cannot make it like trees can.

Water: Absorbed by the small intestine. Humans can live about a month without food but only one week without water.

Shelter: Humans need protection from elements such as weather. Different types of shelter are created depending on the environment a person lives in.

Space: Space is needed to move and exercise. A creature that does not have enough space is more prone to obesity, boredom, and sickness.

Air: Oxygen is necessary for healthy cell functioning. Humans take in oxygen from the air and release carbon dioxide.

TREES' BASIC NEEDS

Nutrients: Most of the nutrients a tree needs are found in the soil. Roots absorb the nutrients and they are transported throughout the tree by the xylem.

Sunlight: Needed in the process of photosynthesis to create sugars used by the tree for food.

Water: Absorbed by the roots. Major component of sap which carries nutrients and food.

Space: Necessary for proper growth. A tree needs space for its roots underground, as well as its branches and leaves above ground. If a tree is crowded and cannot get the nutrients and sunlight it requires, its growth will be stunted.

Air: Carbon dioxide is necessary for trees to complete photosynthesis. Oxygen is released as a byproduct of the process.

