

LESSON 4

INNER SYSTEMS OF PLANTS OR TREE BLOOD FOR BREAKFAST

California Science Standard 5th Grade – Life Sciences

2.e. Students will know how sugar, water and minerals are transported in a vascular plant.

2.b. Students know how blood circulates through the body.

National Science Standards Life Science Content Standard C 5-8

Specialized cells perform specialized functions in multicellular organisms. Groups of specialized cells cooperate to form a tissue, such as a muscle. Different tissues are in turn grouped together to form larger functional units, called organs. Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.

The human organism has systems for digestion, respiration, reproduction, circulation, excretion, movement, control, and coordination, and for protection from disease. These systems interact with one another.

Lesson Plan: Inner Systems of Plants

Objective

After examining and categorizing plants based on their exterior appearances, we will now guide the student in distinguishing plants based on their interior structure.

Materials: Teacher Guide: Inner Systems Worksheet
Student Inner Systems Worksheet
Venn Diagram worksheet

Key Vocabulary: circulate, roots, stem, leaf, veins, vascular, xylem, phloem, arteries, stomata, absorb

Anticipatory Set

Tell students that they will be comparing systems within humans and plants that allow them to carry out basic functions necessary for life. Review the basic parts of most plants (roots, stem, leaf, flower and fruits) and characteristics by which we classify leaves. Be sure to highlight the fact that leaves have discernible veins.

Ask the students, "What is the purpose of veins in our bodies?" After soliciting responses ask the class, "What would happen if one of our veins were cut?" Of course they should know we would bleed. Ask the students if anyone would like to taste the "blood" of a tree. One could play up the creepy aspect of the question while encouraging students to be brave and try something new. For those that are willing to taste "tree blood" (maple syrup), pass out samples of real maple syrup and discuss its flavor and taste (focusing on how sugary it is).

Explain to students that not all plants are filled with a sweet sugary substance and in fact some plants are poisonous. Students should not experiment without adult supervision.

Lesson

Ask students how the bodies of humans and plants are similar. Use a Venn Diagram to record answers for this part of the lesson. Follow this by asking how we are different. Focus on the fact that both plants and humans are similar in that we both have to distribute nutrients and important chemicals throughout our bodies. Today we will draw diagrams of a human body and a plant, and label the systems that carry out these important functions.

Distribute Inner Systems worksheets. Teachers can choose to use either a blank sheet of paper which allows students to sketch their own human body and plant or the one provided with this lesson.

Using the Inner Systems Worksheet (Teacher's Version), guide the students in drawing and coloring a simple diagram of veins and arteries emanating from the heart and spreading throughout the body. Color the arteries red, veins blue, and label accordingly. For the plant's vascular system have the students color and label the xylem blue and the phloem green within the plant.

Teacher Tip: Using an overhead transparency could be a helpful means of guiding students in drawing and labeling their diagrams. Or, one could make a large poster that the class can refer to as they create their diagrams.

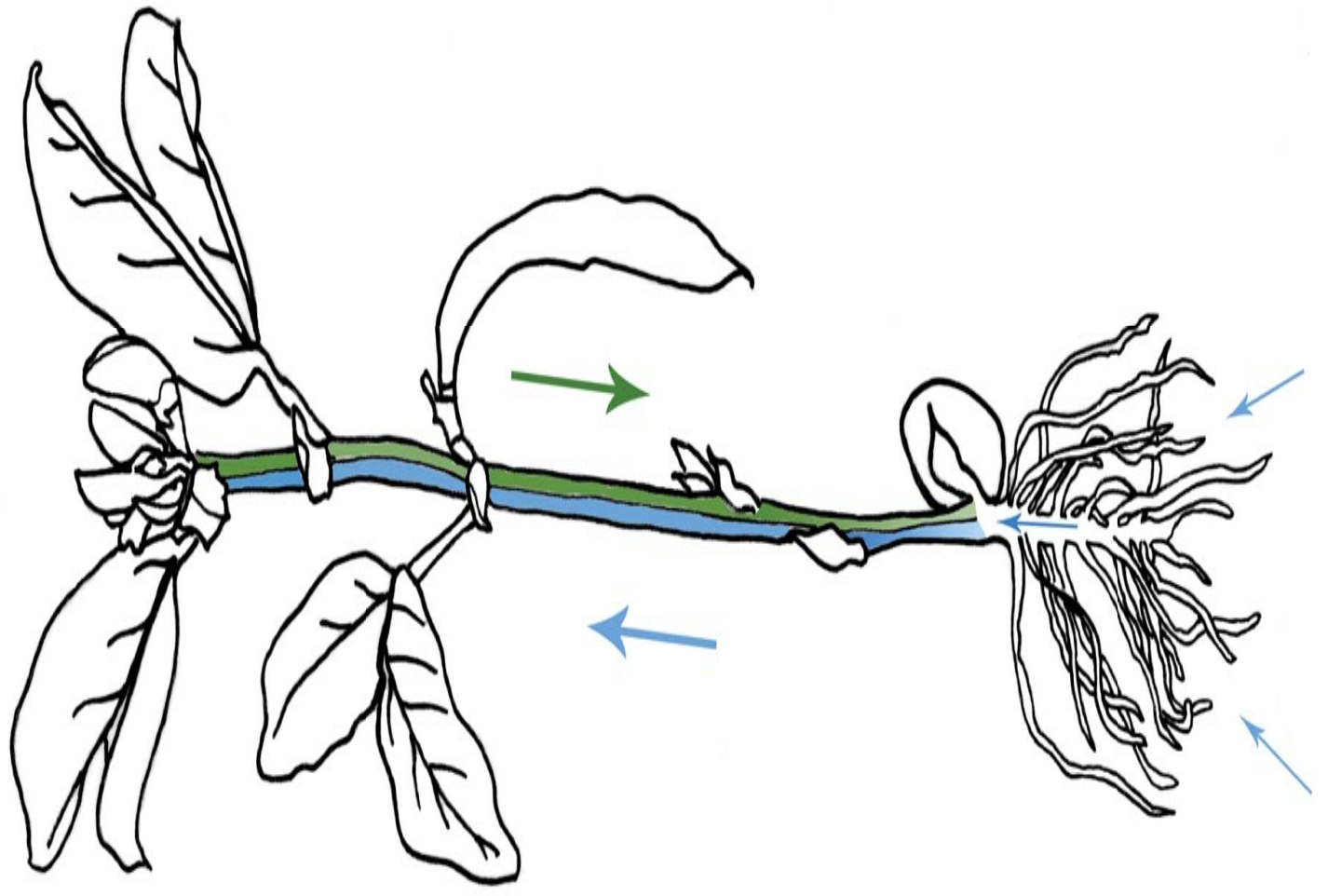
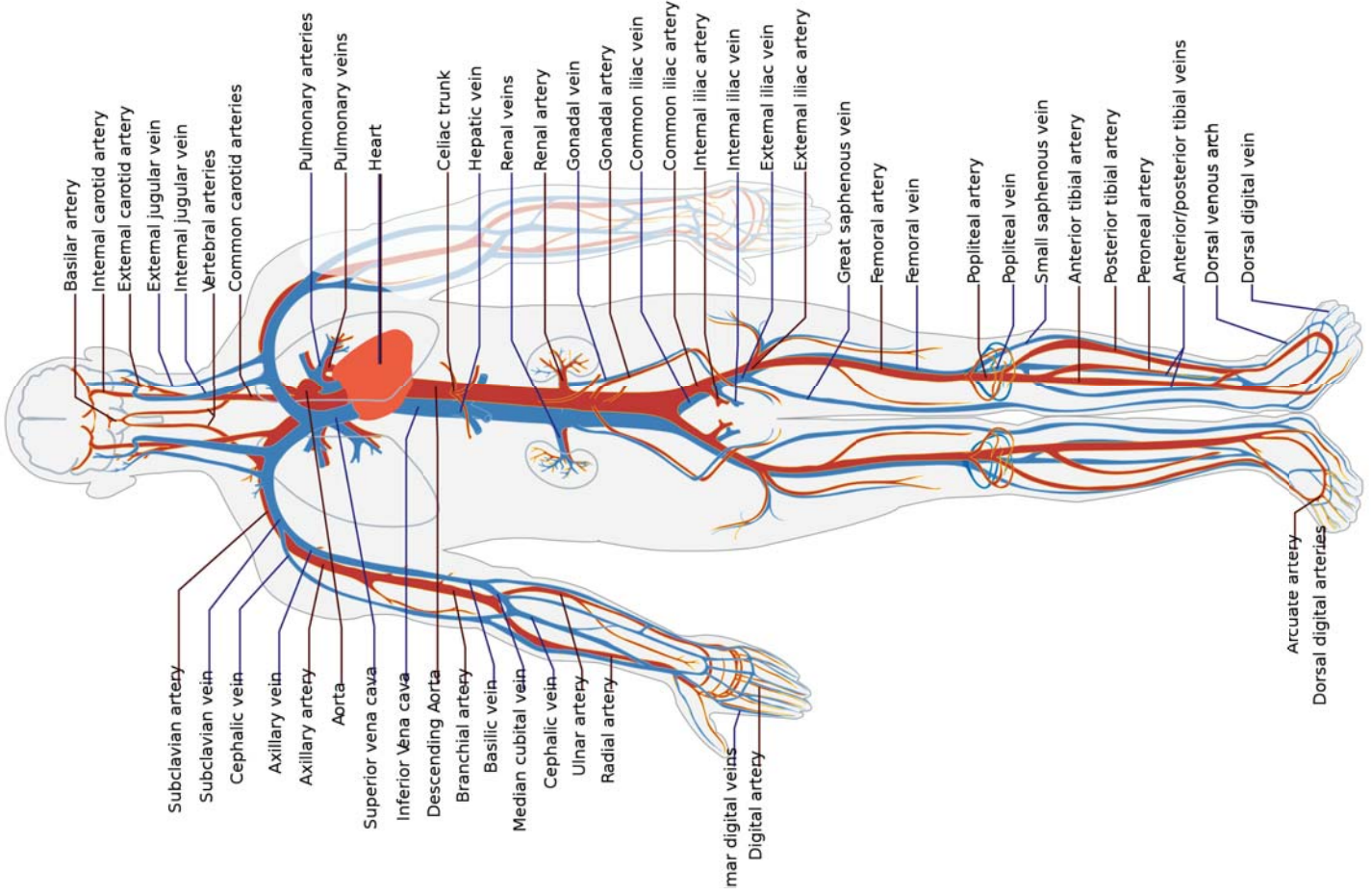
<p>Humans</p> <p>Cardiovascular System Veins carry blood <u>towards</u> the heart. Arteries carry blood <u>away</u> from the heart.</p> <p>Pores Openings in the skin that allow the body to sweat, which in turn helps to regulate body temperature.</p>	<p>Plants</p> <p>Vascular System Veins (There are 2 types in vascular plant.)</p> <ol style="list-style-type: none">1. Xylem – tubes that bring water and minerals from the roots into the leaf.2. Phloem – tubes that usually move sap, produced by photosynthesis, out of the leaf and down into the stem or roots where it is then stored. <p>Stomata Openings in leaves that allow gases and water to be exchanged with air.</p>
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Conclusion/Assessment

Lead the students in discussing what similarities they recognize between humans and plants. Of course they will also be able to describe ways in which we are different. Have students record answers on their worksheet. Using the Venn Diagram and their Inner Systems worksheet, have students summarize the differences and similarities between plants and humans.

Extension

- Either as a whole class, or in small groups, place celery, preferably with leaves still attached, in a container filled with water tinted with food coloring (perhaps a distinct color such as blue or red).
- Begin by slicing up sections of a stalk and distribute magnifying glasses so that students can examine and draw the “Before” image of the celery.
- When about to proceed with the experiment, it’s best to cut off the bottom of the celery to better expose its veins to the water. Place near a window so that the leaves might have a better chance to draw the colored water up into its stalk. This experiment also works well with carnations.
- On the following day, have students observe the celery and determine if there are any visible changes (perhaps the leaves have assumed the color of the water).
- Cut off slices of the stalk and have students again use magnifying glasses to observe and record their observations. They should be able to note how the veins have been filled with the colored water.
- Discuss how the roots of a plant absorb nutrients and water which are drawn up and distributed within the plant by the xylem.



Inner Systems Worksheet (Teacher's Version)

