FOSS LIVING SYSTEMS MODULE—WEEK 3

Hello Students, Teachers, and Families,

This package includes **Home/School activities for Environments Investigation 3—Transport Systems**. During school closures, the FOSS team will be expanding the **Home/School Connection Center** on the FOSS website **https://www.fossweb.com**.

Families can access Home/School Connections and many other resources (multimedia, streaming video, and *FOSS Science Resources* interactive e-book) on FOSSweb through the class pages set up by the teacher. The teacher will need to provide the class username and password for full access. .

If the teacher has not set up Class Pages, families can still access the **Home/School Connections Center** page from the main FOSSweb login page. No registration is necessary for this access.

The Home/School Connections for each module are active investigations that can be conducted at home (inside or outdoors). New activities are added to FOSSweb each Friday.

For reading science content at home when you can't get to a library, we r**ecommend NSTA's Interactive eBooks**. Many of these books are on our recommended books lists, and all of these books are full of fantastic content. As of today, NSTA has made this content entirely free for the time being. No login required!

https://www.nsta.org/ebooks/

In addition, we recommend going to the website for your local city or county library. Many libraries offer ebooks through multiple providers.

If you haven't used FOSSweb resources before, here's how.

For Students and Families: To sign in to FOSSweb, use the user name and password provided by your teacher. This might be a Common Class or Individual Student login. Here's a short video to get you started on FOSSweb

For Student Sign in Video: **https://youtu.be/Fcfjbt7Li2k**

For FOSSweb help: **https://www.fossweb.com/student-parent-help**.

FOR TEACHERS: For help in setting up and using Class Pages, use the Walk-through Videos on FOSSweb: **https://www.fossweb.com/fossweb-walkthrough-videos**

Visit the Home/School Connection for each module you teach, select the specific assignments that will be most relevant to your students at this point in instruction. Communicate with families about which content you are assigning through the Class Pages Notes on FOSSweb or through any other established parent communication channel your school has in place.

Tech support on FOSSweb: **https://www.fossweb.com/contact-us#jotform**

Sincerely, The FOSS Team at the Lawrence Hall of Science

HOME/SCHOOL CONNECTION—WEEK 3, A

Investigation 3: Transport Systems

Review

In the last few explorations at home we considered how plants get the nutrients they need. We learned about plant cells containing chlorophyll and that they can make their own food with energy from the sun.

Introduction

Leaves are sometimes referred to as a plant's energy factories. If this is true, they must deliver that energy to the rest of the plant's cells. Today we will look at plant leaves and conduct a simple experiment using two clear plastic bread bags—you will also need two pieces of string, or perhaps the twist ties that held the bread bags closed.

Focus Question: How are nutrients transported to cells in a plant?

1. Obtain numerous and different leaves near your home. Try to find a wide variety of shapes of leaves. (Tips: Large leaves are preferable, don't take from neighbors' gardens, try to find leaves on ground first, pinch the stems of the leaves with your finger nails)
2. Observe leaves closely, record observations in notebooks. Do all the leaves share anything in common?

You may have noticed that the leaves have pathways in and on them called **leaf veins**. The veins are structures composed of tiny tubes through which water and a fluid called sap flow. Sap is water carrying various kinds of dissolved plant nutrients. The veins have two kinds of tubes: **xylem** and **phloem**. The function of the xylem tubes is to transport water and minerals from plant roots throughout the entire plant. The function of the phloem tubes is to transport sap from the green cells to all the other cells in the plant.

3. Let's see if we can see if moisture escapes through a plant's leaves. Take the plastic bag out to a tree or bush near your home, select a plant in the sunshine. Slide the bag carefully over a bunch of leaves and seal the open end with the twist tie or string. Depending on the temperature you may see some results right away, if cooler you may have to wait some time. Set up another bag, over a branch without leaves as a control.
4. After some time has passed, record your results in your notebooks. Note the weather conditions, the kind of plant, or any other data you think you should include.

What you observed is water that traveled up from the plant's roots through the xylem all the way up to the leaves, and then passed through tiny holes in the leaves as water vapor which condensed on the inside of the bag. This process is called transpiration.

5. Read "Plant Vascular Systems" in the eBook in your Media Library on FOSSweb. How do your outdoor experiences connect to the reading? Record thoughts in your notebook.
6. Explore the FOSSweb **online activity** called "Plant Vascular System."
7. Answer the focus question in your notebook.

HOME/SCHOOL CONNECTION—WEEK 3, B

Investigation 3: Transport Systems

Review

Recently you explored how nutrients flow to the cells of plants. How the xylem and phloem tubes move water throughout the plant. Water transports various nutrients to and from cells.

Introduction

Today we will explore the human transport systems, specifically the circulatory system.

Focus question: How do humans transport nutrients to all their cells?

Read: Login to FOSSweb, go to the Living Systems Media Library and find the eBook called "The Human Circulatory System."

Turn to the third page and look at the diagram on the bottom half of the page. You are looking at the front half of a person. What do you notice for structures? Look at your wrists, below the surface of your skin, do you see any lines, that could be similar to those in the image?

The human circulatory system pumps blood through vessels called arteries, veins, and capillaries. The arteries and tiny capillaries deliver blood to all of the cells in your body. Blood carries nutrients to your cells and carries waste products away from your cells.

The human circulatory system has a four-chambered pump called the heart and a system of tubes: arteries, capillaries, and veins.

View the Streaming Video, *Circulatory and Respiratory Systems*
To access the streaming videos, login to FOSSweb, click on the Living Systems Module, and go to the Media Library. Click on the Streaming Videos, watch Chapter 5 of the video.

Answer the following questions in your notebook

1. How does blood move through the system?
2. What is the function of the heart valves?
3. Where is blood sent after it enters the right side of the heart?
4. Where is blood sent after it enters the left side of the heart?

Revisit the image you looked at in the eBook. Click on the video icon and observe how the blood flows through the heart. Read the article and answer these questions:

5. What is the heart and what is its role in the circulatory system?
6. What are the heart valves, where are they, and what do they do?
7. What is the main function of the left side of the human heart?
8. What is the main function of the right side of the human heart?

Finally, answer the focus question in your notebook.

HOME/SCHOOL CONNECTION—WEEK 3, C

Investigation 3: Transport Systems

Introduction

Take one hand and place it on the center of your chest for about one minute. Shut your eyes and notice what you feel. Do you feel any movement? Can you feel your heart beating? Do you feel any other movement? Perhaps your breath moving in and out of your body?

Now stand up and do jumping jacks for a full minute. If this feels amazing, go ahead and keep going. Do it until you are breathing more rapidly. If you are unable to do this movement for some reason, you may do some other kind of movement to get your heart rate up. As soon as you are done put your hand back on your chest and feel the difference. Is your heart beating faster? Are you breathing more heavily?

The focus question for today is: Why do people breathe?

The lungs are the most important part of the respiratory system. The respiratory system is the system you use for breathing. Your lungs are connected to the environment by a system of tubes and openings. Your two lungs rest in a chamber inside your chest. As you inhale air is pulled into your lungs and air flows out of your lungs when you exhale.

Read the eBook from your Media Library on FOSSweb.

First look at the pictures throughout the article in the eBook on FOSSweb called "The Human Respiratory System." Now read the article. After reading the article, record other questions you have about this system in your notebook.

View the Streaming Video on FOSSweb.

Now, view Chapters 1-4 of the video "Circulatory and Respiratory System." You may want to watch Chapter 3 twice.

Answer these questions in your notebook

1. What are the parts of the respiratory system?
2. What is the system's function?
3. What are the alveoli and what happens there?

Vital capacity is the maximum amount of air you can exhale on one breath. It is the measure of a person's ability to acquire oxygen and eliminate carbon dioxide.

4. Why do you think vital capacity is considered a runner's secret weapon?

Answer the focus question in your notebook.

Optional follow up activities:

a. Read "Other Circulatory and Respiratory Systems" in the eBook on FOSSweb.

b. Research the hearts and circulatory systems of animals such as birds, reptiles, or fish

c. Make a detailed drawing of one or more of the organ systems that you have studied and label the organs.