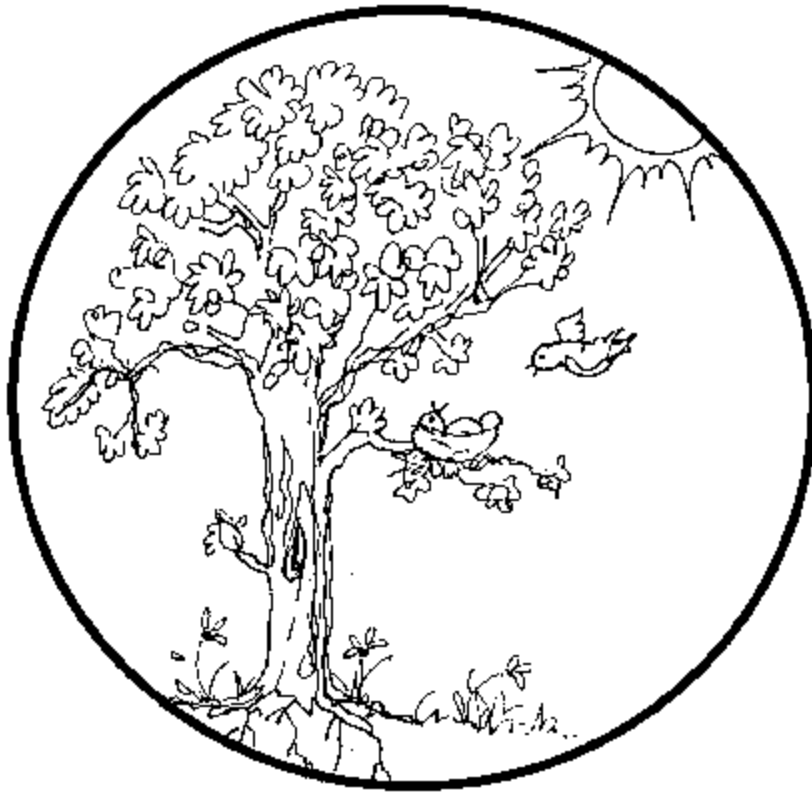




Life Cycle
Diversity in a Balance



FOURTH GRADE HUMAN BIOLOGY



2 WEEKS
LESSON PLANS AND
ACTIVITIES

LIFE CYCLE OVERVIEW OF FOURTH GRADE ORGANISMS

WEEK 1.

PRE: *Exploring the components of a cell.*

LAB: *Comparing cells, tissues, and organs.*

POST: *Classifying different organisms.*

WEEK 2.

PRE: *Understanding the reasons for invertebrate classification.*

LAB: *Comparing and contrasting invertebrates.*

POST: *Comparing characteristics of the 5 kingdoms.*



HUMAN BIOLOGY

WEEK 3.

PRE: *Describing how the human body works.*

LAB: *Discovering if boys are more flexible than girls.*

POST: *Exploring four types of tissues.*

WEEK 4.

PRE: *Exploring how the circulatory system works.*

LAB: *Comparing the pulse rate of males and females.*

POST: *Exploring the components of blood.*

PLANT LIFE

WEEK 5.

PRE: *Defining the characteristics of plants.*

LAB: *Comparing monocots and dicots.*

POST: *Identifying monocots and dicots in the field.*

WEEK 6.

PRE: *Explaining how light is transformed into food.*

LAB: *Discovering that starch is important to plants.*

POST: *Analyzing components of drugs.*

NATURAL ENVIRONMENT

WEEK 7.

PRE: *Investigating soil.*

LAB: *Exploring a soil profile.*

POST: *Investigating the ecosystem of the school yard.*

WEEK 8.

PRE: *Identifying plants in a saline environment.*

LAB: *Creating a San Francisco Bay mud fauna food web*

POST: *Examining a fresh water aquarium ecosystem.*

LIFE CYCLE - HUMAN BIOLOGY (4A)

PRE LAB

Students review the parts of their body.

OBJECTIVES:

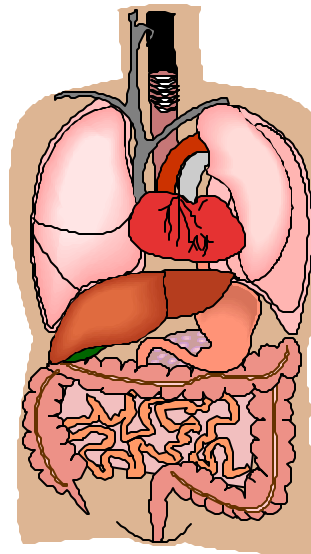
1. Describing how the human body works.
2. Exploring the organs and systems of the body.

VOCABULARY:

organ
system

MATERIALS:

human torso
Human Body Placemat
skeletal model



BACKGROUND:

The human body is composed of organs that are part of different body systems that allow the human body to work. The design of the body will be explored as well as the different tissues that combine to make the different organs such as the heart and lungs. In addition, the organs that combine into systems such as the skeletal system or digestive systems need to be explored, since these systems work in groups to serve the needs of the human body. Students need to become more familiar with the interior of their bodies. At this grade, some of the students are becoming aware of changes in their own bodies and older friends or siblings.

Human bodies vary a little from person to person, not only in the visible aspects of size and shape but also in the placement of internal organs. Human bodies, however, do follow a general pattern. No part of the human body works in isolation; each part does its job, day and night, supported and aided by all the other organs.

PROCEDURE:

1. Use the Human Body Placemat to review the organs of the body. Quiz students to see if they know where the organs are by having select students locate parts of the body.
2. Also discuss the major systems of the human body and their functions. Use the human torso to point out the different internal organs.

3. Discuss the skeletal and muscular systems of the human body. Have the students find some of the bones figured on the placemat on their body.

Bone tissue varies in hardness. The outside of most bones is very hard. Minerals give bone tissue its hardness. Inside the bones is a soft material called marrow. Cartilage is generally found at the ends of bones that move against one another. Cartilage is a smooth, flexible material that is tissue. Ligaments are tissues that may be found at the ends of bones if the bones are still held together. There are 206 bones in an adult skeletal system.

Bones articulate at joints and are held together there and allowed to move with the help of ligaments. Bones and muscles are attached to each other by means of tendons. This combination of muscle and bone provides an extraordinarily effective means of movement.

LIFE CYCLE - HUMAN BIOLOGY (4A)

LAB

Students perform simple exercises to see how flexible they are.

OBJECTIVES:

1. Discovering if boys are more flexible than girls.
2. Interpreting data.

VOCABULARY:

flex
flexible

MATERIALS:

students' bodies
broom or stick



BACKGROUND:

The skeletal system is basically a bag of bones without the ability of the muscular system to make the bones work together. The skeletal system is made up of bone mass, cartilage, and blood tissue. The bones are living substances with many blood vessels running through them. Bone marrow is where blood is made. Bones are porous, but brittle. They can break if too much stress is applied on portions of a bone. The muscles can attach themselves to parts of the bone to make the bones move in unison. Cartilage acts as a protection between bones so they do not damage the bone.

Flexibility is the ability to bend a joint or limb and to move a muscle so that it bends a joint. The anatomy behind flexibility is very complicated.

PROCEDURE:

1. The objective of this lab is to introduce students to their own flexibility and to realize that muscles and joints play an important role in movement. The students are to perform the flexibility tests and to record whether they can or cannot do the exercise. They will then tabulate the class results. You may want them to graph their findings. Although girls are generally more flexible than boys, some boys can be human rubberbands! Also note, that some of your students may be double jointed, meaning that their bones have more movement than most at the joints. They are capable of doing flexible acts that most humans cannot.

2. Depending on the size of the class may depend on how you do this lab. You can do the exercise as a class, so you can watch the students do each correctly. Demonstrate

with one group of students, give them time to write the information on their sheet. The other way is to make stations and have the students follow the direction at each station. You should time the students at each station so they can finish the lab.

1. BODY THROUGH BROOM

Step through a broom or stick. Then up and over. Don't let go.

2. SQUAT WITH FEET FLAT

Keeping feet flat, squat without lifting your heels off the ground.

3. HAND CLASP (FRONT)

Start with back of hands toward each other, cross arms, clasp palms together (intertwine fingers), bring toward body still clasping hands, then extend arm outward.

4. HAND CLASP (BACK)

Put your right hand over the top of your shoulder, your left arm down and toward your back. Try to clasp or touch hands.

5. HAND CLASP (SHOULDER)

Holds hands in back, and bring up hands to shoulder length without moving your upper body forward.

6. KNEES TO SIT

Get down on knees and see if you can sit down.

7. LEG TO CHEST

Bring one leg all the way up to chest, keeping the other leg flat on the ground.

8. BALLERINA

Put feet together, move feet 180 degrees, put one foot in front of the other keeping them parallel.

9. BEND TOUCH FLOOR

Students should bend their torso without bending their knees. They should touch to floor with open palms.

10. BEND TOUCH FLOOR, REVERSE

Do the same as above, but put one leg over the other leg before touching the floor.

LIFE CYCLE - HUMAN BIOLOGY (4A)

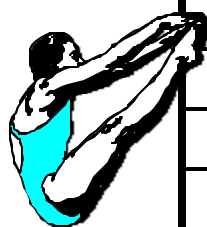
PROBLEM: Are girls more flexible than boys?

PREDICTION: _____

PROCEDURE: Do the following activities and record either a yes or No. Your teacher will discuss each activity. Record your partner's results.

	YOURS Sex _____	PARTNER Sex _____
1. body through broom		
2. squat with feet flat		
3. hand clasp (front)		
4. hand clasp (back)		
5. hand clasp (shoulder)		
6. knees to sit		
7. leg to chest		
8. ballerina		
9. bend touch toes		
10. bend touch toes reverse		

Collect the data from your class and then make a bar graph of the results. In your conclusion interpret the results and see if you can figure out if flexibility has anything to do with whether you are male or female.



ACTIVITY #	# MALE	# FEMALE

CONCLUSION: Is there a difference between girls and boys? If there is a difference, can you explain why? _____

LIFE CYCLE - HUMAN BIOLOGY (4A)

POST LAB

Students try to find tissue cells on their skin.

OBJECTIVES:

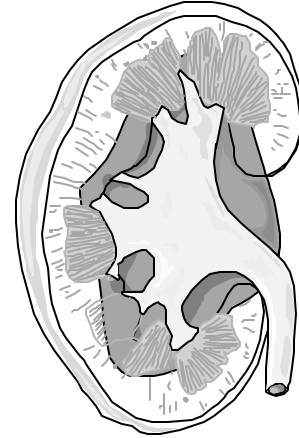
1. Exploring four types of tissues.
2. Comparing nervous, connective, epithelial, and muscular tissues.

VOCABULARY:

connective
epithelial
muscular
nervous

MATERIALS:

worksheet
Swift GH microscope



BACKGROUND:

A tissue is a group of cells that have a similar shape and function. Different types of tissues can be found in different organs. In humans, there are four basic types of tissue: epithelial, connective, muscular, and nervous tissue. There may be various sub-tissues within each of the primary tissues.

Epithelial tissue covers the body surface and forms the lining for most internal cavities. The major function of epithelial tissue includes protection, secretion, absorption, and filtration. The skin is an organ made up of epithelial tissue which protects the body from dirt, dust, bacteria and other microbes that may be harmful. Cells of the epithelial tissue have different shapes as shown on the student's worksheet. Cells can be thin, flat to cubic to elongated.

Connective tissue is the most abundant and the most widely distributed of the tissues. Connective tissues perform a variety of functions including support and protection. The following tissues are found in the human body, ordinary loose connective tissue, fat tissue, dense fibrous tissue, cartilage, bone, blood, and lymph, which are all considered connective tissue.

There are three types of **muscle tissue**: **skeletal**, **smooth**, and **cardiac**. Skeletal muscle is a voluntary type of muscle tissue that is used in the contraction of skeletal parts. Smooth muscle is found in the walls of internal organs and blood vessels. It is an involuntary type. The cardiac muscle is found only in the walls of the heart and is involuntary in nature.

Nerve tissue is composed of specialized cells which not only receive stimuli but also conduct impulses to and from all parts of the body. Nerve cells or neurons are long and string-like.

In tissues the simplest combination is called a membrane, or a sheet of tissues which cover or line the body surface or divide organs into parts. Examples include the mucous membrane which lines body cavities. Tissues combine to form organs. An organ is a part of the body which performs a definite function. The final units of organization in the body are called systems. A system is a group of organs each of which contributes its share to the function of the body as a whole.

PROCEDURE:

1. Use the worksheet to go over the four tissues of the Human Body. Make them take notes about each of the tissues and have them research where these tissues may be in the human body.

2. Make sure that the students realize that tissue is made up of cells.

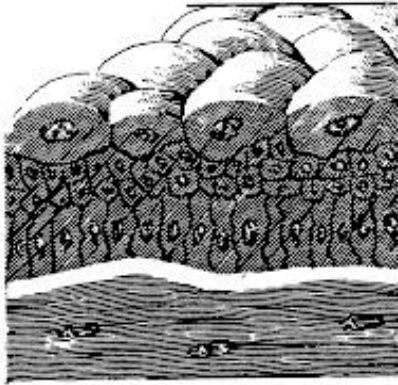
3. Students should look at their own cells of their skin, and ask them if they can see the entire tissue. Remember the skin is epithelial tissue. Students should use a Swift-GH microscope to focus on the different parts of their skin. They can look at their leg, hand, arm, or palm. They will notice that the shape of the cells vary considerable from one area of the body to another.

Make them think they may find some tissue, so they look at different parts of their skin. Review with them that there are different skin cells at different locations. They cannot find tissue because they are just look at the surface part of the skin.

LIFE CYCLE - HUMAN BIOLOGY (4A) POST

FOUR TISSUES OF THE HUMAN BODY

DIRECTIONS: Look at the following pictures and describe each of the tissues.



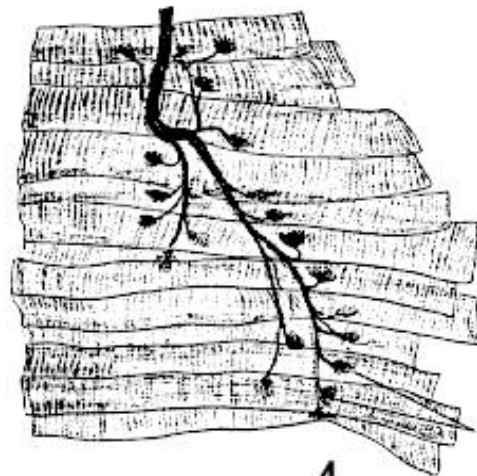
1



2



3



4

CONNECTIVE TISSUE _____

MUSCLE TISSUE _____

NERVOUS TISSUE _____

EPITHELIAL TISSUE _____

LIFE CYCLE - HUMAN BIOLOGY (4B)

PRE LAB

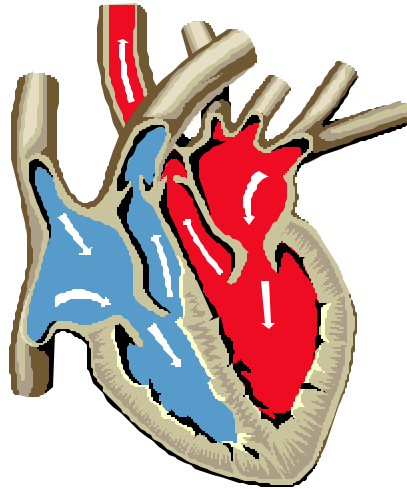
Students learn the parts of the heart.

OBJECTIVES:

1. Exploring how the circulatory system works.
2. Investigating the function of blood.

VOCABULARY:

arteries
atrium
capillaries
circulatory system
veins
ventricle



MATERIALS:

worksheet
pumping heart
stethoscope

BACKGROUND:

Digested food and other nutrients that are needed by our bodies are carried to the cells by the blood. The blood also carries wastes away from the cells. Blood must be kept moving through the body to accomplish these jobs. This is made possible by the heart. The heart acts as a pump. Blood is carried through tubes called arteries, veins, and capillaries. This entire network of blood is called the circulatory system.

The human heart contains four chambers. The upper two are the right and left atria. The lower two are the right and left ventricles. Arteries carry blood away from the heart and veins carry blood to the heart. Capillaries connect arteries and veins. The heart is a mechanical device whose function is to pump blood through the body to replenish oxygen lacking blood cells with oxygen. The importance of constant circulation of blood throughout the body cannot be over emphasized, for without blood, life could not be. If blood does not reach the brain for just five seconds an individual loses consciousness; after 15-20 seconds the body begins to convulse; and if such a block lasts for nine minutes, irreparable damage to the brain results.

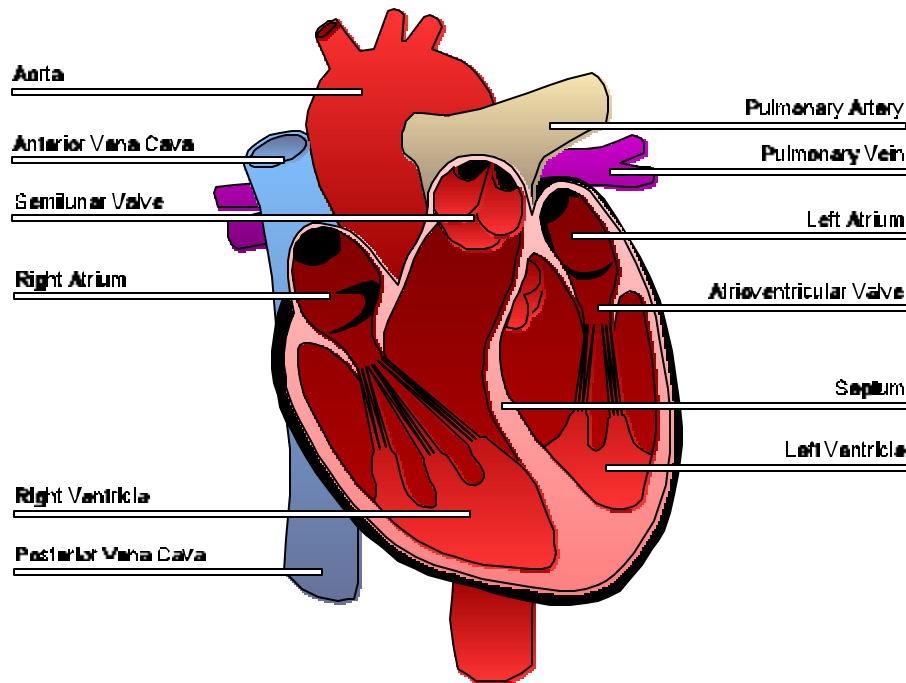
The strong contraction of the heart muscle forces blood into the arteries in two ways: the first expands the muscular walls of the arteries and the second pushes the blood through

the arteries to regions of the body away from the heart. This rhythm makes the arteries expand thereby producing a pulse. In the wrist, the pulse is detected by a throbbing sensation near the surface.

PROCEDURE:

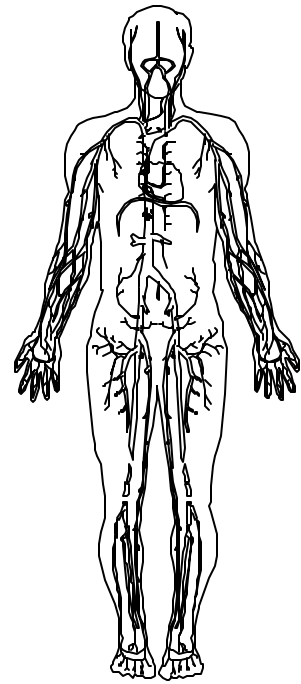
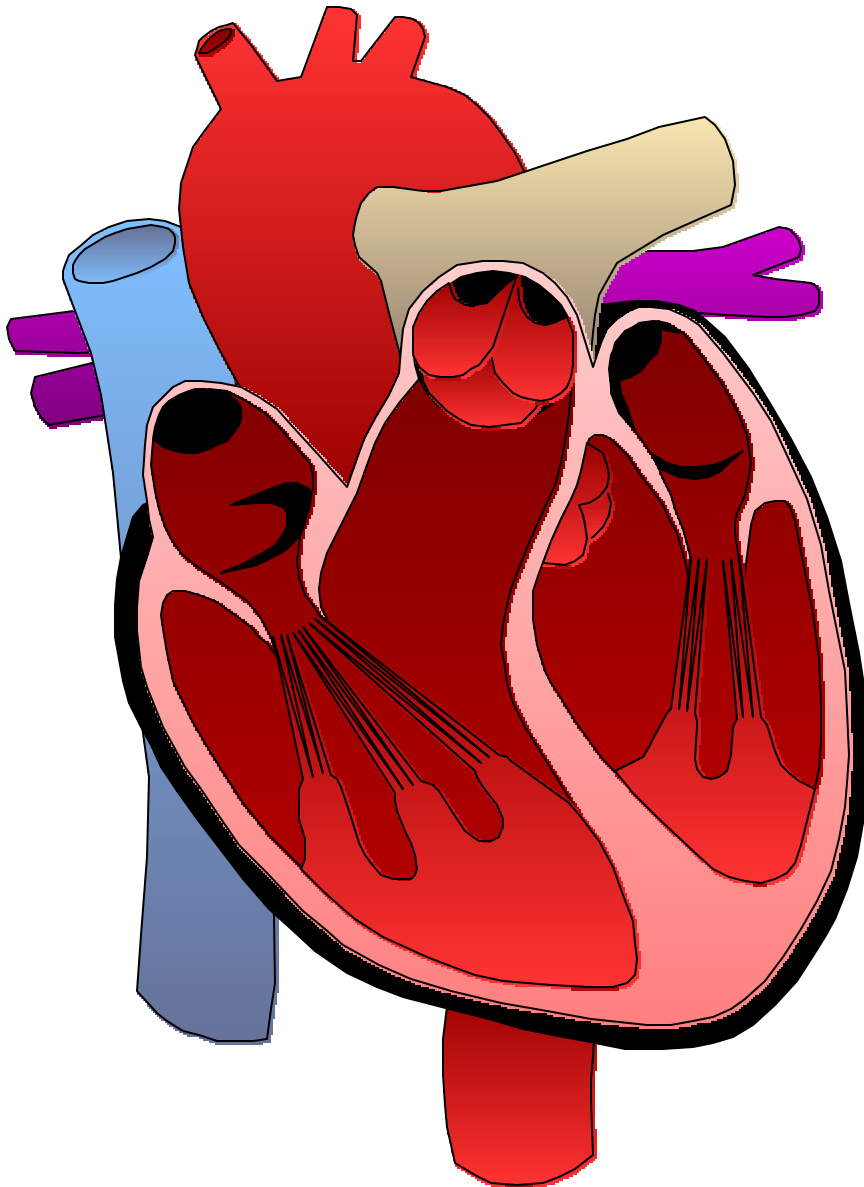
1. The heart is composed of four chambers, two upper chambers, the right and left atria, and two lower ones, the right and left ventricles. Using the worksheet go over the heart with the students, so that when they do the lab exercise they will be able to visualize the heart as it creates a pulse. Point out on the smaller diagram where the heart is located.

2. Use the pumping heart for students to see if this model is realistic.



LIFE CYCLE - HUMAN BIOLOGY (4B)

PRE



LIFE CYCLE - HUMAN BIOLOGY (4B)

LAB

Students measure their heart rate and graph the information.

OBJECTIVES:

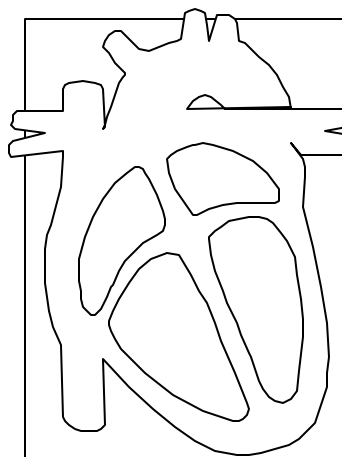
1. Discovering how your pulse and heart rate are related.
2. Comparing the pulse of males and females.

VOCABULARY:

arteries
blood pressure
pulse

MATERIALS:

watch with a second hand or stop watch
pumping heart



BACKGROUND:

A pulse is created when the ventricles of the heart contract and force blood into the arteries. Each beat of the heart makes an artery stretch thereby causing a pulse within the artery. Blood in the arteries has a much higher pressure than the blood in the veins. Therefore, blood found in the arteries moves much faster than blood found in the veins. That is why it is so difficult to stop an artery from bleeding and why so much blood is lost if an artery is cut. Blood pressure is a measure of the pressure of the blood on the walls of the arteries. The students should observe the mechanical heart found in the module so they can see a "pulse" in motion.

PROCEDURE:

1. This lab has the students detecting their own pulse rates and calculating the number of beats per minute. They will determine their pulse rates while standing still and after running.
2. The purpose of this lab is to determine if boys and girls have a different pulse rates. The students will have to determine the average of the class for both girls and boys and then compare this with the average pulse rate. This lab may take a considerable longer time than most of the other labs, because you will have to tabulate each child's pulse rate.
3. Reinforce the information given in the pre lab.

LIFE CYCLE - HUMAN BIOLOGY (4B)

PROBLEM: Is the pulse rate the same for boys and girls?

PREDICTION: _____

EXERCISE 1. Find an artery close to the surface of your body (either wrist or neck). Count your pulse for 15 seconds. Have your partner keep watch of the time while you count. Add the number four times (or multiply by four). This will record your pulse rate per minute.

My pulse rate: trial 1 _____ X 4 = _____ beats per minute

(15 second trial) trial 2 _____ X 4 = _____ beats per minute

trial 3 _____ X 4 = _____ beats per minute

sum of trials _____

Average pulse rate (sum of trials divided by 3) = _____

How does your rate compare with your partner's? _____

2. After running in place for one minute, my pulse rate is:

_____ beats per minute

EXERCISE II. Let's look at the class average and see if there is a difference between the girls' and boys' pulse rate. (You may need to use the back of this sheet.)

STANDING STILL: girls	STANDING STILL: boys	RUNNING: girls	RUNNING: boys
AVERAGE: _____	AVERAGE: _____	AVERAGE: _____	AVERAGE: _____

Find the average: add up all the pulse rates under each section and then divide by the number of people in that section.

CONCLUSION: What did we determine in this experiment? _____

LIFE CYCLE - HUMAN BIOLOGY (4B)

POST LAB

Students measure arteries and veins.

OBJECTIVES:

1. Exploring the components of blood.
2. Defining the components of blood.

VOCABULARY:

arteries
plasma
platelet
red blood cells
veins
white blood cells

MATERIALS:

worksheet
metric rulers

BACKGROUND:

Blood is composed of a solid portion and a liquid portion. The liquid portion or plasma provides a medium in which the solid portion can be transported. Within plasma are found many substances, including water, inorganic salts, proteins, nitrogen bearing substances including fats, cholesterol, sugars, hormones, and dissolved gases. The cellular solid portion includes red blood cells, a variety of different types of white blood cells and platelets.

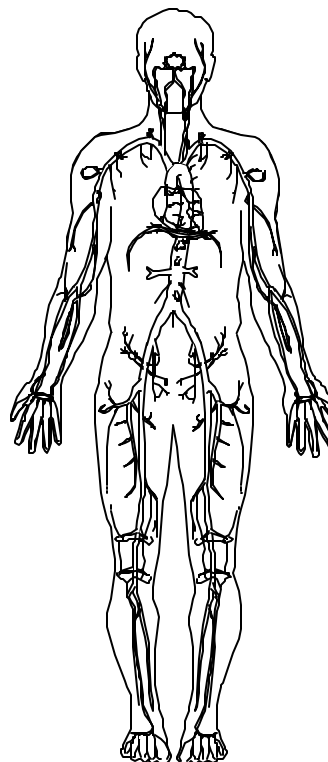
Four major parts to blood are plasma, red blood cells, white blood cells, and platelets. On the worksheet the students will identify each of the components after you discuss the characteristics of each part.

About 55% of blood is plasma. Plasma is about 90% water. Food, nutrients, and oxygen are dissolved in plasma. Plasma also contains antibodies. Antibodies help fight disease.

Red blood cells are saucer shaped cells found in the plasma that carry oxygen. They are the most plentiful blood cells found in the human body. Red blood cells are also called erythrocytes. White blood cells are used by the blood to destroy harmful germs. White blood cells are also called leukocytes.

Platelets are smaller than red blood cells and colorless. Platelets help stop bleeding by producing blood clots that stop blood from escaping a blood vessel.

Blood travels through veins and arteries. On the students' worksheets they will



measure the widths of the various blood vessels and rank them in order of largest width to smallest width. The largest artery (aorta) and the two largest veins (vena cava) measure about 2-3 cm wide. Because of their muscle tissue, the walls of arteries are thicker and firmer than those of veins.

PROCEDURE:

1. Give students the worksheet and have them measure the different cross sections of arteries and veins. See if the students know what each of the cross sections represent before you give them the answer.

2. Remind students that when you measure in metric you can record in decimal by recording the whole number, place decimal, and then count the spaces. The answers are in centimeters. However, students can record .1 cm as 1 mm.

ANSWERS: 1.aorta - 2.8 cm; 2. large artery - 1.3 cm; 3. small artery - .5 cm; 4.arteriole - .2 cm; 5. capillary - #.1 cm; 6. venule - .2 cm; 7. small vein - .3 cm; 8. small vein 1.2 cm; 9. vena cava - 2 cm

3. The second picture goes over the names of the arteries and veins. Notice that veins have “v” in front of the name and arteries have “a” in front of the name. Students are fascinated with an understanding of the different parts of the body. The names may be difficult, but they represent a part of their body.

LIFE CYCLE - HUMAN BIOLOGY (4B)

POST

