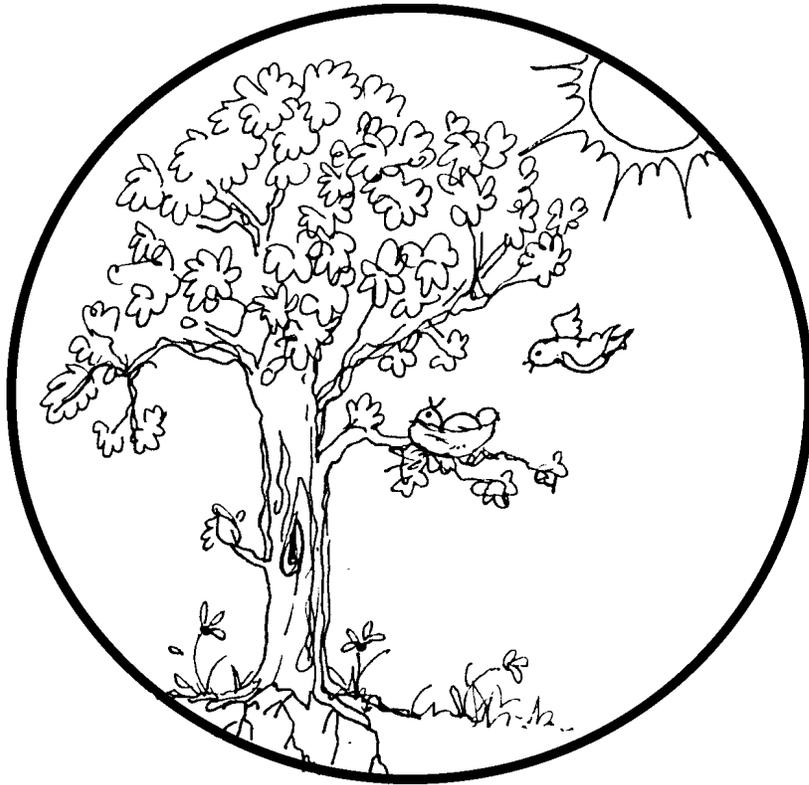


**Life Cycle**  
Diversity in a Balance



**SECOND GRADE**  
**HUMAN BIOLOGY**



**2 WEEKS**  
**LESSON PLANS AND**  
**ACTIVITIES**

## LIFE CYCLE OVERVIEW OF SECOND GRADE

### ORGANISMS

#### WEEK 1.

PRE: *Distinguishing characteristics of vertebrates.*

LAB: *Discovering characteristics of animals.*

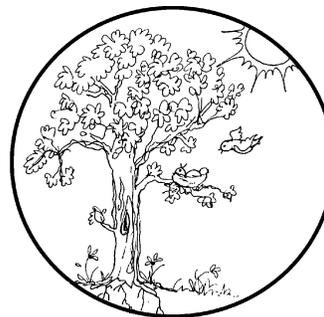
POST: *Identifying animals by the tracks they make.*

#### WEEK 2.

PRE: *Developing and understanding animal jokes.*

LAB: *Describing local habitats.*

POST: *Comparing land and water organisms.*



### HUMAN BIOLOGY

#### WEEK 3.

PRE: *Charting the growth of humans.*

LAB: *Comparing the growth of hair.*

POST: *Analyzing how babies grow.*

#### WEEK 4.

PRE: *Investigating growth in humans.*

LAB: *Comparing the positions of human organs with those of other animals.*

POST: *Analyzing fingerprints.*

### PLANT LIFE

#### WEEK 5.

PRE: *Exploring the different types of leaves and roots.*

LAB: *Comparing and contrasting leaves.*

POST: *Exploring the parts of trees and flowers.*

#### WEEK 6.

PRE: *Discovering the diversity of plants.*

LAB: *Classifying broad and needle leaf trees.*

POST: *Discovering the importance of trees.*

### NATURAL ENVIRONMENT

#### WEEK 7.

PRE: *Exploring different eating strategies.*

LAB: *Observing a worm family.*

POST: *Comparing the components of the nutrient cycle.*

#### WEEK 8.

PRE: *Investigating the life of owls.*

LAB: *Exploring owl pellets.*

POST: *Exploring your local natural environment.*

## LIFE CYCLE - HUMAN BIOLOGY (2A)

### PRE LAB

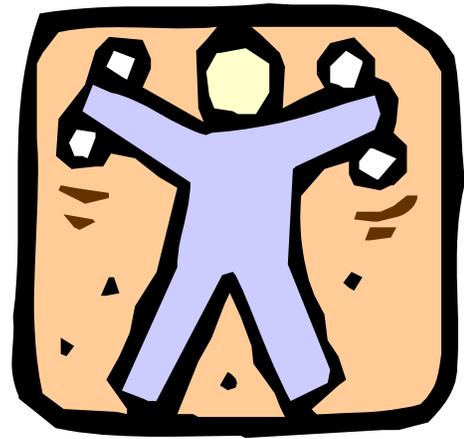
Students chart how babies grow compared to adults.

### OBJECTIVES:

1. Discovering how humans grow.
2. Charting the growth of humans.

### VOCABULARY:

cell  
childhood  
growth  
infancy  
size



### MATERIALS:

worksheet  
Human Body Placemats

### BACKGROUND:

Growth in humans refers to an increase in size. The two ways that growth is accomplished in an organism is by an enlargement of cell size and through an increase of the number of cells in that organism.

Some organisms stop growing at maturity, others continue to grow throughout their lives (i.e. many plants). Living things grow and change. The stages an organism goes through between birth and death is called the life cycle.

The human life cycle begins as a single cell and through countless cell divisions develops into an embryo then a fetus and ultimately a child which is born within nine months. For several months after birth, a baby is in the stage called infancy. As babies produce more cells they grow and enter childhood. Here a child begins to walk and talk. A stage of rapid growth and change occurs during the teen years called adolescence. At about 20 or so a person enters adulthood. At this stage full growth is reached (in height, not waist size!) and is representative of the longest stage in the human life cycle.

### PROCEDURE:

1. Review the human body systems before emphasizing human growth. Discuss the different parts of the human body by using the Human Body Placemats to examine the different systems.

2. Give students worksheet and see if they can figure the answers. This worksheet should be more of a homework assignment, where students are forced to look at people in their community that might be the age they are looking for.

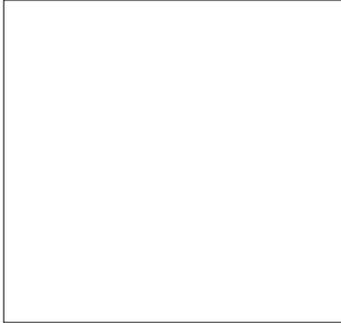
3. The following are the approximate answers to the worksheet. Baby with diaper is usually 1-12 months, although some children take longer. Baby walks between 9-12 months. Baby talks between 9-12 months. Child goes into the 5th grade about 10 years old, graduates high school around 17-18, begins working around 18-20, retires around 60-65 and dies around 65-100.

**LIFE CYCLE - HUMAN BIOLOGY (2A)**

**PRE**

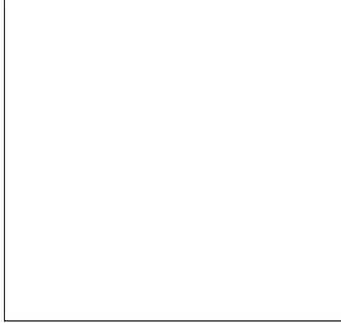
**HOW DO WE GROW?**

**Baby with diaper**



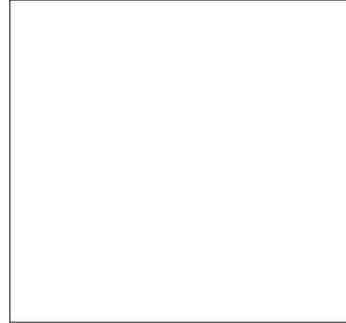
**Age \_\_\_\_\_**

**Baby walks**



**Age \_\_\_\_\_**

**Baby talks**

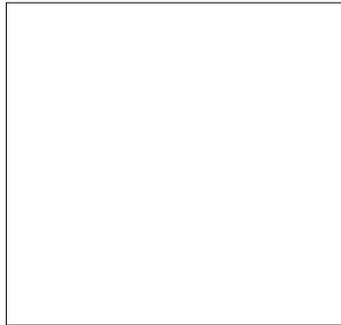


**Age \_\_\_\_\_**

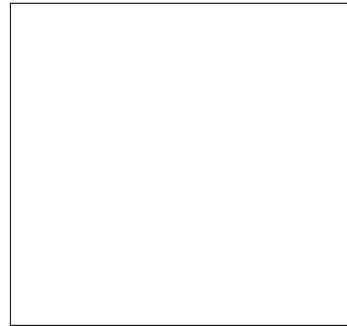
**Goes to 5th grade Graduates high school Goes to college**



**Age \_\_\_\_\_**

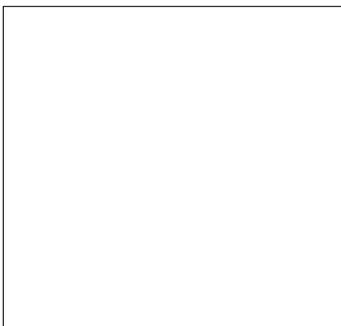


**Age \_\_\_\_\_**



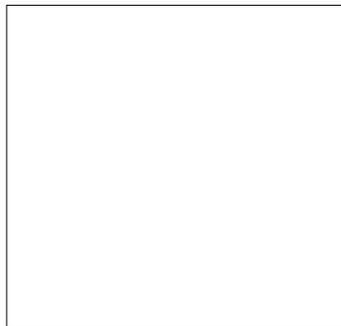
**Age \_\_\_\_\_**

**Begins Working**



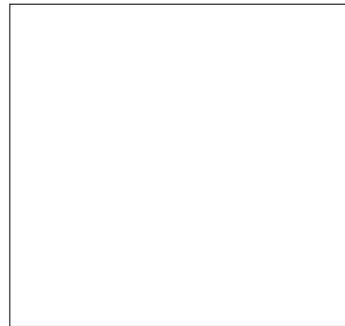
**Age \_\_\_\_\_**

**Retires from work**



**Age \_\_\_\_\_**

**Dies**



**Age \_\_\_\_\_**

## LIFE CYCLE - HUMAN BIOLOGY (2A)

### LAB

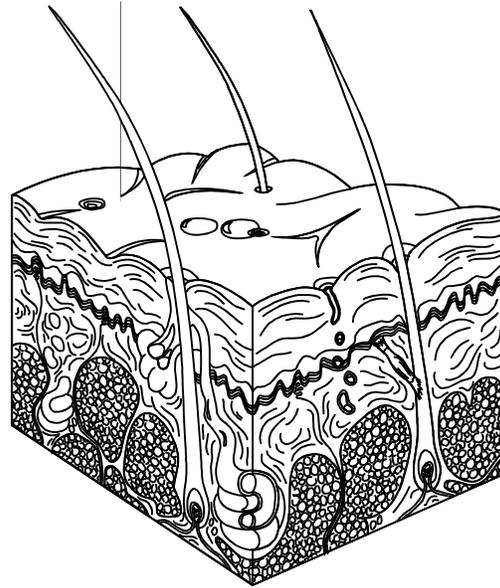
Students look and compare different types of hair.

### OBJECTIVES:

1. Learning about hair.
2. Comparing the growth of hair.

### VOCABULARY:

curly  
follicle  
fur  
hair  
skin  
straight  
wavy



### MATERIALS:

hand lenses  
Swift GH  
hair samples [Life Cycle - Human Biology (2A)]  
tweezers  
*Straight Hair, Curly Hair* by A. Goldin (Harper Trophy)

### BACKGROUND:

Human growth in body height usually stops at around 18-20 years. However, there are other portions of a human body that will continue to grow like hair, fingernails, and fat cells. Adult humans can get fatter, but rarely do they get taller. This lab focuses on the hair and how it grows.

Hair is a threadlike structure that is used for insulation against the cold. Mammal hairs are threadlike outgrowths of the skin. Although the general structure of all human hair is similar, there are some variations among ethnic groups. In fact, differences can occur even among hair of people from the same regions. Human hair is usually soft after birth and after a few months of infancy is shed and replaced by the typical coarser hair which is longer and heavily pigmented. Virtually the entire human skin is covered with hair, though much of it is too fine to be visible. Hair is very sensitive to the touch. The part above the skin is the shaft, below the skin is the root.

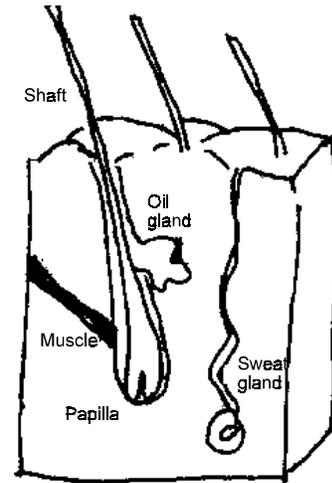
## PROCEDURE:

1. Draw the following picture of the hair follicle on the board and discuss the following parts with your students.

- a. muscle can move the hair shaft
- b. the papilla is the soft base of the shaft
- c. nerves help to interpret touch
- d. sweat glands extract salts, water, and acids from the body
- e. oil glands keep skin soft, emit oil, prevent evaporation and heat loss.

2. Students will look at different types of hair during lab. Hair is a part of the skin, which is the largest organ of the human body. If you haven't purchased the module you can make baggies of children's hair and save them. You may want to ask children weeks before the lab that if they are getting a hair cut to save their hair in a baggy and bring it to school.

3. Use the recommended book *Straight Hair, Curly Hair* as a reference. The book shows the difference between the different hair follicles. Straight hair has follicles that are round (in cross section); wavy hair has follicles that are oval (in cross section); tight, curly hair has follicles that are flat (in cross section).



## LIFE CYCLE - HUMAN BIOLOGY (2A)

**PROBLEM:** Are there different types of hair?

**PREDICTION:** \_\_\_\_\_

**PROCEDURE:** Look at different samples of hair. Describe and draw the texture of the hair under the microscope.

USE WORDS LIKE BLACK, BROWN, BLONDE, WAVY, STRAIGHT, CURLY, TIGHT CURLY

SAMPLE - DRAW SPECIMEN	DESCRIBE IN WORDS
SAMPLE 1.	
SAMPLE 2.	
SAMPLE 3.	
YOUR OWN HAIR	

**CONCLUSION:** What types of hair have you seen?

\_\_\_\_\_  
\_\_\_\_\_

## LIFE CYCLE - HUMAN BIOLOGY (2A)

### POST LAB

Students measure a baby's head.

### OBJECTIVES:

1. Analyzing how babies grow.
2. Comparing the head of a baby with that of an adult.

### VOCABULARY:

baby  
brain  
growth

### MATERIALS:

worksheet



### BACKGROUND:

Body proportions change remarkably from birth to maturity. At birth, a baby's head is one-fourth the size of the body, the forehead is wider than the chin, the lower jaw is small and receding. Growth lengthens the limbs and trunk so that at about two years of age the general body configuration is longer and thinner and the head is about one fifth the size of the body. At six years of age, the body has stretched out further so that the head occupies about one-sixth of its length. The tendency for linear growth continues until puberty when the body tends to broaden relative to height. At about age 15 the head is one-seventh the size of the body which is maintained through life.

### PROCEDURE:

1. Give your students the "baby" worksheet. Ask the students if they think babies have the same body parts as adults (Yes). Ask the students if there are any differences between a baby's body and an adult's body? (Yes, the head is proportionally larger in a baby's.)

2. Although this is a cartoon of a baby, it shows that one obvious difference, the size of the head appears out of proportion with the rest of the body. Ask your students if they believe this cartoon is accurate. Ask them to remember what a baby looks like and have them visually compare the body size with the head size.

3. For a homework assignment see if the students can find out at what time a child's body is in proportion with its head. Have the students ask their parents or observe

their younger sisters, brothers, or friends. Record this information on the lab sheet. This usually occurs about 5-8 years.

4. After you tabulate what students have observed, see if they can figure out why. The brain size of a baby during the time in which it is developing inside the mother tells the mother's body when it's time for the new baby to emerge. The rest of the body has not kept pace with the rapidly growing head.



## LIFE CYCLE - HUMAN BIOLOGY (2B)

### PRE LAB

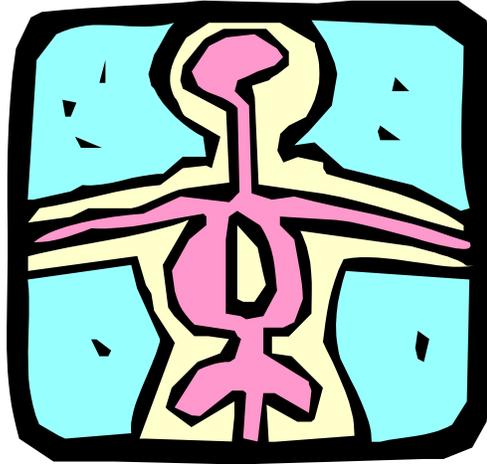
Students list what a body needs to grow.

### OBJECTIVES:

1. Analyzing requirements for growth.
2. Investigating growth in humans.

### VOCABULARY:

energy  
fat  
fuel  
mineral  
nutrient  
protein  
vitamin



### MATERIALS:

worksheet

### BACKGROUND:

Physical growth is easily measured in terms of weight and height. Individual growth is an individual matter, sudden weight gain may be as ominous as weight loss.

In general, a baby weighs three times as much at the end of the first year as he did when he was born. His birth weight is doubled at approximately five months of age. Continuous weight gain during the first year is one index of good nutrition. If a baby's weight after the first few months from birth remains stationary this is an indication of illness or improper feeding. Weight continues to increase during the second year, but at a considerable slower "velocity." Sometime around two or three years of age, a child may look comparatively thin and undernourished to a worried mother, although his growth rate is normal. A great growth spurt comes with puberty, which begins at different ages in different children. Rapidly growing adolescents customarily consume, and need more food than adults.

How tall will a child be? There are some rough formulas for predicting height. First take a child's height at two years of age and multiply by two. Add slightly to this result if the child is a boy, subtract a little if the child is a girl. The answer, however cannot be taken too seriously since growth is not a fixed process but a variable condition.

In order to grow our bodies must obtain fuel and energy to meet the needs of our body cells. The substances that meet these needs are called nutrients. Animals take in these nutrients by eating food. Food supplies us with necessary nutrients such as

carbohydrates, proteins, fats, vitamins, and minerals. In order to keep our bodies in the best of health we must eat a balanced diet. A balanced diet includes eating from the four food groups, milk group, meat group, vegetable and fruit group, and breads and cereals group. Three to four groups per day insures a nutritionally balanced diet.

**PROCEDURE:**

1. Give the student the worksheet and read off the words listed below. Have the students write in the appropriate place whether they are needed for the body to grow or they are not needed.

- coffee
- vegetables
- paint
- water
- meat
- cigarettes
- milk
- candy
- bread
- dirt
- fruit
- aspirin
- fish

2. The answers for the lab sheet are that the body does not need coffee, paint, dirt, candy, nor aspirin.

**LIFE CYCLE - HUMAN BIOLOGY (2B)**

**PRE**

**HOW DO WE GROW?**

Write down in the two columns below, whether the item your teacher reads aloud, is needed or not needed for your body to grow.

NOT NEEDED

NEEDED



## LIFE CYCLE - HUMAN BIOLOGY (2B)

### LAB

Students find different organs using a stethoscope.

### OBJECTIVES:

1. Investigating the position of organs.
2. Comparing the position of human organs with those of other animals.

### VOCABULARY:

brain  
limb  
heart  
organ

### MATERIALS:

Human Body Placemat  
Stethoscopes or paper towel tubes  
pictures of different organisms  
worksheet



### BACKGROUND:

Comparative anatomy examines how structures are similar or different in vertebrates. It wasn't until the 16th century that it was realized that all animals are constructed with a similar body plan. It was through studies of comparative anatomy that people realized that there may have been an evolution or changing of animals through time. When you compare and contrast structures like limbs, organs, and body systems you see how animals have adapted to their specific environments.

The heart is a muscle whose function is to pump blood through the circulatory system. It is located in the upper part of the body in all large animals. In humans, the heart is as large as a closed fist. The heart grows in size until the adult stage.

The eye is a sensory organ and is located on the head, but different animals have different directions of sight. Humans can see straight, but do not have a large area of sight around their heads but then that is why our necks can rotate. Other animals have their eyes more to the back, so they can see a larger area without turning their heads. The intestine is part of the digestive system. Most animals have their intestines at the bottom of the body.

The brain is part of the central nervous system and is located under the skull. Different animals have different sizes of brain, which the size of the skull usually reflects

### PROCEDURE:

1. Use the Human Body Placemats to make sure that students can find the brain,

eye, heart, stomach, and lungs. You may want them to locate other organs like the kidney, liver, small and large intestines. Instruct students to point on their body to make sure that they can locate the organs.

2. Show the students how to use the stethoscope. You may want to have alcohol to wipe the eyes of the stethoscope before the students use them. Alcohol will disinfect the stethoscope from any bacteria or viruses. Make sure the stethoscope is flat on a person's surface. It is better to put the stethoscope directly on the skin. Listening through clothes may cause the sound to be muffled. Instruct the students to record the sound that they hear from the organ they are asked to listen. You may want to add other organs.

3. The second part of the lab has the students "thinking" about other animals and how they can be compared to humans. Discuss the functions of each of these organs. If you have a local dog or cat to bring in, you may want to use a live example. You can have the students use the stethoscope to listen to the organs of the animal. Dogs especially have a very active stomach sound!

## LIFE CYCLE - HUMAN BIOLOGY (2B)

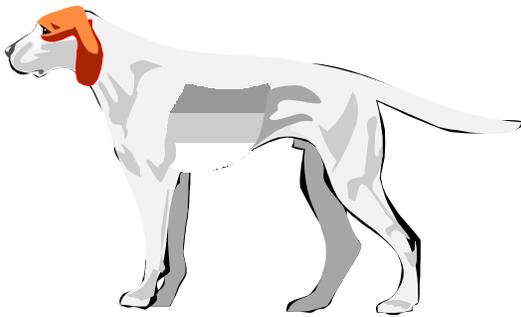
**PROBLEM:** Do all animals have similar organs in similar places?

**PREDICTION:** \_\_\_\_\_

**PROCEDURE:** Use the stethoscope and listen to the following organs. Describe the sound and write the function of each organ.

organ	sound with stethoscope	function
heart		
stomach		
brain		
lung		

Locate and then label where you think the eye, stomach, heart, brain, and lung are located on a cat and dog. Compare with picture of human.



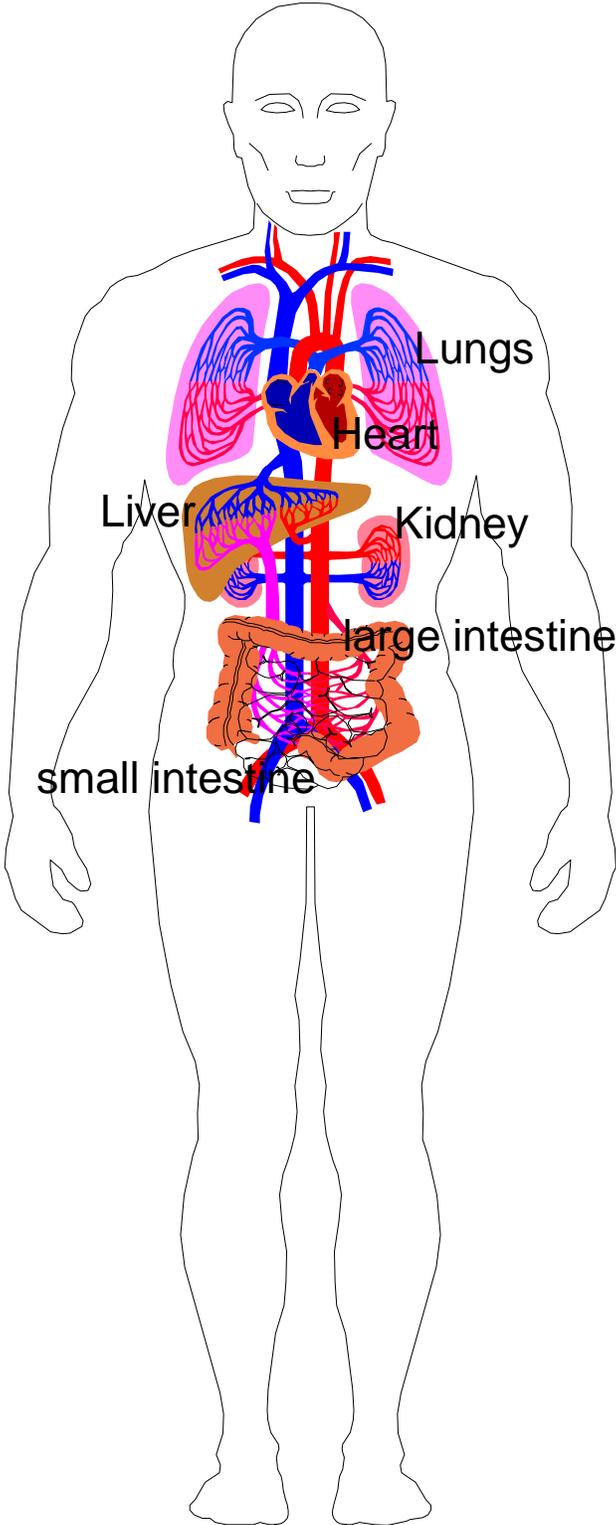
**CONCLUSION:** Are the functions of the organs similar in each animal?

\_\_\_\_\_

Where the organs located in similar places?

\_\_\_\_\_

LIFE CYCLE - HUMAN BIOLOGY (2B)



## LIFE CYCLE - HUMAN BIOLOGY (2B)

### POST LAB

Students make fingerprints and look under the microscope.

### OBJECTIVES:

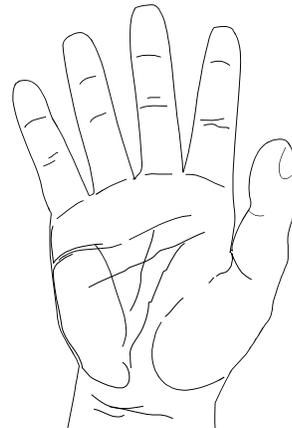
1. Exploring the largest organ of the human body.
2. Analyzing fingerprints.

### VOCABULARY:

fingerprint  
organ  
skin

### MATERIALS:

ink pad  
Swift-GH Microscope  
worksheet



### BACKGROUND:

The skin is the largest organ of the body and with the exception of the brain, probably the most complex. It wraps the adult body in about 20 square feet of tissue, weighing some seven pounds. The skin can be very sensitive or very tough. Human skin is furrowed by ridges and valleys, pitted with tunnels from which hair tips project, moistened by salt water and lubricated by an invisible moving film of oils.

The skin is a layered organ. The outer skin or epidermis, has several anatomical layers. The topmost horny layer is composed of dead cells that are always being worn off. We shed our skins continuously, not all at once as reptiles do. Beneath the epidermis is the dermis. It contains connective tissue, is strong and elastic, and is the part of animal skin that makes leather when tanned. It is laced with blood vessels, nerve fibers, receptor organs for sensations of touch, pain, heat and cold. Beneath the dermis is a layer of tissue with fatty elements that help cushion the skin above it.

Our skin is equipped with upward of two million tiny glands which excrete fluids well known as sweat or more generally as perspiration. We have about as many oil secreting glands in the skin as we have sweat glands. Most of these occur in or near hair follicles.

Hair is a modified form of skin cells and so are fingernails and toenails. Hairs grow in almost the entire skin, though in many areas they are so inconspicuous that they are never noticed.

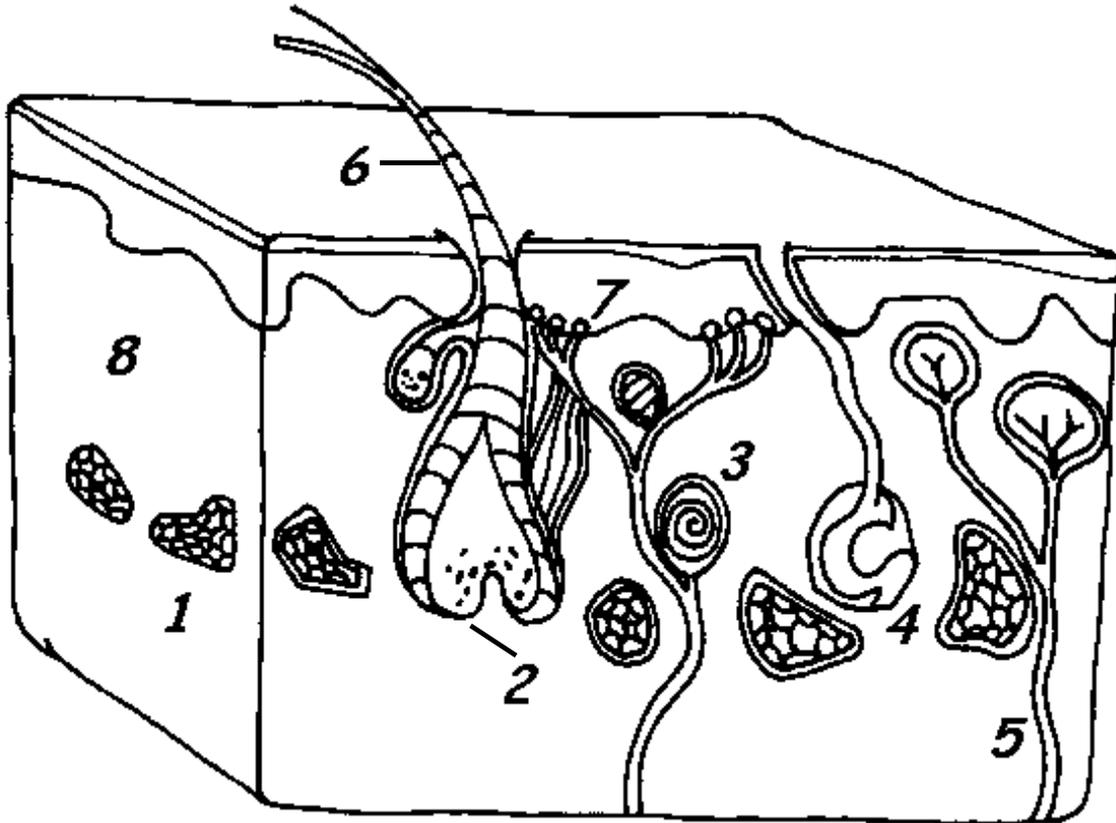
## PROCEDURE:

1. Students should complete the worksheet on the skin so they can see all the different layers. You may want to tell students that the color pigments of our skin are only on the first layer. The pigment melanin, is responsible for the darkening. The pigments are there as an evolutionary reaction to being out in the sun for a long time. The darker the skin the more that person's ancestry was exposed to the sun (this is a simple explanation.)

Answers: 1=fat cells; 2=papilla; 3=nerve ending; 4=sweat glands; 5=oil secreting glands; 6=shaft; 7=epidermis; and 8=dermis.

2. Making fingerprints is relatively easy. Using an ink pad, have the students roll the tip of their fingers on the pad. Then have them roll it on the sticky part of tape. Then put the tape (sticky side down) a paper, so you can easily view it with your microscope or hand lense. Instruct students to compare their fingerprints with a partner's and have them determine how they differ.

LIFE CYCLE - HUMAN BIOLOGY (2B) POST



COLOR THE PICTURE OF THE OUTER PART OF THE SKIN. WRITE DOWN WHAT EACH NUMBER REFERS TO BELOW.

1. \_\_\_\_\_

5. \_\_\_\_\_

2. \_\_\_\_\_

6. \_\_\_\_\_

3. \_\_\_\_\_

7. \_\_\_\_\_

4. \_\_\_\_\_

8. \_\_\_\_\_



A



B



C



D



E



F

Place your fingerprint below.  
See if you can locate the different  
grooves as described below. List  
them under your fingerprint.

A = plain arch; B = plain whorl; C =  
tented arch; D = central pocket loop;  
E = loop; F = double loop; G = loop;  
H = accidental



G



H