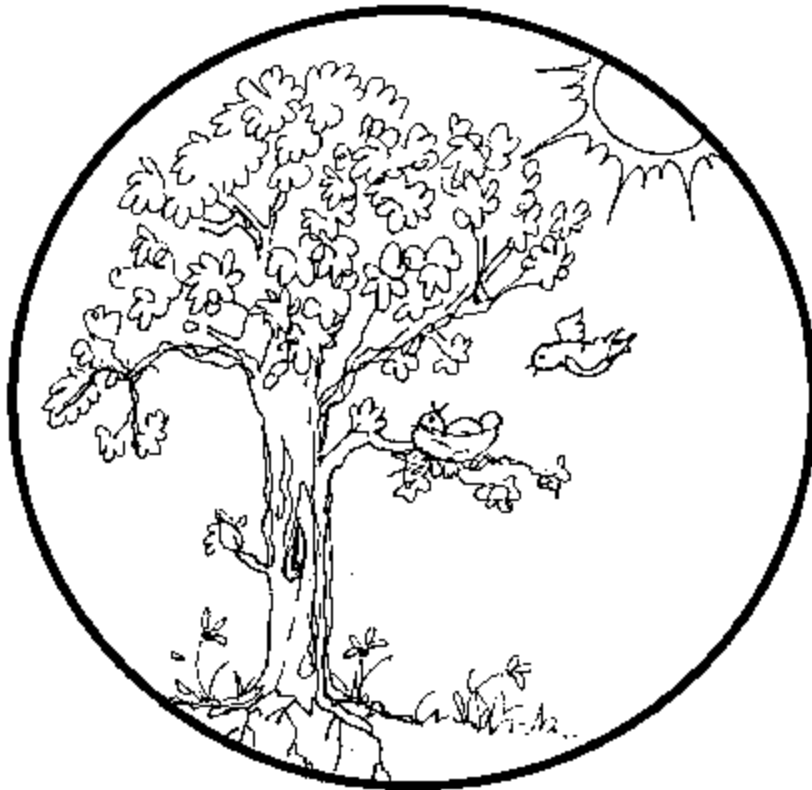




Life Cycle
Diversity in a Balance



FIFTH GRADE HUMAN BIOLOGY



2 WEEKS
LESSON PLANS AND
ACTIVITIES

LIFE CYCLE OVERVIEW OF FIFTH GRADE ORGANISMS

WEEK 1.

PRE: *Identifying animal and plant cell parts.*

LAB: *Exploring the different organelles of a cell.*

POST: *Exploring the importance of RNA and DNA.*

WEEK 2.

PRE: *Explaining the importance of reproduction.*

LAB: *Comparing asexual and sexual reproductive strategies.*

POST: *Comparing characteristics of the 5 kingdoms.*



HUMAN BIOLOGY

WEEK 3.

PRE: *Comparing functions of specific body systems.*

LAB: *Calculating calorie intake.*

POST: *Comparing how and where digestion takes place.*

WEEK 4.

PRE: *Comparing the three types of muscle tissue.*

LAB: *Calculating reflex time.*

POST: *Defining different components of the medical profession.*

PLANT LIFE

WEEK 5.

PRE: *Analyzing the structure of plant cells.*

LAB: *Observing different plants under the microscope.*

POST: *Demonstrating photosynthesis.*

WEEK 6.

PRE: *Exploring the diversification of plant reproduction.*

LAB: *Comparing reproduction of a gymnosperm and angiosperm.*

POST: *Discovering how seeds are dispersed.*

NATURAL ENVIRONMENT

WEEK 7.

PRE: *Exploring coral species.*

LAB: *Exploring and distinguishing the different types of corals.*

POST: *Discussing the requirements of corals.*

WEEK 8.

PRE: *Comparing autotrophs and heterotrophs.*

LAB: *Exploring the eating habits of an owl.*

POST: *Interpreting data obtained from owl pellets.*

LIFE CYCLE - HUMAN BIOLOGY (5A)

PRE LAB

Students use a worksheet to review the different body systems.

OBJECTIVES:

1. Comparing functions of specific body systems.
2. Defining the organs of body systems.

VOCABULARY:

circulatory
digestive
endocrine
excretory
integumentary
muscular
nervous
reproductive
respiratory
skeletal



MATERIALS:

Magic School Bus - Inside the Human Body by J. Cole (Scholastic) (optional)
Internet
worksheet

BACKGROUND:

The human body is composed of interactive systems. Most organs in the body are necessary, a few like tonsils are not. There are specific functions for each of the organs in the systems, but they cannot operate by themselves.

Below is a chart that will help you review the different systems with your students.

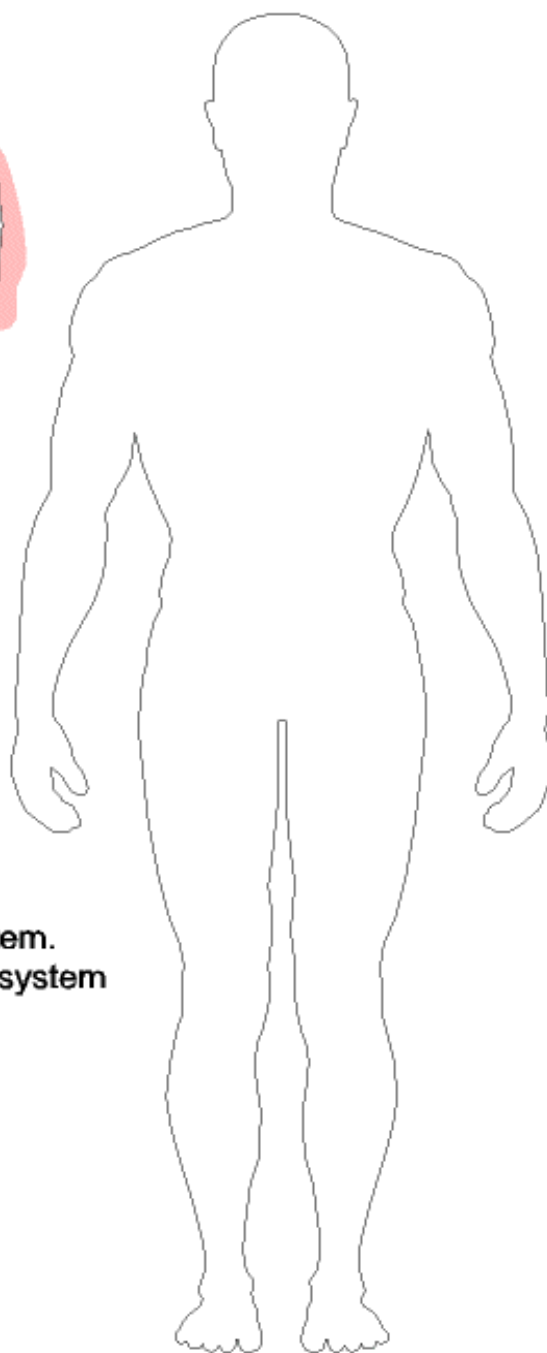
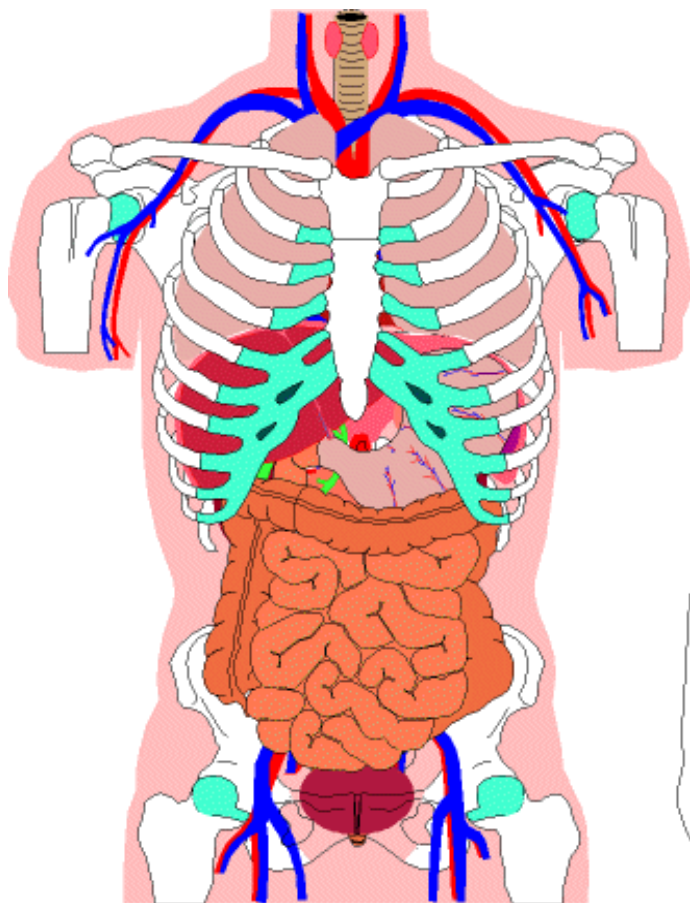
SYSTEMS	ORGANS	FUNCTIONS
respiratory	lungs, nasal passages, bronchi, pharynx, trachea, diaphragm, bronchial tubes	intake of oxygen and removal of carbon dioxide from body

nervous	spinal cord, brain, nerves, skin, eyes, ears, tongue, nose	control of body activities and the reaction to stimuli
digestive	stomach, liver, teeth, tongue, pancreas, intestine, esophagus	break down of food and absorption for use as energy
excretory	kidneys, bladder ureters, skin	controls water and salt balance
endocrine	pituitary gland, adrenal gland, thyroid gland, gonads	production of hormones and body regulation
skeletal and muscular	bones, muscles	protection and movement
circulatory	blood, blood vessels, heart, lymph	transport of nutrients, metabolic wastes, water, salts, and disease fighting cells
integumentary	skin	protection of body from injury and bacteria, maintenance of tissue moisture, holds receptors for stimuli response, body heat regulation

PROCEDURE:

1. Use the worksheet to have students identify the different systems of the body.
2. The *Magic School Bus* can act as a review of the different systems. Please take note that some of the information is distorted to keep the story line entertaining.

LIFE CYCLE - HUMAN BIOLOGY (5A)



Identify on these figures the following system.
You may draw in appropriately where the system
is located if not represented above.

RESPIRATORY
DIGESTIVE
NERVOUS
CIRCULATORY
SKELETAL
MUSCULAR
INTEGUMENTARY
ENDOCRINE

LIFE CYCLE - HUMAN BIOLOGY (5A)

LAB

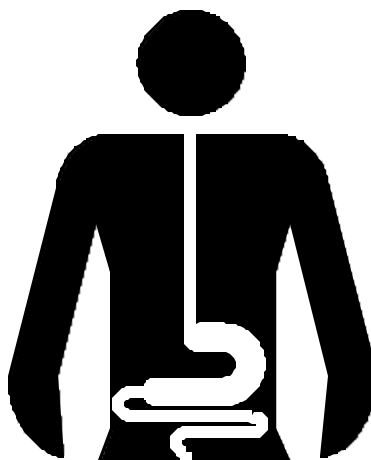
Students calculate how many calories they ate.

OBJECTIVES:

1. Calculating calorie intake.
2. Analyzing how calories are used.

VOCABULARY:

calorie
carbohydrate
fat
mineral
protein
vitamin



MATERIALS:

calorie books

BACKGROUND:

Proper food is essential for the maintenance or restoration of health. There are six classes of food substances: carbohydrates, fats and oils, proteins, minerals, vitamins, and water.

A calorie is a unit of heat used to measure body metabolism and "how fat" individual foods will make you. Technically, a calorie is the amount of heat necessary to raise the temperature of one kilogram (2.2 pounds) of water one degree Centigrade. Emphasize with students that a calorie is not a nutrient or a substance but a measure of food composition and heat energy.

Carbohydrates and fats are the chief sources of calories; proteins may also furnish calories. One gram (one-thirtieth of an ounce) of these nutrients, when burned in the body, supplies the following number of calories:

carbohydrate	4 calories
fat	9 calories
protein	4 calories

It is evident that fat is a concentrated source of calories. It is easy to understand then, why reduced intake of fats is advised for those who are overweight and wish to lose weight. Alcohol is also a concentrated source of calories, supplying 7 calories/gram and the familiar "beer belly".

The amount of calories needed for body functions varies with age, sex, activity, and climate. Boys are usually more active than girls and require more calories. If you eat more calories per day than you use in your body, the excess is changed to fat and stored in the body. Fifth grade students need between 2000 to 3000 calories, depending on activity. You will become overweight if you continually eat more than your body needs.

PROCEDURE:

1. In lab the students will use the calorie charts to determine how many calories they ate within a 24 hour period. Students will have to break down some of their foodstuff, for instance, a hamburger would be ground beef, catsup, and bread. This lab may take a while to do, but will prove very informative as to what your students are eating. Many students do not realize that the more they eat, the more weight they gain.

2. Make sure that you go over how to read the book. You may have to give students a few examples, like peanut butter and jelly sandwiches or half of an apple.

3. Students will have to remember what they ate the day before, so a reminder the day before the lab would be appropriate.

LIFE CYCLE - HUMAN BIOLOGY (5A)

PROBLEM: Does my calorie intake reflect my weight?

PREDICTION: _____

PROCEDURE: Use the calorie sheets that are at your table and figure how many calories you ate for breakfast, lunch, dinner, and any snacks you might have had in the last 24 hours.

ITEM	CALORIES	ITEM	CALORIES
BREAKFAST		DINNER	
LUNCH		SNACK	
TOTAL: _____		TOTAL: _____	
GRAND TOTAL: _____			

CONCLUSION: How much do you weigh? _____ To keep that body weight you need to consume approximately 20 calories per pound.

Will you gain weight or lose weight if you continue eating like you did in the last 24 hours? Why? _____

Look at the chart of activities. What activity could you do to maintain your weight at about 2300 calories per day? How would you determine this? _____

LIFE CYCLE - HUMAN BIOLOGY (5A)

POST LAB

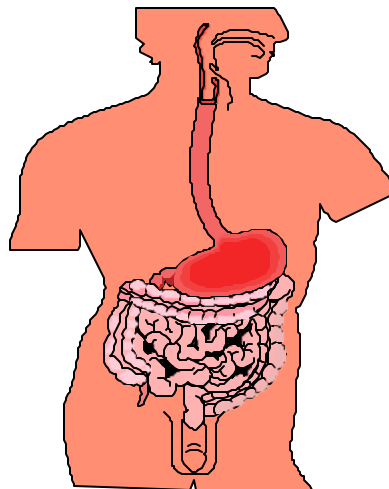
Students use a worksheet to trace how food goes through the human body.

OBJECTIVES:

1. Comparing how and where digestion takes place.
2. Explaining the different types of food molecules.

VOCABULARY:

calorie
carbohydrate
diet
enzyme
fat
mineral
protein
vitamin



MATERIALS:

worksheet
What Happens to a Hamburger by P. Showers (Harper)

BACKGROUND:

Food provides energy to help our bodies grow. No one kind of food can fulfill all of the body needs, so we must eat a variety of foods in order to receive proper nutrition. Nutrients in foods are chemical substances and are classified as carbohydrates, fats and oils (lipids), proteins, minerals, and vitamins.

Carbohydrates contain carbon, hydrogen, and oxygen, and their "burning" is the body's usual source of energy for muscular work, body heat, breathing, and other functions. Amino acids which are linked together to form proteins contain nitrogen and sometimes sulfur in addition to carbon, hydrogen, and oxygen. Amino acids are essential to our bodies. Fats are made up of fatty acids and glycerol. Fatty acids or unsaturated fats cannot be manufactured by our bodies so they must be supplied by our diets. Vitamins and minerals are needed in small amounts and are needed to make chemical reactions happen in tissues. In other words vitamins help a body run smoothly. A normal healthy diet provides almost all of the vitamins one needs.

In this worksheet, students are asked to trace how sugars, starches, proteins and fats are digested in the body. Students should be familiar with the parts of the digestive system.

However, they may not know that the duodenum is about 10 inches in length and is the shortest, widest, and most firmly attached portion of the small intestine.

Digestion begins in the mouth with some starches and sugars being broken down into simple sugars by an enzyme in the saliva. Proteins are then partially digested in the stomach with some carbohydrate digestion. Fats are not affected. In the duodenum, bile from the gallbladder emulsifies (breaks up) fats and digestive enzymes from the pancreas attack carbohydrates, proteins and fats. In the small intestine, remaining parts are further broken down and absorbed into the body.

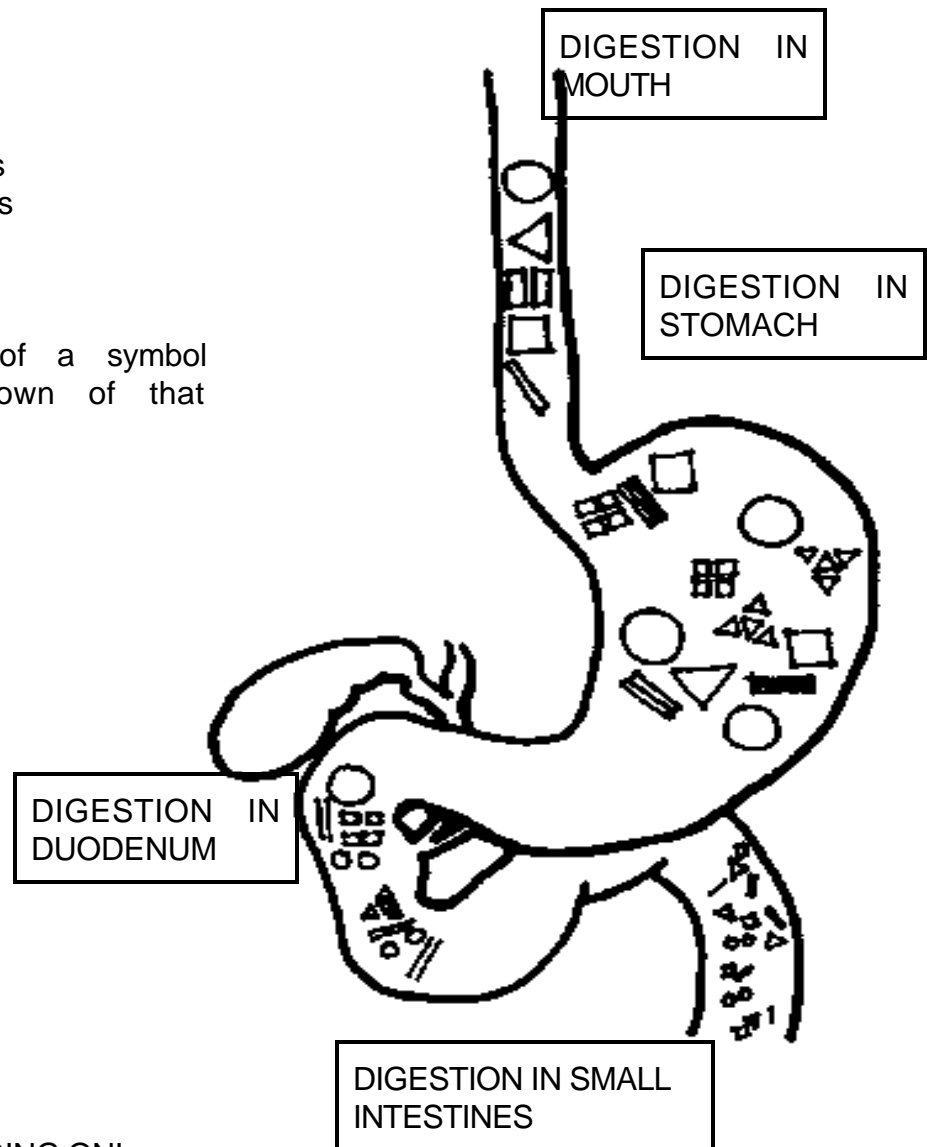
PROCEDURE:

You may want students to critique *What Happens to a Hamburger* to see if the information in the book. This book is essentially correct. It is important for students to know that just because it is in a book, doesn't mean that it is correct. You should always question what you read.

LIFE CYCLE - HUMAN BIOLOGY (5A) POST

Triangles = sugars
squares = starches
bars = proteins
circles = fats

NOTE: smaller size of a symbol represents a breakdown of that substance



DESCRIBE WHAT IS GOING ON!

LIFE CYCLE - HUMAN BIOLOGY (5B)

PRE LAB

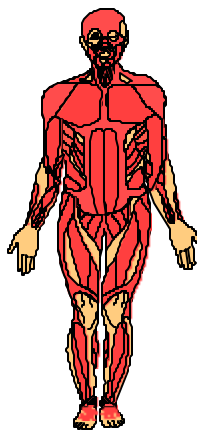
Students compare muscle tissue in the body.

OBJECTIVES:

1. Exploring the tissues of the muscular system.
2. Comparing the three types of muscle cells.

VOCABULARY:

cardiac
muscle
skeletal
smooth



MATERIALS:

worksheet

BACKGROUND:

There are four basic types of tissues recognized in higher animals, epithelial, connective, muscular and nerve. This activity focuses on muscle tissue. Students should complete the worksheet before you compare and contrast the different types of muscle cells.

A muscle is a tissue that performs different functions which cause some sort of movement to take place. There are three different types of muscle cells: skeletal, smooth, and cardiac. The various muscles of our bodies serve as the engines or powerhouses of the body and are so constructed to provide speed and power. Each muscle cell is designed for various functions that are needed by a certain area in the body. Muscle tissue has the ability to contract or to shorten, thus producing movement of internal and external body parts. Breathing, speaking, walking, talking, eating, and almost every other function requires muscle tissue.

Smooth muscles are composed of elongated, spindle shaped cells and are commonly involved in involuntary motions. Involuntary muscle contractions or motions are those movements that cannot be consciously controlled. The nucleus is centrally located and there are no striations in smooth muscle cells. These types of cells are located throughout the body. Muscles made from these types of cells include those found in the walls of blood vessels, urinary bladder, and the digestive system.

Skeletal muscles allow movement by being attached to bones in the body. Skeletal muscles control voluntary movements which can be consciously controlled. Skeletal muscles are made up of cylindrical fibers which are found in the locomotive system. The nucleus of each cell tends to be toward the edge of each cell and the cells are striated.

Cardiac muscles are roughly quadrangular in shape and have a single central nucleus.

The cells form a network of branching fibers. The muscles are cross striated and are involuntary. The muscles are found in the heart.

Muscle tissues are supplied with nerve fibers that carry messages to and from the central nervous system (brain and spinal cord). Muscles are composed of about 75 per cent water, 20 per cent protein, and about 5 per cent is made up of carbohydrates, lipids, inorganic salts, and nonprotein nitrogenous compounds. The composition does vary in the different muscles.

PROCEDURE:

1. Give students worksheet on the three types of muscle tissues.
2. Make sure that students know what they are observing. For example, give them guidelines for shape of cells; where the nucleus would be; what is a striations; location of the tissue in the human body; and whether the tissue is voluntary or involuntary

LIFE CYCLE - HUMAN BIOLOGY (5B) PRE

THREE TYPES OF MUSCLE TISSUES

Directions: Look at the following pictures of the 3 types of muscle tissues. Color in the different types and observe the characteristics of each tissue. Fill in the chart below.

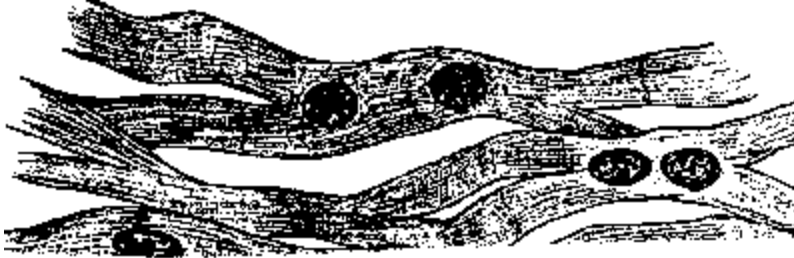
	skeletal	smooth	cardiac
shape of cell			
location of nucleus			
presence of striations			
location in the body			
voluntary/involuntary			



SMOOTH



CARDIAC



SKELETAL

LIFE CYCLE - HUMAN BIOLOGY (5B)

LAB

Students determine their own reflex time.

OBJECTIVES:

1. Exploring reflexes.
2. Calculating reflex time.

VOCABULARY:

involuntary muscle
voluntary muscle

MATERIALS:

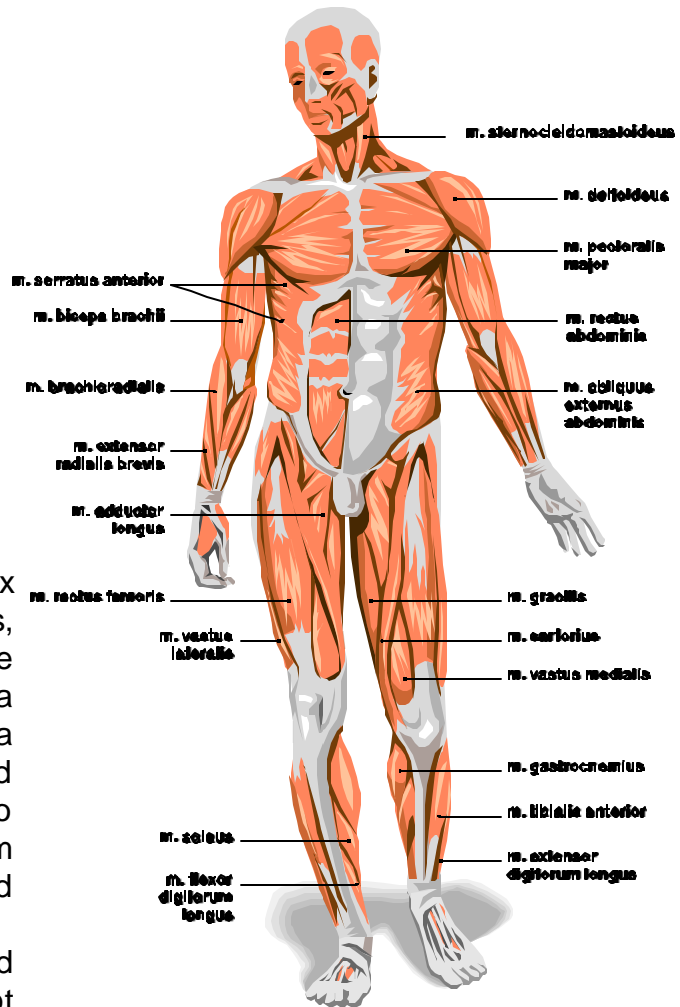
meterstick (or yardstick)

BACKGROUND:

Muscle cells are part of a complex system involving muscles, tendons, nerves, hormones, blood vessels, and sense organs. Muscle contraction resembles a change in the elastic constraints of a spring. In order for a muscle to pick up and lift some weight, the "spring" contracts to accomplish the work. The energy from muscle contraction comes from sugars and fats stored within the muscle.

The term involuntary muscle is used to indicate that this type of muscle is not subject to our conscious control. Smooth and cardiac muscles are involuntary. Imagine if we had to control our heart pumping or food passage in order to live!

Voluntary muscles indicate that the muscle is under the conscious control of that particular animal. Skeletal muscles are voluntary, in that we control their actions and whether to make them more responsive. Voluntary muscles in the body are usually attached to the skeleton in such a way that they are stretched near their optimal length. Muscles can pick up weight not directly but through a lever system.



PROCEDURE:

1. In this activity, students will see if they can improve their voluntary muscle reflexes by repeating a skill. The skill involves preventing a meterstick from falling between two fingers.

2. Go over directions on the lab sheet with students. Tell them to make sure they remember where they started on the meterstick. In order to avoid confusion it may be best to have the whole class begin at one place on the meterstick.

3. Have the students record their reflex times and then graph them on the lab sheet. In most cases, there will be improvement from the first trial to the last trial. You may want to discuss what happens when a person does not have control of his muscles. There are several diseases that are due to muscle disorders. Muscular dystrophy is the wasting of the trunk and limb muscles. Poliomyelitis (Polio) is a disease which involves the connective tissue and leads to the destruction of the muscle fibers.

LIFE CYCLE - HUMAN BIOLOGY (5B)

PROBLEM: Can voluntary muscles "learn" to react faster?

PREDICTION: _____

MATERIALS: metersticks

PROCEDURE: One student will hold a meterstick vertically at shoulder height while another student attempts to catch it when it is released. Measure the distance that the meterstick dropped. (This is the distance between the holding and the catching hand). Do this 10 times, recording your reflex distance. Then, reverse the position with your partner.

trial number	1	2	3	4	5	6	7	8	9	10
your reflex distance										
partner's reflex distance										

Graph your reflex distance compared to your partner's

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 trial number

CONCLUSION: What happened with each successive trial?

LIFE CYCLE - HUMAN BIOLOGY (5B)

POST LAB

Students investigate what it means to be a doctor.

OBJECTIVES:

1. Defining different components of the medical profession.
2. Exploring different types of doctors.

VOCABULARY:

doctor
medicine

MATERIALS:

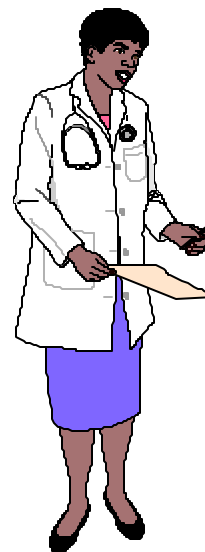
reference material on doctors (may want to call local hospitals for information)
internet

BACKGROUND:

Medical doctors are an integral part of a child's life. They are the people that children constantly see as professionals and they tend to look up to them. There are a large number of students who want to become doctors when they grow up, yet few achieve this goal. Low income students especially want to become doctors, but many do not realize how long it takes or how much science it requires in order to achieve this goal.

There are many branches of anatomy that one can specialize in, in order to become a doctor. However, a base overview of the body would include taking classes in gross anatomy (dissection of entire body), histology (microscopic structure of organs and tissues), developmental anatomy (study of growth), comparative anatomy (organ systems of various organisms), genetics (study of heredity), and systematic anatomy (organ systems). The study of the skeletal system is called osteology; of joints, arthrology; of the muscular system, myology; the skin, dermatology; the nervous system, neurology; the circulatory system, angiology; the endocrine system, endocrinology; the internal organs collectively comprising the digestive, respiratory, urinary, and reproductive system, splanchnology. There are many more subdivisions that you may want to go over.

Becoming a doctor is a long and expensive process. In many cases it takes over 10 years after high school to become qualified to be a doctor. Doctors may specialize in certain fields after their general internship which can include obstetrics (pre-natal mother care), gynecology (women organs), ophthalmology (doctor of the eye), orthopedics (bone), pediatrics (child doctor), podiatry (foot doctor), psychiatry (mind doctor), and urology (urinary



system).

PROCEDURE:

1. Ask students how many of them want to be doctors when they grow up. Don't be surprised if a majority of the class raises their hand. It is common for young children to respect doctors, because it is doctors who make them feel better when they are sick. (And besides, it sounds good!)

2. However, many students do not realize how many types of doctors there are. In this exercise we want the students to research the many types of medical doctors that one can make a profession from.

3. Don't limit this search to just doctors. Students should realize that there are many different professions from nurses to ambulance drivers that need a level of medical knowledge.

LIFE CYCLE - HUMAN BIOLOGY (5B)

WHAT KIND OF CAREERS ARE AVAILABLE IN MEDICINE

LIFE CYCLE - HUMAN BIOLOGY (5B)

WHAT KIND OF CAREERS ARE AVAILABLE IN MEDICINE

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