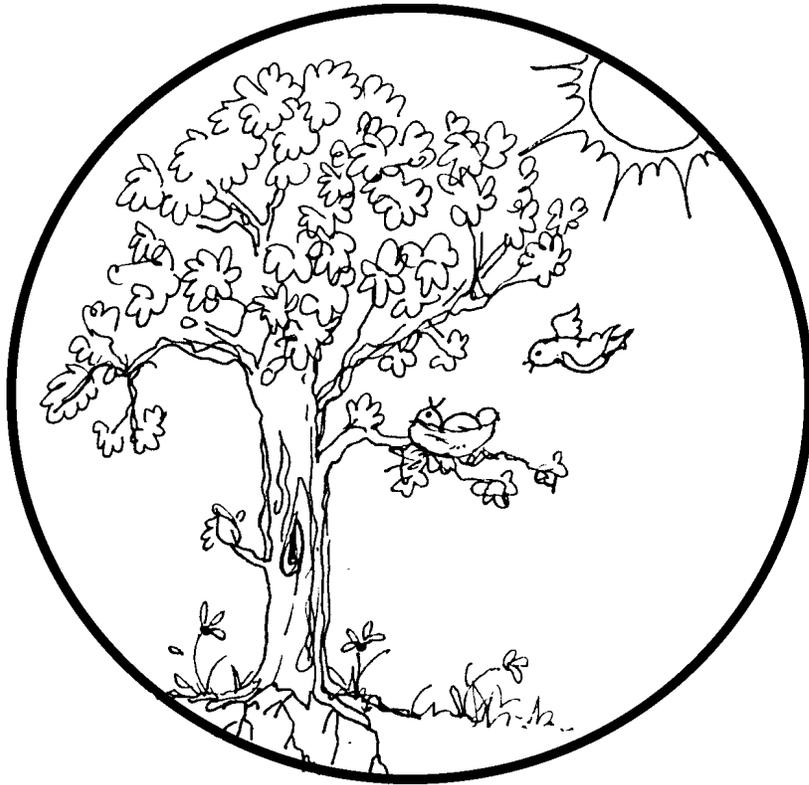


Life Cycle
Diversity in a Balance



THIRD GRADE
HUMAN BIOLOGY



2 WEEKS
LESSON PLANS AND
ACTIVITIES

LIFE CYCLE OVERVIEW OF THIRD GRADE

ORGANISMS

WEEK 1.

PRE: *Comparing and contrasting invertebrates and vertebrates.*

LAB: *Learning about different marine invertebrates.*

POST: *Exploring where marine invertebrates live.*

WEEK 2.

PRE: *Comparing marine and terrestrial invertebrates.*

LAB: *Classifying different types of arthropods.*

POST: *Investigating metamorphosis.*



HUMAN BIOLOGY

WEEK 3.

PRE: *Comparing human organ systems.*

LAB: *Exploring external signs of internal systems.*

POST: *Analyzing components of the respiratory system.*

WEEK 4.

PRE: *Comparing the different sensory organs.*

LAB: *Analyzing how we taste.*

POST: *Investigating the digestive system.*

PLANT LIFE

WEEK 5.

PRE: *Investigating requirements of growth.*

LAB: *Designing an experiment testing two variables.*

POST: *Comparing how plants reproduce.*

WEEK 6.

PRE: *Exploring plant characteristics.*

LAB: *Comparing cellulose from different plant products.*

POST: *Investigating the importance of plants.*

NATURAL ENVIRONMENT

WEEK 7.

PRE: *Comparing the world's biomes.*

LAB: *Comparing locations of plant and animal biomes.*

POST: *Identifying the local vegetative biome.*

WEEK 8.

PRE: *Comparing how organisms obtain food.*

LAB: *Comparing herbivores and carnivores.*

POST: *Analyzing the importance of natural environments.*

LIFE CYCLE - HUMAN BIOLOGY (3A)

PRE LAB

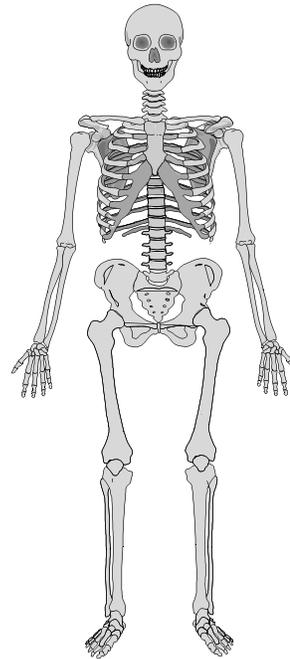
Students review the human body systems.

OBJECTIVES:

1. Comparing human organ systems.
2. Discussing human body systems.

VOCABULARY:

circulatory
digestive
endocrine
muscle
nervous
renal
respiratory
sensory
skeleton



MATERIALS:

torso model
worksheet
reference material

BACKGROUND:

The human body is composed of different systems that have specific tasks to complete. The Respiratory System contains organs, that working together will allow us to breathe. The respiratory system has lungs, diaphragm, and esophagus. However, the heart is also part of the respiratory as it pumps blood into the lungs to get oxygenated. It is important to emphasize that we operate as a well-tuned machine, with most of our parts having more than one function. When one part of the body fails, it sometimes triggers other organs to fail also. Below are descriptions that may be useful when the students do their activity.

The **lungs** are found in the chest and abdomen region. The main function is to transport oxygen to all parts of the body. The lungs contain air tubes, tissues, and blood vessels. There are two lungs that are in an airtight compartment of the chest. This compartment is surrounded by tissue, thin sheets of muscles and the ribs. When you inhale, a large, dome shaped muscle under the lungs, the **diaphragm**, lowers and the chest expands. This changes the air pressure in the pleura and causes the lungs to draw in air. Reversing the process causes you to exhale.

The two **kidneys** of humans are located behind the abdomen. The kidneys regulate how much water, sodium, potassium, calcium, and phosphate are in the blood. The kidneys also remove waste products from the body such as uric acid. Each kidney is filled with capillaries wrapped around very tiny nephrons which filter the blood.

The **liver** is about 3.5 pounds and is located in the abdomen. The main function is to produce digestive juices and enzymes for our body. The **pancreas** is about 2.5 ounces and produces a mixture which helps to neutralize the strong acid from the stomach (a natural "Tums"). It also contains enzymes that help break down food mixtures so it can easily be absorbed. The liver produces a salty fluid known as bile which is stored in the **gall bladder**. This fluid also enters the small intestine and is used to digest fats.

The **stomach** fits under the diaphragm and can hold 1.2 liters (2.5 pints) of food. Food usually remains for about 2-4 hours in the stomach on its way through the body. Digestive glands in the stomach wall release acid that aids in digestion and kills off most harmful bacteria.

The **small intestines** extend from the stomach to the large intestines. In an average adult the small intestine is about 6.4 meters (21 feet) long. It is coiled and folded to fit into the abdomen. The small intestines receives digestive juices from the pancreas and liver.

The **large intestines** help remove food that cannot be digested. Indigestible parts of the food move from the small to the large intestines. Some water is recycled back into the blood stream and the remaining waste travels on to the rectum and out the body through the anus.

The **heart** is only about 12 ounces and is located on the right side of the chest. The main function is to pump blood to all parts of the body. The heart pumps more than five quarts of blood through the body every minute. The organ is divided into four chambers, two sending blood to the body and lungs, and two receiving it. The heart beats about seventy two times each minutes. Each beat has two parts. During the first, blood from the body and lungs enters the upper chambers of the heart, then passes through one way valves to the lower chambers. The next stage allows the blood to go to the body and lungs. The lub-dub sound of your heart is the sound of the valves opening and closing.

The **cerebrum** and **cerebellum** are part of the brain, which is part of the nervous system. It is located in the head and weighs about 2-3 pounds. The brain interprets and reacts to nerve signals. The cerebellum controls certain movements and keeps the body balanced. The cerebrum is divided into two halves covered by a thin layer of millions of nerve cell bodies. It is responsible for learning, judgment, creativity, and some parts of your emotions.

PROCEDURE:

1. Review the different body systems by using the human torso. Show students where each organ is located. The torso should be placed where students can look at it during class.
2. Cut the worksheet into tickets. Copy enough copies so there is enough for your

classroom. Put them in a bowl and have students select one.

3. Each child is to take the card home or go to the library and read information on that organ or system. If they have Internet access have them do a search on their browser. Parent involvement should be encouraged.

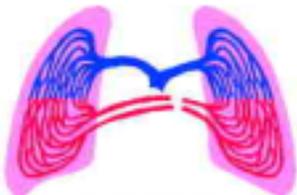
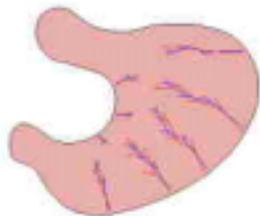
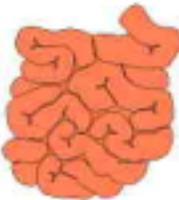
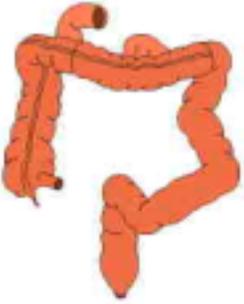
4. Have the students develop a series of questions for their particular organ. They should have at least five questions. The first one should be hard and the last one should be easy. For example:

1. I am 30 feet long.
2. I help absorb food into the blood.
3. I help absorb water into the blood.
4. I am curled up into the lower part of the stomach.
5. I digest food.

The answer is the INTESTINES.

5. Each students should try their questions with the rest of the class. The other students should try to identify the organ or system.

LIFE CYCLE - HUMAN BIOLOGY (3A)

| | | |
|--|---|--|
|  <p>LUNGS</p> |  <p>DIAPHRAGM</p> |  <p>KIDNEYS</p> |
|  <p>LIVER</p> |  <p>STOMACH</p> |  <p>SMALL INTESTINES</p> |
|  <p>PANCREAS</p> |  <p>GALLBLADDER</p> |  <p>LARGE INTESTINES</p> |
|  <p>HEART</p> |  <p>CEREBRUM</p> |  <p>CEREBELLUM</p> |

LIFE CYCLE - HUMAN BIOLOGY (3A)

LAB

Students examine their body.

OBJECTIVES:

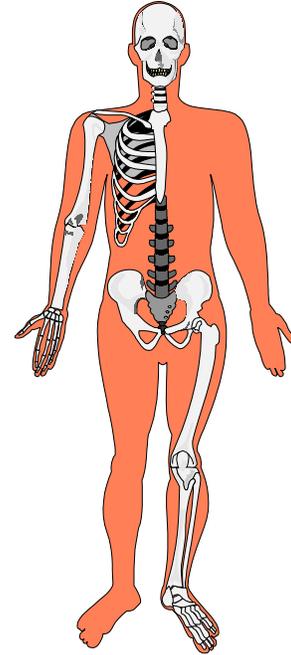
1. Exploring external signs of internal systems.
2. Analyzing how some of the internal systems work.

VOCABULARY:

organ
system

MATERIALS:

bag of bones
mirrors (if not working with partners)
magnifying lens
skeletal model
stethoscopes



BACKGROUND:

The internal body structure is very difficult for children to imagine. We do not have corpses available for students this young to learn about internal anatomy. People are left with their outside body to help decipher what their inside body looks like. In this activity, the students are looking for external clues as to how their insides are working. External names are head, abdomen, legs, arms, torso, and fingers. But under each of these external parts are the organs that make our body work as a fine-tuned machine.

PROCEDURE:

1. If you have a skeletal model, ask students if the outside of our body reflects the inside. Students should understand that our entire form is because of the structure of our skeleton. The outside can help us understand the inside.

2. There are 10 tasks that the students observe which are listed under "body parts." The students will then describe what they see and then try to interpret what systems the various parts belong to. Each of the parts of the body is explained below. You should leave adequate time to go over each of the parts so the students understand what they actually observed.

1. MOVEMENT OF CHEST (*up and down*) - RESPIRATORY

When air enters the lungs, they "blow up" like a balloon. The expanded lungs push on the rib cage and make the entire chest move up and down. Students should use a stethoscope to listen to their lungs. They can put the stethoscope on their back to listen. It is much better to put the stethoscope on skin. So if they have a partner they might want to listen to the lungs through their back. But if the student is doing it their body, they can listen from their front.

2. *NAILS (tips of fingers and toes) - SENSORY*

The nails are modified outer skin cells. New nail cells take place as the nail moves forward and grows in length. The crescent or moon at the base of the nail is called the lunula which is the living nail. Use the magnifying lense to look at this are closely.

3. *PULSE (beating) - CIRCULATORY*

A pulse is caused when blood goes through the arteries of the heart. The heart is a strong muscle that "squirts" blood through the arteries as the blood leaves the heart. The blood will return through the veins, but this action does not produce a pulse. Use the stethoscope to listen to their blood move, they can either listen to their own heart or they can listen on their wrist or neck.

4. *FOLD UNDER EYES - CIRCULATORY*

Students should move the skin under the eye down, to see the pink capillaries. If they do not have a partner, they will require a mirror. You can see very small blood vessels.

5. *UNDERSIDE OF TONGUE - CIRCULATORY*

Blood vessels are difficult to observe. Have students look at either their underside of their tongue using a mirror or their partner's tongue. They will see thick blue lines (veins), thick pink lines (arteries) and tiny hair-thin lines which are capillaries. Arteries take the blood away from the heart, the blood is rich in oxygen and is red. Veins take blood that has lost its oxygen toward the heart and the blood looks blue. Capillaries are a system of blood vessels that join the veins and arteries. When students look at the fold under their eye (pull slowly down to expose a small area), they will see capillaries.

6. *MID BACK - SKELETAL*

To observe their vertebrae have students touch their back or partner's back midway. Have them press slightly so they can feel the segmented vertebrae. The students can feel the bone better if the other student hunches over. Students can also feel their own vertebrae that run along the middle of their back. Have students use the bag of bones to observe where the vertebrate is located.



7. *SKIN - SENSORY*

The skin and eyes are part of several systems, but they have to do with the senses. Note that we are using the sensory system which is not a real system. Most elementary



text books use sensory as a system and this is probably easier for children to understand. Students may ask you about goose pimples which are an involuntary muscle reaction which causes the hair to "stand on end."

8. *ARM, FLEX - MUSCULAR*

The biceps get large as you flex your muscle. Muscle cells contract and become larger. Students should make a muscle slowly. The partner should feel the muscles and how they contract as the muscles is being made.

9. *ARM, BEND - MUSCULAR*

In this activity have the students just bend their arm with no force. If you add no force nothing will happen. Muscles can only contract.

10. *HAIR - SENSORY*

Hair is a modified form of skin cells. Hair cells are produced at the embedded tip of the hair follicle in the skin. Students should use a magnifying lens to look at the hair follicles.

3. In the conclusion, we ask the students to determine which system does the human body most reflect. The skeletal system basically controls the overall shape of the human body.



LIFE CYCLE - HUMAN BIOLOGY (3A)

PROBLEM: How can you determine what is going on inside your body?

PREDICTION: _____

PROCEDURE: mirrors, stethoscope, bag of bones

Look at the following parts of your body and see if you can determine what it is telling you about the inside. Describe what you see and try and determine the body system it belongs to. Consult reference material.

| PART OF BODY | DESCRIBE WHAT HAPPENS | PART OF WHAT SYSTEM |
|----------------------------|-----------------------|---------------------|
| 1. Movement of chest | | |
| 2. Nails | | |
| 3. Pulse | | |
| 4. Fold under eye | | |
| 5. Underside of tongue | | |
| 6. Mid back | | |
| 7. Skin | | |
| 8. Arm, flex | | |
| 9. arm, bend with no force | | |
| 10. hair | | |

CONCLUSIONS: Is there a relationship between the external part of the human body and the internal parts? Which systems does our body reflect the greatest?

LIFE CYCLE - HUMAN BIOLOGY (3A)

POST LAB

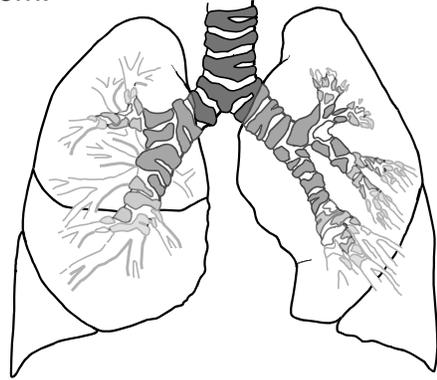
Students look at how humans breathe.

OBJECTIVES:

1. Analyzing components of the respiratory system.
2. Exploring human systems in detail.

VOCABULARY:

bronchus
esophagus
larynx
lungs
respiratory
trachea



MATERIALS:

worksheet

BACKGROUND:

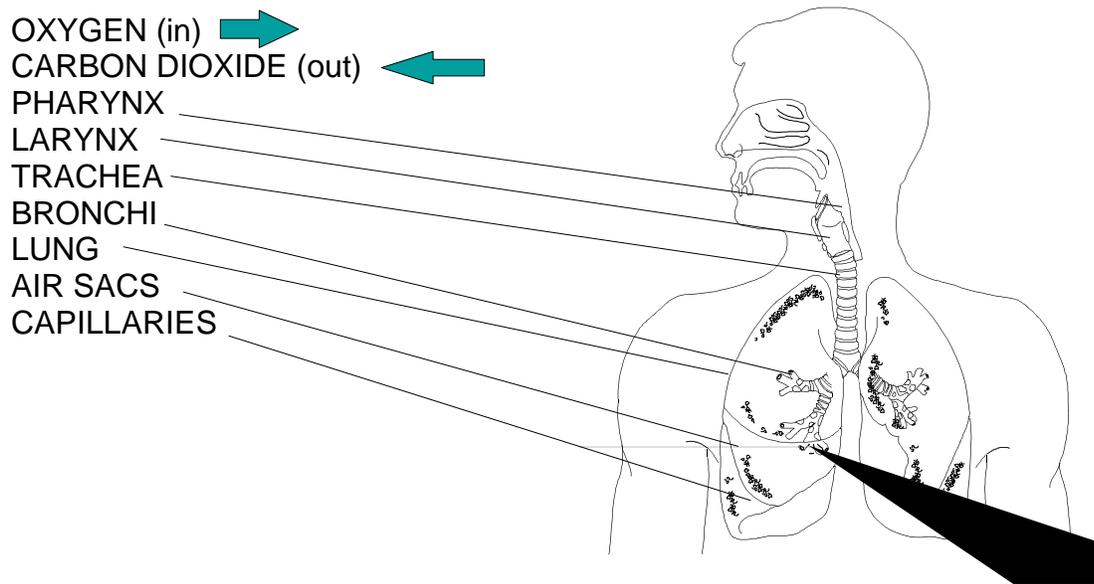
It is the respiratory system that enables our bodies to breathe in oxygen and breathe out carbon dioxide. Without oxygen, we cannot live for more than a few minutes. All the cells in the body use oxygen to aid in the process of converting food into energy.

The process by which we breathe is as follows. Oxygen is taken in through the nose (nasal cavity). Oxygen is a component of air. From the nose the air enters the pharynx (the throat cavity behind the mouth). From there the air passes through the voice box or larynx and then into the windpipe or trachea. The trachea becomes divided at the lower end into two tubes, called bronchi (bronchus - singular). Each bronchus enters a lung (left and right). Tiny air sacs in the lungs hold the air for a brief period until the oxygen is diffused into the blood through capillaries. Blood returning from the heart carries carbon dioxide which leaves the blood stream by diffusing into the air sacs which is then exhaled out by the lungs.

PROCEDURE:

1. Provide students with copy of worksheets.
2. Go over each of the words on their worksheet.

3. Repeat the section above on how we take in air through our lungs. Have the students label the parts of the respiratory system as you talk. Give them clues on where each part belongs.



LIFE CYCLE - HUMAN BIOLOGY (3A)

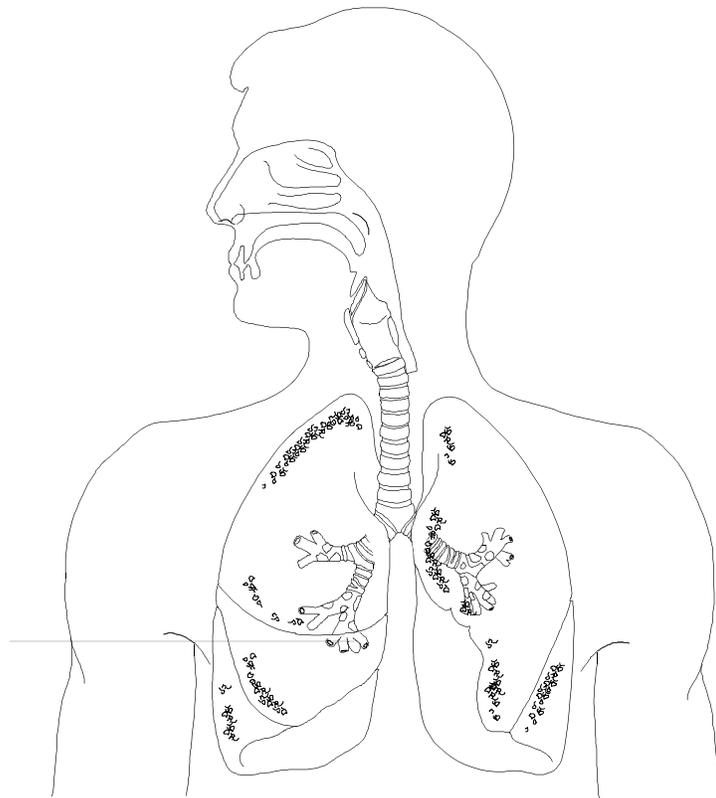
POST

RESPIRATORY SYSTEM

USING THE WORDS IN THE DIAGRAM, EXPLAIN HOW THE RESPIRATORY SYSTEM FUNCTIONS OR WORKS.

VOCABULARY

OXYGEN
CARBON DIOXIDE
PHARYNX
LARYNX
TRACHEA
BRONCHI
LUNG
AIR SACS
CAPILLARIES



LIFE CYCLE - HUMAN BIOLOGY (3B)

PRE LAB

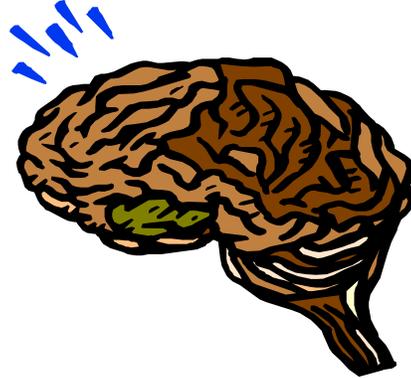
Students compare their sensory organs.

OBJECTIVES:

1. Comparing the different sensory organs.
2. Contrasting their functions.

VOCABULARY:

senses
sensory system



MATERIALS:

worksheets
reference material
Internet

BACKGROUND:

Children have learned that they have 5 different senses consisting of sight, hearing, taste, touch, and smell. However, developing an understanding of each of these senses requires a more in depth study of the matter and an understanding of the how the brain interprets these signals.

The sense of touch is dependant on the skin and the thousands of receptors that bring the information to the brain. It illustrates that the skin is composed of a bottom layer called the dermis and an upper layer called the epidermis. Under most of the skin there is a layer of fat. Certain parts of the body are more sensitive than others.

The eyes are our window into seeing the world. The different parts of eye, including the lens, cornea, iris, retina, and optic nerve allow light to be translated in our brain as objects.

The sense of tasting uses the tongue, which can detect salt, bitter, sugar, and sour in different places. It also looks at why certain flavors taste the way they do.

The smelling is due to tiny receptors in our olfactory membrane in our nasal cavity that sends information to the brain.

The ears can translate sound waves into a recognizable form for the brain.

The brain grows from 13 ounces as a baby to almost 3 pounds as a 6-year old. Electricity helps spark measures to our brain for interpreting. It explains that damage to your brain can cause other damage, because the brain is so important for relaying messages from one part of the body to another.

PROCEDURE:

1. Give students the worksheet. Students should research more information about each of the senses pictured on the worksheet (hearing, touching, seeing, tasting, and smelling).

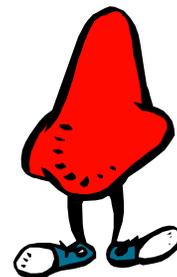
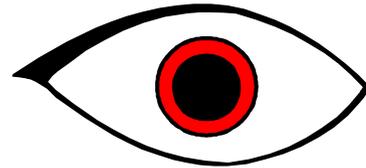
2. They should try and determine how and where in the brain does the translation occur. Each of the sensory organs have ways to detect its surrounding. Students should find out where they are located and how they work.

3. You may want to have students do search on the Internet or go to a children's encyclopedia.

LIFE CYCLE - HUMAN BIOLOGY (3B)

RESEARCH TOPIC: How do the senses work?

A large rectangular box containing 25 horizontal lines for writing.



LIFE CYCLE - HUMAN BIOLOGY (3B)

LAB

Students determine taste buds on their tongue.

OBJECTIVES:

1. Experimenting with the tongue.
2. Analyzing how we taste.

VOCABULARY:

taste bud
taste
tongue

MATERIALS:

sugar
vinegar
baking soda
salt water
containers
paper cups
cotton swabs
sugar cubes
towels



BACKGROUND:

The tongue lies along the mouth but it begins in the throat. The tongue has several functions including acting as an organ of taste, aids in chewing, helps you swallow, helps keep your teeth clean, and is essential to speech.

Four areas of the tongue have been identified with four different tastes. The area at the back of the tongue is the area of bitter taste. The area in the middle of the tongue on both sides is the area of sour taste. The front of the tongue is the area of salty taste. The very tip of the tongue is the area of sweet taste.

Exactly how we taste is not fully understood. We can only taste those substances which can dissolve or are soluble in water. The sensation of taste results from the stimulation of certain nerve endings. The nerve endings are located within the taste buds. Much of the sensation that we know as taste is really the sensation of smell. When apples or onions are chewed, the vapors enter the inner openings of the nose. There, they reach the nerve endings for smell, and one can distinguish between them.

Food must be moist in order for the tongue to be able to taste them. Substances must be dissolved in order for them to be tasted. This is why the sugar cube could not be

tasted.

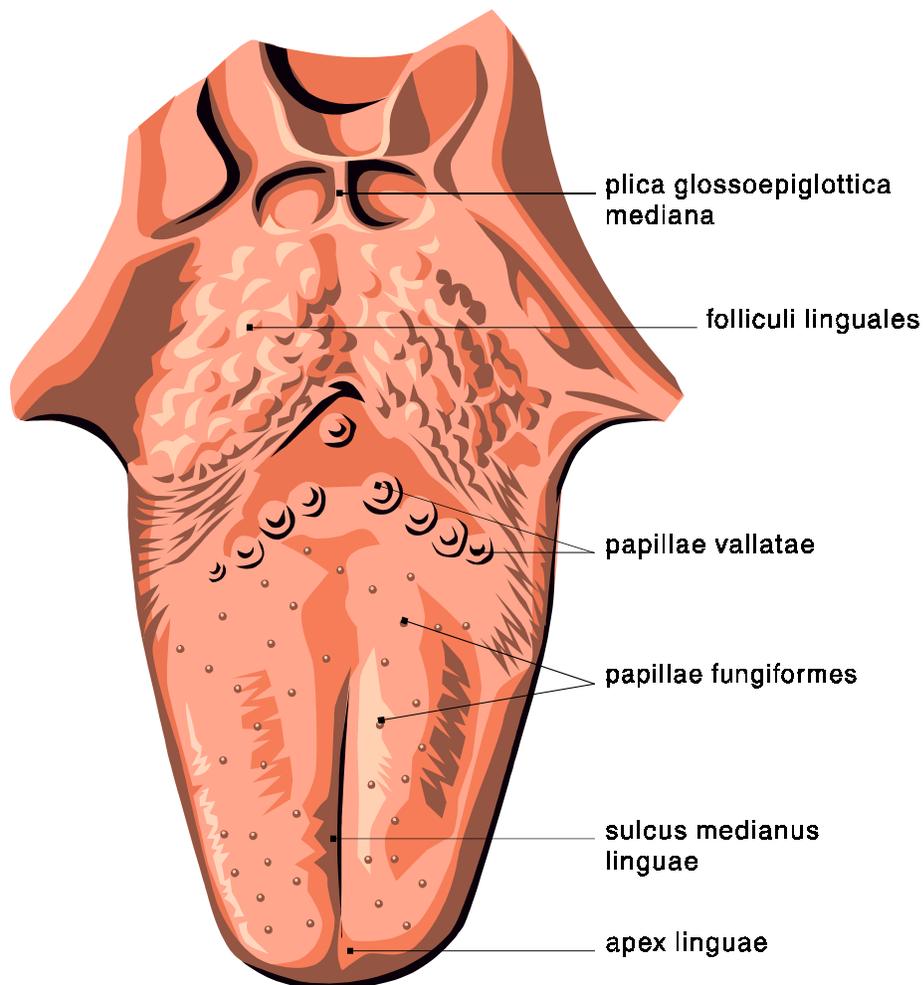
Some students may have trouble distinguishing bitter from sour. This is an abstract thought that many people cannot understand.

The tongue is part of the digestive system and the nervous system. In the post lab, students will investigate what happens to the food after it is eaten.

PROCEDURE:

1. Dry your tongue with a towel. Put a sugar cube on your tongue.

2. Dip a cotton swab into a solution of each item and find out which area of your tongue has the sweetest, sourest, and saltiest sensation. Sip water after each item. Do this experiment carefully. Make sure that you have students keep a sanitary area. Do not reuse cotton swabs



LIFE CYCLE - HUMAN BIOLOGY (3B)

PROBLEM: How do we taste?

PREDICTION: _____

PROCEDURE: There are two experiments in this lab. Follow directions for each.

Experiment 1. **MATERIALS:** sugar cubes, towels

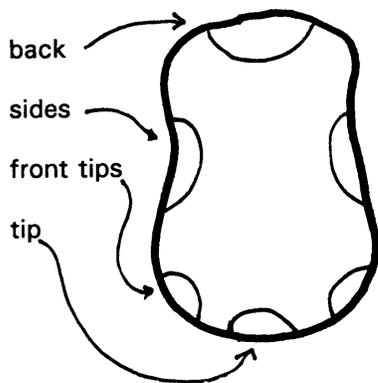
Dry your tongue with a towel. Put a sugar cube on your tongue. Can you taste it? Explain.

Experiment 2. **MATERIALS:** sugar + water (sweet), vinegar (sour), salt + water (salty), baking soda + water (bitter), cotton swabs, small containers, paper cups

Dip a cotton swab into a solution of each item and find out which area of your tongue has the sweetest, sourest, and saltiest sensation. Sip water after each item. Do this experiment carefully.

| | salt (salt) | sour (vinegar) | sweet (sugar) | bitter (baking soda) |
|--|----------------|-------------------|------------------|----------------------------|
| area of my tongue where I sensed the taste | | | | |
| area of my partner's tongue | | | | |

CONCLUSION: In the diagram below, fill in the type of tastes your tongue sensed next to the four areas marked.



| | |
|------------|--|
| BACK | |
| SIDES | |
| FRONT TIPS | |
| TIP | |

LIFE CYCLE - HUMAN BIOLOGY (3B)

POST LAB

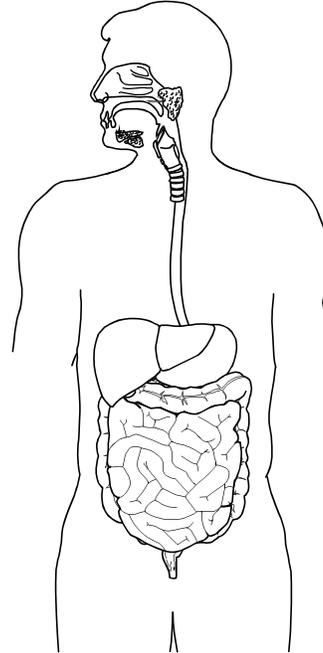
Students trace the digestive system.

OBJECTIVES:

1. Investigating the human body systems.
2. Analyzing the digestive system.

VOCABULARY:

digestive system
large intestine
liver
small intestine
stomach



MATERIALS:

worksheet

BACKGROUND:

A “system” is a group of organs (heart, lungs, liver, etc) that work together toward one specific function. For example, some of the organs that make up the digestive system are the stomach, pancreas, liver, gallbladder, and the small and large intestines. Some of the systems of the human body include the circulatory, excretory (renal), respiratory, and nervous.

The digestive system changes food so it can be used by our bodies. The food is first taken in by the mouth and chewed. The food is then swallowed and moved down a tube (the esophagus) into the stomach. Here the stomach muscles contract and the food is mixed with stomach fluids to further break down the food. Now, the food moves from the stomach to the small intestine. It is from here that vitamins and digested food passes into the blood and throughout the body. Water is passed into the blood through the large intestine. The large intestine is where water is removed leaving the solid material which cannot be used. This material is not digested and finally removed as waste through the anus.

What makes food go down? It is not gravity, because you can eat and drink lying down. A tiny pulsation of movements of the muscles called peristaltic motion causes this movement. Help your students visualize this motion by using a soft plastic tube with a marble that just fits in the tube. Instruct the students to push it through the tube. They will experience peristaltic motion. The nourishment from the digestive system goes into the blood stream which distributes it to the cells. What the cells can not use becomes liquid waste. The body removes this liquid through the lungs, perspiration, kidneys, and bladder.

The kidney acts as a filter. Once the waste is filtered the kidneys send back to the blood stream what is still usable, and the liquid waste is sent out to the bladder via two tubes called ureters. In the bladder the liquid called urine is stored until there is enough urine for the body to eliminate.

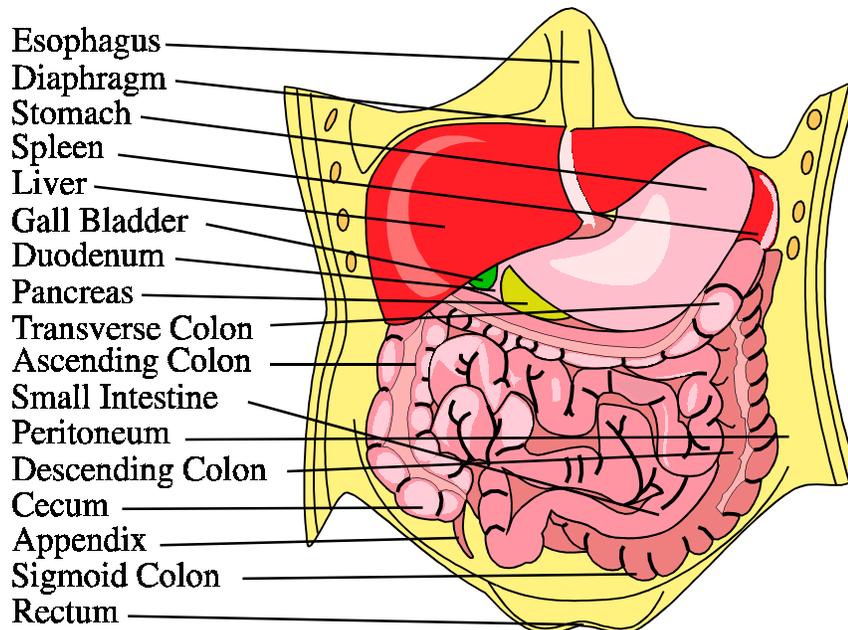
The liver's main function is to produce digestive juices and enzymes for our body. The pancreas produces a substance that neutralizes the strong acid from the stomach.

PROCEDURE:

1. Give students the two worksheets. Have them cut out one set and color them.
2. Students should then paste the organs in their correct position. Please note that these organs may be partly hidden when looking from the front of a person.

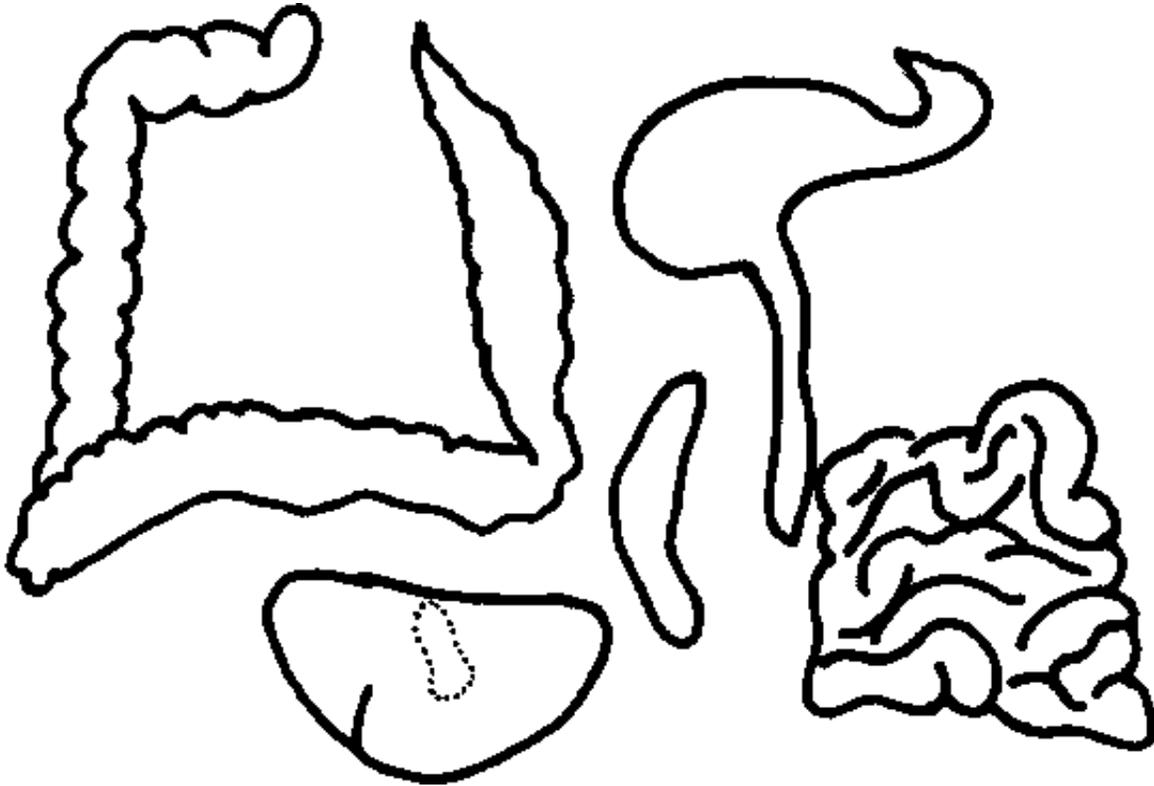
ANSWERS: 1. STOMACH, 2. LIVER (dotted line is gall bladder), 3. PANCREAS, 4. SMALL INTESTINES, 5. LARGE INTESTINES

Abdominal Digestive Organs



LIFE CYCLE - HUMAN BIOLOGY (3B)

POST



THE ORGANS OF THE DIGESTIVE SYSTEM ARE:

| NUMBER | ORGAN NAME |
|--------|------------|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |

LIFE CYCLE - HUMAN BIOLOGY (3B)

POST

