This unit deals with the appearance, location and functions of human organs. To maintain normal and healthy vital activities, the organs of the human body must function properly. This unit helps students learn the structures and functions of human organs and understand how those organs work together.

Students learn the structures and functions of bones and muscles and of digestive, circulatory, excretory and sensory organs using images and models. They also learn how those organs are closely related and understand that each organ must function properly to maintain proper health.
The grade 5 English science unit, The Human Body, meets the academic content standards set in the Korean curriculum, which state students should:

a) Learn about the shapes and locations of the human organs.

b) Observe bones and muscles through a model and understand their functions and the relationship between them.

c) Be aware of the types, locations, shapes and functions of digestive, circulatory, excretory, and sensory organs.

d) Understand how the aforementioned organs are closely related.

e) Appreciate how healthy habits and exercise help human organs function properly.
What do I need to do? You will need a stopwatch, and a ruler.

1. Read the words on the list below as fast as you can. Use a stopwatch to see how fast you can do it.
2. Use the same list, but only say the color the word is written in. Use a stopwatch to see how fast you can do it.
3. Hold a ruler just above your friend’s index finger. Drop it and see what centimeter mark is covered by their finger.

What happened?

<table>
<thead>
<tr>
<th>Reading Words Time</th>
<th>SAYING COLORS TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>BLUE</td>
</tr>
<tr>
<td>YELLOW</td>
<td>GREEN</td>
</tr>
<tr>
<td>PINK</td>
<td>BLACK</td>
</tr>
<tr>
<td>BLUE</td>
<td>RED</td>
</tr>
<tr>
<td>ORANGE</td>
<td>BLACK</td>
</tr>
<tr>
<td>GREEN</td>
<td>BLUE</td>
</tr>
<tr>
<td>GREEN</td>
<td>RED</td>
</tr>
<tr>
<td>RED</td>
<td>GREY</td>
</tr>
</tbody>
</table>

Some useful information

Your brain controls everything that happens in your body. Different parts of the brain have different jobs. Some parts allow you to understand language. Other parts allow you to remember things. The different parts of the brain are connected by many paths known as nerves. When information is sent to two different parts of the brain at the same time, you get confused.

It takes time for messages to be sent to and from your brain. If you want to catch something, your brain has to send a message to your muscles to move.

What did I learn?

1. Why was it easier to read the words, rather than the color of the words?

2. Why was it impossible to catch the ruler at 0cm?

Reaction Time

<table>
<thead>
<tr>
<th>Distance (cm)</th>
<th>Time (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.101</td>
</tr>
<tr>
<td>10</td>
<td>0.143</td>
</tr>
<tr>
<td>15</td>
<td>0.175</td>
</tr>
<tr>
<td>20</td>
<td>0.202</td>
</tr>
<tr>
<td>25</td>
<td>0.226</td>
</tr>
<tr>
<td>30</td>
<td>0.247</td>
</tr>
</tbody>
</table>

The time it takes for a message to be sent from the brain to cause movement in your muscles is known as the reaction time. What was your reaction time?
What are your five senses?

What do I need to do? You will need a blindfold, cups, coins, lemon juice, salty water, black coffee, sugary water, cotton buds, cups, vanilla extract, soy sauce, and paper towels.

1. For touch: Put a variety of coins in your pocket. Feel the coins and say its value as you pull it out of your pocket. Check how accurate you were with your guesses.

2. For smell: Put different smells, such as vanilla extract, soy sauce, etc., on paper towels and place them in different cups. Have your blindfolded friend smell them.

3. For taste: Blindfold your friend. Dip a cotton bud into the lemon juice, salty water, black coffee or sugary water and see if your friend can guess these basic tastes. Do it for all four tastes using new buds.

What happened?

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch</td>
<td>/</td>
</tr>
<tr>
<td>Smell</td>
<td>/</td>
</tr>
<tr>
<td>Taste</td>
<td>/</td>
</tr>
</tbody>
</table>

Some useful information

You use your sense organs such as your eyes, nose, ears, tongue and skin to react to things around you. Your eyes allow you to see. The cells at the back of your eyes send information to your brain. Your brain then makes out what you saw as an image. Your nose allows you to smell. When you sniff in things from the air, the cells in your nose sends the information to your brain and allows you to identify different smells. Your ears allow you to hear. As sound waves enter your ears, they stimulate receptors and the information is sent to your brain. Your brain then makes sense of the sound. Your tongue and nose allow you to taste. The cells on your tongue send information about the chemicals in the food to your brain. Your brain then makes sense of the taste. Your skin allows you to touch. Under your skin are different receptors that allow you to feel a variety of things.

What did I learn?

1. What are your five senses?

2. If a person is blind, how can they move around town by themselves?
**What happens to food after it enters your mouth?**

**What do I need to do?** You will need crackers, bread, a balloon, dishwashing detergent, a Ziploc bag, and orange juice.

1. **For Mouth:** Eat a cracker. As you do so, notice the role of your teeth, tongue and saliva.
2. **For Esophagus:** Squirt some detergent into a balloon. Roll a piece of bread into the size of a marble. Put it into the balloon and slowly squeeze behind the bread. Continue squeezing behind the bread, hand over hand.
3. **For Stomach:** Pour some orange juice into a Ziploc bag. Add some pieces of bread and start squeezing the bag.

**What happened?** Draw pictures to show what happened in each step.

**Some useful information**

We put food in our mouth. Our teeth chew the food into smaller pieces and the saliva starts to break down the starch into sugar. The tongue helps move the food around our mouth and turns the food into a ball.

After we swallow the food, it goes into our esophagus. Food gets pushed down by the smooth muscles that squeeze together.

After the esophagus, food enters our stomach. The stomach is full of acids and enzymes that dissolve the food. The smooth muscles in the stomach walls also squeeze in and out. Food stays in the stomach for a few hours and changes into a liquid, called chyme.

**What did I learn?**

1. Why does our body make saliva?

2. If you stood on your head while eating, would the food still go to your stomach? Explain.
**What is the job of your intestines?**

**What do I need to do?** You will need a stocking, water balloon, olive oil, a clip, a bowl, water, and two retort stands.

1. Knot one leg of the stocking close to the top and cut off the part below the knot. Use a clip to pinch shut the top of the other leg and cut the toe area. Use two retort stands to hold the stocking up.

2. Fill a water balloon with water and tie it off. Rub a little bit of olive oil over it so that the balloon gets all slippery.

3. Put the balloon into the top of the stocking. Remove the clip and squeeze the balloon through the stocking leg until it drops into a bowl filled with water.

**What happened?** Draw pictures to show what happened.

**Some useful information**

The liquid food then enters our small intestine after its time in the stomach. The liver makes an acid, called bile, and the pancreas makes juice to help break down the liquid food some more. The nutrients from the liquid food can now pass through the wall of the small intestine into our blood. These nutrients are used to help the body grow, fix itself and to give the body energy.

The liquid food that doesn't pass through the wall of the small intestine enters our large intestine. The large intestine takes out the water from the liquid food. The food now looks brown and is stored in our rectum. When we feel like we need to go to the toilet, the unwanted food leaves our body through the anus.

**What did I learn?**

1. What is the main job of the small intestine?

_________________________________________________________

_________________________________________________________

2. What is the main job of the large intestine?

_________________________________________________________

_________________________________________________________
What do I need to do? You will need a whoopee cushion, chocolate cake mix, sweetcorn, olive oil, a tablespoon, a teaspoon, a cup, a plate, and chopsticks.

1. For Feces: Mix a heaped tablespoon a chocolate cake mix with a tablespoon of olive oil.
2. Add some sweetcorn and mix in another tablespoon of chocolate cake mix. Shape it into your favorite poop shape.
3. For Gas: Push down on a whoopee cushion. Observe why it makes a sound.

What happened? Draw pictures to show what happened.

Some useful information

The large intestine is filled with billions of bacteria that help to break the food that your body didn’t use. As the bacteria do this, it produces gas. This gas is made mostly of carbon dioxide, hydrogen and methane. Sometimes, if you eat lots of beans, broccoli or cabbage, hydrogen sulfide gas is also made which smells like rotten eggs. Your body passes this gas through your anus.

The leftover food that leaves the body through the anus is known as feces (poo). It is made up of dead cells, germs and any food that your body couldn’t digest. Sweetcorn husks are an example of a food that your body can’t digest. Your feces are covered in fat and mucus from the parts it passes as it moves to the anus.

What did I learn?

1. Why do humans pass gas (fart)?

2. What are feces made from?
What do I need to do? You will need a pet bottle, 2 balloons, Blu-tac, tape, a large empty pet bottle, 2 straws, a bowl, water, a measuring cylinder, and scissors.

1. Cut the bottom off from the pet bottle. Put a hole through the lid of the bottle.
2. Insert a straw that has a balloon taped to its bottom. Cut the second balloon in half and pull it taut over the bottom of the pet bottle. Pull down on the balloon.
3. Fill the large bottle with water and put it upside down in a bowl containing water. Slip a straw through the opening of the bottle, take a deep breath and blow through the straw for as long as you can. Find a way to calculate the amount of water that was displaced from the bottle.

What happened?

Draw pictures to show how your lung model worked.

Lung capacity- __________ mL

Some useful information

Our diaphragm goes down and our ribs go out so that we can breathe in. The air goes down our trachea. The trachea splits to form two tubes, called bronchi. The bronchi divide many times into small tubes called bronchioles. At the end of the bronchioles are many balloon shaped air sacs called alveoli. The oxygen passes into the blood through the alveoli and adds to the sugar from the food we eat to be taken around our body and gives us energy.

As the oxygen enters the blood, carbon dioxide passes into the alveoli. This carbon dioxide is breathed out of our body as our diaphragm relaxes and moves up.

What did I learn?

1. What happens to the oxygen after you breathe it in?

2. What gas does your body want to remove?
What do I need to do? You will need light corn syrup, red disc candy, white candy, candy sprinkles, small containers, and a spoon.

1. Pour corn syrup into the container so that it is about 55% full.
2. 44% of the container should be filled with red disc candies. Then, add a few pieces of white candy and a pinch of candy sprinkles.
3. Share the contents of the container with your group members. Make sure you have recorded your observations before you do so.

What happened? Draw a picture of the “blood” you made.

Some useful information

About 45% of your blood is made up of red blood cells. Their job is to carry oxygen to your cells and then take away the carbon dioxide.

Your body also has white blood cells, which make up less than 1% of your blood. Their job is to fight against disease and infections.

There are also platelets in your blood which help to heal your cuts. The platelets help the blood clot. They trap the blood cells and allow the white blood cells to get to any infection.

About 50% of your blood is made up of plasma. This is a yellowy liquid that is made up mostly of salt water. The plasma allows the blood cells, platelets and nutrients from your food to move through your body.

What did I learn?

1. What is the job of the red blood cells?

_________________________________________________________

_________________________________________________________

2. What is the job of the white blood cells?

_________________________________________________________

_________________________________________________________
**What do I need to do?** You will need a stopwatch.

1. Measure your pulse rate at rest for 15 seconds and multiply it by 4. Write your results in the table below.
2. Walk on the spot for 1 minute. Stop and measure your pulse rate for 15 seconds and multiply it by 4.
3. Complete step 2 for all the other physical activities in the table and create a bar graph.

**What happened?** Complete the table and graph.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Pulse Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>At rest</td>
<td></td>
</tr>
<tr>
<td>Walking</td>
<td></td>
</tr>
<tr>
<td>Running</td>
<td></td>
</tr>
<tr>
<td>Star jumps</td>
<td></td>
</tr>
</tbody>
</table>

**Some useful information**

The heart is a muscle. It is called the cardiac muscle. Its job is to pump blood throughout the body. When you exercise, your heart needs to pump faster to deliver the oxygen your muscles need. When you feel your pulse, you are feeling the blood that is being forced through your arteries.

The left side of your heart pumps the blood with the oxygen it received from the lungs around through the arteries. The oxygen passes through the capillaries to all the cells in your body. Your blood then collects carbon dioxide. This blood now travels through veins back to the right side of your heart so that it can be pumped through your lungs again, allowing it to get more oxygen and for the carbon dioxide to be breathed out.

**What did I learn?**

1. Why does your blood need to go through your lungs?

2. Why does your heart beat faster when you exercise?
**What do I need to do?** You will need 2 test tubes, hot water, a beaker, Universal Indicator paper, Clinistix, and a fake urine sample prepared by the teacher.

1. Note the color and the odor of the first urine sample. Then, divide it into 2 test tubes. Put one test tube in a hot water bath. If it turns cloudy, it means protein is present.

2. Dip some Universal indicator into the urine that was not put into the hot water bath. Note its pH.

3. Pour the sample over the Clinistix and compare its color to the Clinistix chart.

**What happened?** Complete the chart.

<table>
<thead>
<tr>
<th>Urine Sample</th>
<th>Color</th>
<th>Odor</th>
<th>Protein (o or x)</th>
<th>pH</th>
<th>Glucose</th>
</tr>
</thead>
</table>

**Some useful information**

Your urine is made up of water, unwanted salt and waste chemicals from the blood. One of the waste chemicals is called urea. Urea is poisonous to our body.

Blood takes the urea and water through your kidneys. The kidneys take out the urea and water from the blood. This is how urine is made. From the kidneys, the urine travels down the ureters and it enters your bladder. When the bladder is full, the muscles squeeze to push the urine out through your urethra into the toilet.

Protein can enter your urine if your kidney is damaged. You can also test for glucose in your urine. If it contains lots of glucose (sugar), it could show that you have diabetes.

**What did I learn?**

1. What is the job of your kidneys?

__________________________________________________________________________________________________________

2. What health problems can your urine help to identify?

__________________________________________________________________________________________________________
**What do I need to do?** You will need scales, 2 tubes, 2 long balloons, and tape.

1. Hold the scales and push on them hard. How many kilograms can you register? Get your friend to feel your biceps and triceps.

2. Tape the 2 tubes together and add the 2 balloons to make a model that shows your biceps and triceps.

3. Bend and straighten the tubes to see what happens to the balloons.

**What happened?** Complete the chart and draw pictures to show what happened.

<table>
<thead>
<tr>
<th>Arm Strength</th>
<th>kg</th>
</tr>
</thead>
</table>

**Some useful information**

Our bones give our body structure. They help to keep your body upright. Your muscles pull against your bones and this allows you to move. Some of our bones protect our important organs.

We have over 600 muscles in our body. The skeletal muscles help us to move, lift things up, stand up and play sports. They are attached to our bones by tendons. The more exercise you do, the stronger the skeletal muscles get. You use two muscles to bend an arm or leg. The muscle on one side of the bone gets shorter and fatter. This muscle is contracting. The muscle on the other side of the bone gets longer. This muscle is relaxing. When you straighten your arm or leg, the muscle that was relaxing begins to contract and the contracting muscle relaxes.

**What did I learn?**

1. What 3 jobs does your skeleton do?

2. Why do your muscles need to work in pairs to move your body?