

Science's Systems

The Respiratory System

The respiratory system provides a way for oxygen to enter your body and for carbon dioxide, a waste product, to leave. How much air can your lungs hold? Determine your **lung capacity** in this activity.

Materials

- | | | |
|----------------------------|---------|----------------|
| - 4 L labelled plastic jug | - water | - plastic tub |
| - 75 cm flexible tubing | - straw | - masking tape |

Procedure

1. Fill the plastic jug with water and ensure that the plastic tub is about three-quarters full of water.
2. Attach your straw to one end of the flexible tubing. Tape the place where the tubing and straw meet.
3. Put your hand on the top of the jug and flip the jug over into the tub of water. Remove your hand only when the mouth of the jug is completely under water.
4. Tilt the jug slightly (but be sure to keep the mouth under water) and insert the flexible tubing (the end without the straw attached).
5. Take as big of a breath as you can and exhale into the straw. As you force air into the jug, water will empty out of the jug. Once you are finished exhaling, read on the jug the amount of air you were able to empty from your lungs into the jug. Record this number.
6. Take your straw off the tubing and dispose of it in the garbage.

Observation and Reflection

1. How much air did you have in your lungs? _____ litres
2. Compare your results with others in your group. Do everyone's lungs hold the same amount of air? _____

3. Which sports do you think require a large lung capacity? Why? _____

Science's Systems

The Circulatory System

The circulatory system is made up of the heart, blood vessels, and blood. The circulatory system is like the transportation system of the body, moving many products like oxygen and nutrients through the body.

Materials

- 1 m of flexible tubing
- funnel
- tape
- watch or clock with a second hand

Procedure

1. Attach the rubber tubing to the end of the funnel. Tape the funnel if it does not fit tightly.
2. Place the funnel on your chest and the other end of the tubing at your ear and listen to your heart beating.
3. Determine your resting heart rate: have a partner measure 15 seconds while you count heart beats. Multiply your result by four to determine the number of times your heart beats in 1 min.
4. Run in place for 2 minutes. Repeat step three immediately after you finish running. This is your active heart rate.

Observation and Reflection

1. (a) What was your resting heart rate? _____ beats/min
(b) What was your active heart rate? _____ beats/min

2. What occurred when you exercised? Why do you think this happened? _____

3. How did your results compare to others in your group? _____

Science's Systems **The Digestive System**

Your body is fueled by the food you eat. However, the nutrients from your food are only useful after they have travelled through the digestive system. Create a **flow chart** to map the route your food takes through the body.

Materials

- flow chart
- information about digestive system

Procedure

1. Read your text about the digestive system.
2. Choose a food that you will use to complete your flow chart.
3. Fill in your flow chart with the following information:
 - (a) Section: what part of the body you are talking about?
 - (b) Function: what does this part of the body do to the food?
 - (c) Description: how does this part of the body accomplish its task?
4. Complete the questions below.

Reflection

1. Why is food important for the human body? _____

2. What is an enzyme? What role do enzymes play in the digestive system? _____

The Flow of Food

Section: _____
Function: _____
Description: _____



Section: _____
Function: _____
Description: _____



Section: _____
Function: _____
Description: _____



Section: _____
Function: _____
Description: _____



Section: _____
Function: _____
Description: _____

Science's Systems

The Excretory System

The excretory system helps to expel waste from the human body. The kidneys act as filters, cleaning the blood and removing the waste. In fact, approximately 100 L of liquid pass through the kidneys every day! See how filters work to clean fluid in this activity.

Materials

- a funnel
- 3 coffee filters
- 3 beakers or jars
- muddy water

Procedure

1. Place a filter in the funnel and rest the funnel on a beaker. Pour some muddy water onto the filter.
2. Observe the difference in the two beakers after the water has been filtered.
3. Repeat the process with a second beaker and filter, only this time use the water you just filtered, not the original muddy water.
4. Repeat a third time, using the most recently filtered water.

Observation and Reflection

1. What did you observe with the water in the three different fluids? _____

2. What did the filters look like after you had poured water on them? _____

4. What is the purpose of filtration? _____

4. Why is it helpful for the kidneys to constantly filter blood in the body? _____

Science's Systems **The Nervous System**

The nervous system includes the brain, spinal cord, and nerves that exist practically everywhere on your body. You can think of the brain as your body's main control centre, controlling the function of your different organ systems as well as helping you think and learn!

Materials

- 30 cm ruler

- recording sheet

Procedure

1. Have a partner hold a ruler vertically, making sure that the 1 cm end is closest to the ground.
2. Face your partner, holding your thumb and index finger 3 cm apart on either side of the very bottom of the rule. Be sure not to touch the ruler.
3. Your partner will drop the ruler at any time. Try to catch the ruler between your thumb and index finger as quickly as possible.
4. Record the number on the ruler where you caught it. If your finger is resting on the 10 cm mark, record 10 cm.
5. Repeat steps 1 to 4 four more times. Find the average reaction time by adding the five reaction times and then dividing by five.
6. Switch roles with your partner and repeat steps 1 to 5.

Observation and Reflection

1. Compare your average reaction times with your partner. Are they similar? Why do you think some people have a faster reaction time? _____

2. Is it possible to improve reaction time with practice? Why? _____

3. What role do you think the nervous system plays in letting the ruler be caught? _____

Nervous System

Recording Sheet

Distance (cm)	Time (s)
5	0.101
10	0.143
15	0.175
20	0.202
25	0.266
30	0.247

Determine which distance your fingers were closest to and use the above chart to find your reaction time for each trial. For example, if your fingers were closest to 10 cm, your time would be 0.143 s.

Trial Number	Distance (cm)	Time (s)
1		
2		
3		
4		
5		

Average Reaction Time

_____ seconds

Remember, to find your average reaction time, add your five trial times together and divide by 5.