

Combining Science 5 and Health Education 5

Science 5, Life Science: Meeting Basic Needs and Maintaining a Healthy Body
and Health Education 5, My Body, My Self: Body Function, Growth, and Care

Curriculum Supplement



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Science 5, Life Science: Meeting Basic Needs and Maintaining a Healthy Body
and Health Education 5, My Body, My Self: Body Function, Growth, and Care

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Introduction

This curriculum supplement includes sample year-long plans for combining the Science 5 Life Science: Meeting Basic Needs and Maintaining a Healthy Body unit with the Health Education 5 My Body, My Self: Body Function, Growth, and Care unit. The plans and activities show how the outcomes can be combined throughout the school year. The page numbers in the charts refer to the Nova Scotia curriculum guides, *Atlantic Canada Science Curriculum, Grade 5* (2008) and *Health Education, Grades 4–6* (2003).

Year-Long Plan

Note: Page references are from the Nova Scotia curriculum guides.

Fall

Skeletal, Muscular, and Nervous Systems

Science 5		Health Education 5	
SCOs	<i>Students will be expected to</i>	SCOs	<i>Students will be expected to</i>
302-6 p. 62	demonstrate how the skeletal, muscular, and nervous systems work together to produce movement		
302-7 302-8 p. 66	describe the body's defences against infections and describe the role of the skin		
206-4 302-9 p. 66	describe nutritional and other requirements for maintaining a healthy body and evaluate the usefulness of different information sources in answering questions about health and diet	B1.1 p. 124	demonstrate a knowledge of the six major nutrients and how they affect body functions
		B1.2 p. 124	make healthy, balanced food choices
		C3.1 p. 120	demonstrate an understanding of how society's values and behaviours related to nutrition, fitness, and lifestyle have changed over time
		D3.2 p. 120	evaluate various sources of information regarding health and diet
		B1.3 p. 126	demonstrate an understanding of the impact of additives on the nutritional value and safety of food
106-2 106-4 107-12 107-14 p. 68	describe examples of medical techniques and technologies developed by other cultures as well as Canadians that have contributed to the knowledge of body organisms, systems, and health issues	D4.1 p. 122	demonstrate an awareness of changing male/female roles in careers
		C4.1 p. 142	demonstrate proactive strategies for enhancing the social and environmental health of the community
		C2.1 p. 142	identify ways in which volunteer groups and government agencies contribute to the health of the community

Winter

Digestive, Excretory, Respiratory, and Circulatory Systems

Science 5		Health Education 5	
SCOs	<i>Students will be expected to</i>	SCOs	<i>Students will be expected to</i>
302-5 p. 56	describe the structure and function of the major organs of the digestive, excretory, respiratory, and circulatory systems	A1.1 p. 98	demonstrate a knowledge of the circulatory and respiratory systems and their related organs
		A2.1 p. 98	demonstrate an understanding of how the respiratory and circulatory systems work together to exchange gases within the body
204-1 205-1 206-2 p. 60	propose questions and carry out procedures to investigate the factors affecting breathing and heartbeat rate, and compile and display data from these investigations in a graph	B4.4 p. 96	identify and practise strategies for maintaining a healthy heart
		B7.1 p. 130	participate in a broad range of physical activities
		B7.2 p. 96, 98	engage in cardio-respiratory exercise and identify its benefits

Spring

Growth and Development

Science 5		Health Education 5	
SCOs	<i>Students will be expected to</i>	SCOs	<i>Students will be expected to</i>
204-1 301-8 p. 54	propose questions to investigate how our body works and what its components are, and relate bodily changes to growth and development	A3.1 p. 100	demonstrate a knowledge of the physical and emotional changes that take place during puberty
302-4 p. 54	describe the role played by body systems in helping humans and other animals to grow and reproduce and to meet their basic needs	B5.2 p. 100	demonstrate strategies for managing feelings associated with the physical and emotional changes of puberty
		A3.1 p. 100	demonstrate a knowledge of the physical and emotional changes that take place during puberty
		B4.3 p. 132	demonstrate a knowledge of the effects of tobacco, alcohol, and cannabis on the body systems
302-5 p. 56	describe the structure and function of the major organs of the digestive, excretory, respiratory, and circulatory systems	A1.2 p. 100	demonstrate a knowledge of the reproductive and endocrine systems and their related organs
		A2.2 p. 100	demonstrate an understanding of how the reproductive and endocrine systems work together to create new life
Body Systems			
205-2 p. 64	select and use tools in building models of organs or body systems		

Activities

Large Group Activity: Heart Relay

Outcomes

SCIENCE 5

Students will be expected to

- propose questions and carry out procedures to investigate the factors affecting breathing and heartbeat rate, and compile and display data from these investigations in a graph (205-1, 206-2)
- select and use tools in building models of organs or body systems (205-2)
- describe the role played by body systems in helping humans and other animals to grow and reproduce and to meet their basic needs (302-4)

HEALTH EDUCATION 5

Students will be expected to

- A1.1 demonstrate a knowledge of the circulatory and respiratory systems and their related organs
- A2.1 demonstrate an understanding of how the respiratory and circulatory systems work together to exchange gases within the body
- B4.4 identify and practise strategies for maintaining a healthy heart
- B7.1 participate in a broad range of physical activities
- B7.2 engage in cardio-respiratory exercise and identify its benefits

Questions

Describe the pathway blood takes through the circulatory system. How do diseases and disorders affect the circulatory system?

Assessment

- Generate and share questions you have about the functions and components of the human body.
- Identify factors that affect breathing and heart rate.
- Trace the pathway of blood through the circulatory system.

Materials

- bean bags
- chairs
- hula hoops
- pylons
- red and blue pinnies

Procedure

Explain to students that they are going to participate in a bean bag relay that helps develop good cardiovascular fitness. Do not indicate that the design of the relay is a model of the circulatory system. Divide students into two teams (blue and red), then arrange each team into three groups. Explain the role of each group on the red team as you walk through its part of the relay. Repeat for groups on blue team.

	Red Team	Blue Team
Group 1	Take a bean bag from this hula hoop and place it into this circle.	Take a bean bag from this hula hoop and place it into this circle.
Group 2	Take a bean bag from one side of the circle, crawl through an obstacle, and drop the bean bag into the other side of the circle.	Take a bean bag from one side of the circle, crawl through an obstacle, and drop the bean bag into the other side of the circle.
Group 3	Pick up a bean bag from the circle and carry it to place in the other hula hoop.	Pick up a bean bag from the circle and carry it to place in the other hula hoop.

Once groups are in place and bean bags are distributed to each of the hula hoops, relay may begin. (See diagram on page 9.)

After the relay game has been established, stop the activity and ask students to make comparisons of the game to the human body's circulatory and respiratory system. Bean bags represent the blood and are carried by Group 1 (from the body) to the centre circle (heart) and dropped into the circle where Group 2 picks them up and crawls through hula hoops (valves) into the next chamber of the heart and drops them for Group 3 to carry to the next hula hoop (lungs). The other team is performing the same routines but in the opposite order. The red team represents oxygenated blood and the blue team represents deoxygenated blood.

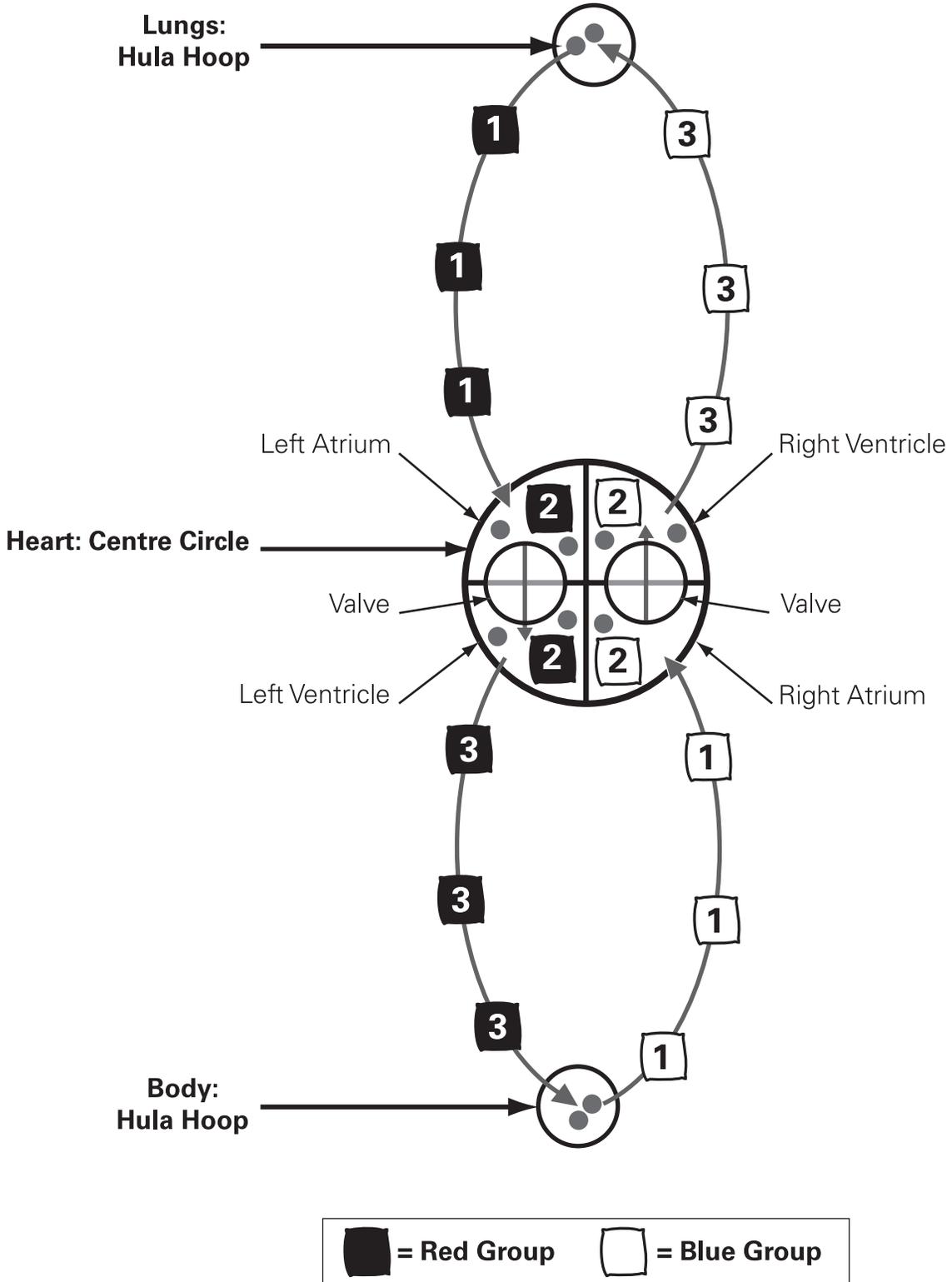
Have students change roles in the relay until they are comfortable with each part of the game. Then stop the game and explain and review the pathway that blood travels through the circulatory system. Ask students if there are any similarities between the relay and the description of the circulatory system. Ask students about diseases and disorders that affect the circulatory system and how we can show this in our relay.

Variations

- Change forms of locomotion for groups (walk, jog, run, hop, skip, scooter, etc.).
- Use different size hula hoops to represent valves.
- Have students crawl under a chair to show how a faulty valve impacts the flow of blood.
- Add pylons to the game at various distances for Groups 1 and 3. The pylons represent diseases and disorders that affect body systems. Students can run around the pylon before dropping the bean bag. This will slow down the game and cause problems with the relay.
- Limit the number of bean bags students may carry. Add exercises for students to perform to allow them to carry more bean bags at one time. Shows students how exercise affects the body (muscles demand more blood and oxygen to perform optimally).

Diagram

HEART RELAY



Large Group Activity: Virus Tag

Outcomes

SCIENCE 5

Students will be expected to

- propose questions and carry out procedures to investigate the factors that affect breathing and heartbeat rate, and compile and display data from these investigations in a graph (205-1, 206-2)
- demonstrate how the skeletal, muscular, and nervous systems work together to produce movement (302-6)
- describe the body's defences against infections and describe the role of the skin (302-7, 302-8)

HEALTH EDUCATION 5

Students will be expected to

- A1.1 demonstrate a knowledge of the circulatory and respiratory systems and their related organs
- B4.4 identify and practise strategies for maintaining a healthy heart
- B7.1 participate in a broad range of physical activities
- B7.2 engage in cardio-respiratory exercise and identify its benefits
- C3.1 demonstrate an understanding of how society's values and behaviours related to nutrition, fitness, and lifestyles have changed over time
- C4.1 demonstrate proactive strategies for enhancing the social and environmental health of the community

Questions

- How does physical activity affect our heart rate?
- What are the effects of physical activity on the human body?
- What diseases and germs compromise the immune system?
- How does the body fight and destroy these intruders?

Assessment

- Identify and discuss factors that affect breathing and heart rate.
- Compile and display data in a graph about heart rate.
- Identify and discuss the body's defences against infections.

Materials

- bean bags (identified as germs or viruses)
- chart paper
- markers
- stopwatches

Procedure

1. Using proper terminology, discuss various diseases and illnesses that affect the human body. Introduce the bean bags as germs or viruses. Use the different coloured bean bags or index cards (with words) to represent different types of viruses or infections.
2. Have students record their resting heart rates on a chart in beats per minute (bpm).
3. Play tag.
Rules: Teacher identifies the “it” students by giving them the germ bean bags. Teacher identifies the “lifesaver” by giving him or her the white blood cell bean bag. The remaining students are healthy bodies. “The faster you run, the healthier you are; you won’t be tagged (infected) by the germs.”
4. Once students are tagged, they remain frozen until freed by the white blood cell. They may then return to the game.
5. Play approximately five minutes. Students may change roles.
6. After the activity, students will retake their heart rates and record.
7. Gather students in a circle for reflection and cool down. Discuss the impact the exercise has had on their bodies (breathing, heartbeat rate, skin colour, sweat). After five minutes, take heart rates again and record.
8. Compare the three recorded heart rates and discuss the differences. Graph results during mathematics class. Find the means.

Variation

- Students must perform exercise when tagged by the white blood cell (e.g., two push-ups; three jumping jacks)

(Curriculum Link: Mathematics F-4 graphing, F-6 mean of data, A-5 rate and ratios)

Note: You can easily substitute pictures, balls, etc., for the bean bags.

Follow-up

- Use this activity to explore, through discussion and research, how society’s values toward nutrition, fitness, and lifestyle have changed over time (e.g., breakfast programs in schools, more physical education time, immunizations, addiction services, and other forms of government support).
- Discuss strategies that your community has implemented to enhance the social and environmental health of the community (e.g., health clinics, youth health centres, recreational activities, recycling programs).

Digestion

Outcomes

SCIENCE 5

Students will be expected to

- describe the structure and function of the major organs of the digestive, excretory, respiratory, and circulatory systems (302-5)
- select and use tools in building models of organs or body systems (205-2)

HEALTH EDUCATION 5

Students will be expected to

B7.1 participate in a broad range of physical activities

Questions

- How does food travel through our digestive system?
- Does gravity aid in digestion?
- What else aids with the digestive process?

Assessment

- Describe the path that food takes through the body.
- Describe the process of digestion using a model beginning with the role saliva plays in digestion and how major organs (esophagus, small intestine, and large intestine) contribute to the process of digestion through peristalsis.
- Discuss the role enzymes play in helping food break down in the digestive tract (use saliva, gastric, and intestinal juices to aid in lubrication and breakdown of food).

Materials

- cooking oil
- cups of water
- exercise mats
- measuring spoons
- scissors
- sliced bread
- thin and long balloons

Procedure

PART A

1. Cut the closed end off the balloon.
2. Add 5 mL of cooking oil to inside of balloon.
3. Remove crust from one slice of bread; discard.
4. Form slice into the shape of a ball (sphere).
5. Insert ball of bread into the balloon.
6. Begin to squeeze the bread through the balloon, alternating one hand in front of the other.
7. What happens?

PART B

1. Place exercise mat beside wall.
2. Using the headstand technique (from physical education class), have student volunteers get into position against the wall.
3. Ask students to predict what will happen if sips of water are given to volunteers. Where will the water travel?

The Food Group Juggle

Outcomes

SCIENCE 5

Students will be expected to

- describe nutritional and other requirements for maintaining a healthy body, and evaluate the usefulness of different information sources in answering questions about health and diet (206-4, 302-9)

HEALTH EDUCATION 5

Students will be expected to

- B1.1 demonstrate a knowledge of the six major nutrients and how they affect body functions
- B1.2 make healthy, balanced food choices
- B7.1 participate in a broad range of physical activities

Question

What are the six classes of nutrients needed to maintain a healthy body?

Assessment

- Identify, discuss, and explain the six major nutrients required for maintaining a healthy body.
- Recognize the benefits of making healthy, balanced food choices.

Materials

- six hula hoops
- meal sets (plastic, magazine pictures, word cards, etc.)
- nutrient labels

Procedure

ACTIVITY 1

Students form a large circle (in gym or classroom). Inside the circle are six hula hoops, labelled: protein, carbohydrates, vitamins, minerals, fats and oils, water. The teacher selects one food item (from each nutrient group) from a container and passes it to a student who must correctly identify the food type and its major nutrient. If successful, the student then places the food inside the appropriate hoop. If unsuccessful, the student must pass the item to another student, across the circle, who must identify and place the item correctly. The teacher then selects another item.

ACTIVITY 2

Perform the same activity as above, except have students pass the item from student to student. They say the major type of nutrient it contains before passing it to another student across the circle. Keep passing out more and more food items. The students must pass the items to the same students they passed it to before. (You may have to establish rules as to how to identify which students have or have not received an item). When the last person receives the item, he or she must place it in the correct nutrient hula hoop and wait for the next item to be tossed to them.

VARIATIONS

- Move the food map (hoops) to other areas around the room allowing students to move around.
- Students must hop, skip, or travel on one foot to the hoop to place the item.
- Perform an exercise independently or in small groups if the item is identified incorrectly.
- If the food item is an object (i.e., not a picture or word card, have the students catch/throw it using one hand, two hands, and right and left hand.

Lung Capacity

Outcomes

SCIENCE 5

Students will be expected to

- describe the structure and function of the major organs of the digestive, excretory, respiratory, and circulatory systems (302-5)

HEALTH EDUCATION 5

Students will be expected to

- A1.1 demonstrate a knowledge of the circulatory and respiratory systems and their related organs
- A2.1 demonstrate an understanding of how the respiratory and circulatory systems work together to exchange gases within the body
- B4.3 demonstrate a knowledge of the effects of tobacco, alcohol, and cannabis on the body systems

Questions

How much lung capacity do you have? How much air can your lungs hold?

Assessment

- Compare your lung capacity with that of other students.
- Identify and discuss factors that affect breathing, such as the use of tobacco products, diseases (asthma), and pollution.

Materials

- masking tap
- 2 L milk jug
- permanent felt marker
- rubber tubing
- straws
- water
- water basin

Procedure

1. Fill the water basin three-quarters full with water.
2. Using a 500 mL container, fill the milk jug with water, marking 500 mL intervals on the outside of it.
3. Holding the rubber tubing, insert a straw into one end and wrap the joint with masking tape to hold them together.
4. Place one hand over the mouth of the jug and by holding it with the other hand, quickly place it upside down into the basin of water. Remove your hand from the mouth of the jug.
5. Carefully raise the jug, making sure the mouth stays under water, and place the end of the tubing without the straw into the mouth of the jug.
6. Take a deep breath, then exhale into the straw. The water is forced out of the jug. Using the measurements on the side of the jug, see how much water was removed and how much air was forced in.

Note: A new straw must be used for each person.

Joins in Motion

Outcomes

SCIENCE 5

Students will be expected to

- demonstrate how the skeletal, muscular, and nervous systems work together to produce movement (302-6)
- select and use tools in building models of organs or body system (205-2)

HEALTH EDUCATION 5

Students will be expected to

B7.1 participate in a broad range of physical activities

Questions

How does the arm move? Knee move? Finger move?

Assessment

- Demonstrate how the skeletal and muscular systems work together to produce movement.
- Apply mechanics of hinge joints to the effects of exercise on the body, by performing bicep curls and leg squats.

Materials

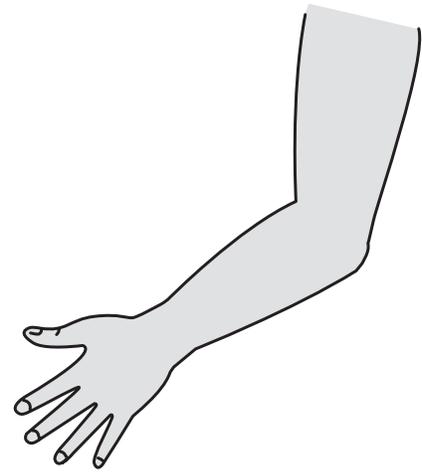
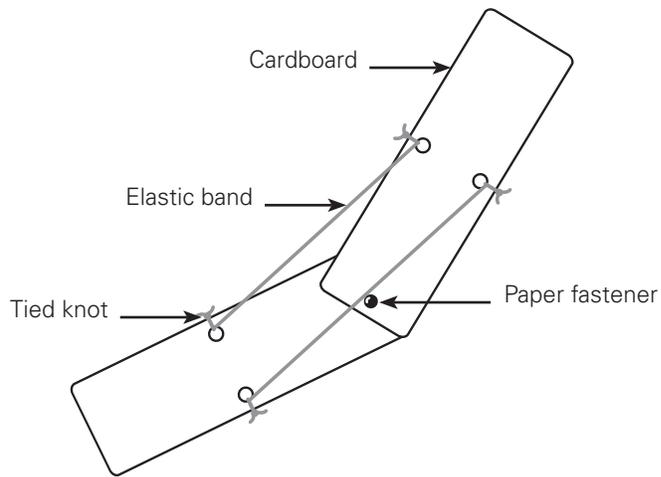
- cardboard
- elastic bands
- paper fasteners
- scissors
- string

Procedure

1. Cut out two sheets of cardboard of about 16 cm × 5 cm. Round the corners. Connect the two pieces of cardboard using a paper fastener (see diagram on page 18).
2. Punch holes along the length of each side of each sheet of cardboard, approximately 8 cm from the end (i.e., about halfway down the long sides).
3. Cut elastic bands into 15 cm lengths (approximately). Tie one end of an elastic piece through the right hole of one sheet of cardboard and tie the opposite end in the corresponding hole in the other sheet of cardboard. Repeat this step on the left side of each sheet of cardboard. (See diagram.)
4. The cardboard sheets represent the bones and the elastic bands represent the muscles. This model arm has only two muscles, while the real arm has many more. To make the arm bend, give the cardboard a slight pull and to straighten the arm push the cardboard in the opposite direction. For the real arm, the brain supplies the push or pull.

5. Should you wish to change this activity to discover how the fingers move, you can replace half of the elastic band with a piece of string. The elastic band pulls and the string carries the force of the pull to the finger. The muscles are attached to string-like tendons, which carry the pull to the fingers. You can ask your students to cover their lower right arm with their left fingers, move their right fingers and palpate the muscles as they work together to move the fingers. The fingers are set up this way to allow the fingers to be powerful but long and slender. If the muscles were in our fingers, the fingers would be very large.

Diagrams



Undercover Work

Outcomes

SCIENCE 5

Students will be expected to

- demonstrate how the skeletal, muscular, and nervous systems work together to produce movement (302-6)
- describe the structure and function of the major organs of the digestive, excretory, respiratory, and circulatory systems (302-5)

HEALTH EDUCATION 5

Students will be expected to

A1.1 demonstrate a knowledge of the circulatory and respiratory systems and their related organs

Questions

- Where are the skeletal, digestive, muscular, respiratory, circulatory, and nervous systems located in the human body?
- How can we display the systems of the human body interlocking with each other?

Assessment

- Make a model that includes all body systems.
- Explain the functions of the body systems.

Materials

- fun foam
- glue
- miscellaneous craft supplies
- permanent marker
- red and blue yarn
- scissors
- stapler
- staples
- toilet paper and paper towel rolls
- vapour barrier

Procedure

- Have children work in small groups. Assign one body system to each group.
- Each group will receive the same length of vapour barrier and a different coloured marker. Trace the outline of the body pattern on the vapour barrier.
- Group members will draw the body system as accurately as possible.
- Using a variety of materials, construct the body system part. Glue the body system part onto the vapour barrier.
- Once all the systems are finished, the sheets of vapour barrier will be stapled together from the top, creating a “flip book.” All systems should be visible.

Connecting Body Systems

Outcomes

SCIENCE 5

Students will be expected to

- demonstrate how the skeletal, muscular, and nervous systems work together to produce movement (302-6)

HEALTH EDUCATION 5

Students will be expected to

B7.1 participate in a broad range of physical activities

Questions

- How did the skeletal, muscular, and nervous systems work together when doing this activity?
- From this activity, what do you surmise would be the best way to learn a new task?

Assessment

- How do the body systems work together to make movement?

Materials

- broom
- 5 cm × 30 cm × 60 cm wooden plank
- watch with a second hand

Procedure

1. Divide students into groups of two.
2. Lay the broom on the floor. Place the wooden plank perpendicularly across the broom handle. Centre the wooden plank perpendicularly on top of the broom handle.
3. Students are to place one foot on the plank on both sides of the broom and balance themselves so that neither end of the plank touches the floor.
4. One student from each pair balances for up to five minutes consecutively.
5. The other student from each pair spreads his or her five minutes over a period of time. For example, do five one-minute tries over the period of the day.
6. The next day, have groups try to balance on the plank again. Who is able to balance better on the plank?

Body System Trivia Game

Outcomes

SCIENCE 5

Students will be expected to

- propose questions to investigate about how our body works, what its components are, and relate bodily changes to growth and development (204-1, 301-8)
- describe the role played by body systems in helping humans and other animals to grow and reproduce and to meet their basic needs (302-4)
- describe the structure and function of the major organs of the digestive, excretory, respiratory, and circulatory systems (302-5)

HEALTH EDUCATION 5

Students will be expected to

A1.1 demonstrate a knowledge of the circulatory and respiratory systems and their related organs

A1.2 demonstrate a knowledge of the reproductive and endocrine systems and their related organs

A3.1 demonstrate a knowledge of the physical and emotional changes that take place during puberty

Question

What are the functions of the main body parts?

Assessment

- Generate and share questions you have about the functions and components of the human body.
- Suggest and describe lifestyle choices that may affect the growth, development, and health of the human body.

Materials

- large felt or paper model of the human body
- cane (optional)
- eye patch (optional)

Procedure

Have students gather in a small group facing the model of the human body. The teacher will ask a question (see pages 21-24). When a student gives a correct response, he or she will take the corresponding pictorial representation or word and attach it to the large form of the body. An alternate adjunct to this game would be to add physical activity by having the student hop, skip, or walk with one eye closed, etc.

Follow-up

Use this activity to promote discussion on bodily changes due to puberty and maturation.

Questions for Trivia Game

Where do the final stages of digestion take place?

Answer: stomach

What body part is shaped like a pipe and leads from the mouth to the stomach?

Answer: esophagus

Food stays in this body part for approximately four hours. What part is this?

Answer: stomach

Nutrients are absorbed into the body from this body part. What is this?

Answer: small intestine

Which body part holds air?

Answer: lung

What operates like a filtering system to rid the blood of poisons and waste products?

Answer: liver

What is the body's main control centre that communicates with the nerve cells in the rest of your body through the spinal cord?

Answer: brain

What are the primary building blocks of the body?

Answer: cells

What organ of the body allows gases to enter and leave?

Answer: lung

During increased activity, which body organ eliminates chemicals through sweat?

Answer: skin

Where is water removed from undigested food and wastes stored until they are eliminated from the body?

Answer: large intestine

What is another word for windpipe?

Answer: trachea

What part of the body allows you to produce sound?

Answer: voice box

Which blood cells carry oxygen?

Answer: red blood cells

Which blood cells fight germs?

Answer: white blood cells

What body part is round, surrounded by bone, and has two main parts—the iris and the pupil?

Answer: eye

Which organ is composed of a four-chamber structure?

Answer: heart

What protects us against germs, infection, and injury?

Answer: skin

What body part is involved in the first stage of the digestive system by breaking the food into smaller pieces?

Answer: teeth

What effect do relaxation and contraction have where muscle is attached to bone?

Answer: movement