Grade 5 – Unit 1:
The Human Body

Emily Coady, Amanda Greer,
Melissa Mountain, and Hilary Waterhouse

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Introduction

This is the first unit of Grade 5 Science. After completing the unit, students will understand that the body is composed of organs and systems that work together to meet their basic needs.

For about a week before we begin the unit, there will be a brightly coloured bulletin board on display in the classroom. It will have interesting facts about the human body and all of its systems. It will also have photos and diagrams. The purpose of the bulletin board is to get students excited about the upcoming unit.

A science center will be set up in the classroom for the duration of the unit. It will be underneath the bulletin board. It will be used during the first lesson plan and throughout the unit. If students finish their work early during a science class, they may complete an activity at the science center. (Science Center activities are attached at the end of this unit.)

The unit begins with a lesson meant to pique students’ curiosity about the human body. As a class, students will compile a list of questions they hope to learn the answers to by the time they complete the unit.

The first system the students will learn about is the digestive system. Students will learn through experimentation the role that saliva plays. Next, students will learn about the excretory system by exploring websites, discussing what they learn, and building a model.

Using a self-discovery approach, students will learn about the respiratory system. Eventually, they will build a model of the system using plasticine. Immediately after learning about the respiratory system, students will learn about the circulatory system. Two main components of the lesson include learning a song and writing a letter. As a cumulative activity, students will evaluate their own heart and breathing rates, creating a graph to share with their peers.

While engaging a variety of learning styles, students will work together to learn about the skeletal, muscular, and nervous systems. These systems will be covered in 4 lessons, with a major activity being the design of a life-size diagram that includes the major bones and muscles of the human body.

In the final two lessons, students will learn about the necessary requirements for maintaining a healthy body and lifestyle. They will plan a healthy meal, hear from several guest speakers, and keep a personal health journal outlining the food they consume and their physical activity.
# Curriculum Outcomes

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<tr>
<th>STSE</th>
<th>Skills</th>
<th>Knowledge</th>
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<tr>
<td><strong>Nature of Science and Technology</strong></td>
<td>Students will be expected to&lt;br&gt;Initiating and Planning&lt;br&gt;204-1 propose questions to investigate and practical problems to solve&lt;br&gt;204-2 rephrase questions in a testable form</td>
<td>Students will be expected to&lt;br&gt;301-8 relate bodily changes, such as acne on the skin and the growth of body hair, to growth and development&lt;br&gt;302-4 describe the role played by body systems in helping humans and other animals to grow and reproduce and meet their basic needs&lt;br&gt;302-5a describe the structure and function of the major organs (i.e., teeth, tongue, oesophagus, stomach, small intestine, and large intestine) of the digestive system&lt;br&gt;302-5b describe the structure and function of the major organs (i.e., kidneys, bladder, ureters and urethra, as well as the skin and lungs) of the excretory system&lt;br&gt;302-5c describe the structure and function of the major organs (i.e., nose, trachea, lungs, diaphragm) of the respiratory system&lt;br&gt;302-5d describe the structure and function of the major organs (i.e., heart, blood vessels (arteries, veins, capillaries), and blood) of the circulatory system&lt;br&gt;302-5e describe the structure and function of the major organs (i.e., brain, spinal cord, and nerves) of the nervous system&lt;br&gt;302-6 demonstrate how the skeletal, muscular, and nervous systems work together to produce movement&lt;br&gt;302-8 describe the body’s defences, such as tears, saliva, skin, certain blood cells, and stomach secretions, against infections&lt;br&gt;302-7 describe the role of the skin&lt;br&gt;302-9 describe nutritional and other requirements for maintaining a healthy body</td>
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Lesson Name: How Does My Body Work?

NSES Outcomes:
Standard A: Science as Inquiry
- Students identify questions that can be answered through scientific investigations.
- Students recognize and analyze alternative explanations and predictions.

Curriculum Outcomes:
- Propose questions to investigate how our body functions and the contribution of its components (204-1)

Content to Be Taught:
- Students will begin to ask questions about how their bodies function.
- Students will learn that the human body contains several different systems that all work together.

Children's Prior Knowledge and Misconceptions:
- Students have already investigated the Needs and Characteristics of Living Things, as well as growth and life cycles by the end of grade 3.
- Students may believe that their body is just one system, not several.

Performance Objective:
- Students will complete an activity from the science center.
- Students will participate in a whole-class discussion and compile a list of questions as a class.
- Students will complete a crossword puzzle about the human body.

Concept Development:

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<td>Materials: bulletin board</td>
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- Students will have had a chance to look at “The Human Body” bulletin board that is on display in the class. The bulletin board has interesting facts about the human body.

Essential Questions
- How do our bodies work?
- What happens if a part of our body stops working?
### EXPLORATION
**Materials:** science center (foam digestive and skeletal system puzzles, clay, student instructions)

- Students will each choose one activity from the science center to complete. They may work individually or in pairs. Activities include foam puzzles depicting different body systems, constructing a system from clay, and “exercising with an unhealthy lung.”

### EXPLANATION
**Materials:** chart paper, marker

- Lead a whole-class discussion and invite students to each share one thing they learned and one thing they want to learn.
- On the chart paper, make a list of what students want to learn. These should be in question form. Ex: “Why do we need to eat?” “What happens to food after I eat it?” “How do my lungs work?”

### ELABORATION
**Materials:** crossword and answer key (attached)

- Each student will be given a crossword to complete. This will serve as a “pre-assessment” for the rest of the unit. They may be able to complete it based on what they already know or based on what they learned in the whole class discussion.

### EVALUATION
- The teacher will observe students to see if they are struggling with the activities.
- The crossword will be collected and used as participation points.

### ACCOMMODATIONS
- Students were given a choice of which activities to complete during “Exploration.”
- Students who are visually impaired or have trouble with literacy may have help with the crossword. Ex: Clues can be read aloud or crossword may be magnified.
The Human Body

Across:
1. Another word for spit.
3. The ______ system works with the respiratory system to get oxygen through your body.
5. Washing your hands can help prevent the spread of ______.
7. The ______ moves food from the back of your throat to your stomach.
8. The ______ is sometimes called the windpipe.
13. You have both a large and small ______.
14. The center of the nervous system.
17. We breathe in ______.
18. The system that rids the body of toxins and waste.
19. Proper ______ is necessary to maintain a healthy lifestyle.

Down:
1. The organ between the esophagus and the small intestine.
2. The system that processes food.
4. The main organs of the respiratory system.
6. Made up of three layers, this covers and protects your body.
9. The organ responsible for pumping blood throughout your body.
10. The system responsible for breathing.
11. The muscles in the stomach are known as the ______ muscles.
12. The skeletal system is made up of ______.
15. A skin condition, causing different types of bumps, that usually develops during puberty.
16. Process of physical changes by which a child’s body matures into an adult’s body.
The Human Body KEY

1 across: trachea
2 across: esophagus
3 across: circulatory
4 across: nutrition

5 down: tonsils
6 down: microorganisms
7 down: intestine
8 down: stomach
9 down: circulatory
10 across: secretory
11 across: brain
12 across: brain
13 across: oxygen
14 across: brain
15 across: uce
16 across: brain
17 across: oxygen
18 across: secretory
19 across: alive

Name: ___________________________
Provided By: TheTeachersCorner.net Crossword Maker
Lesson Name: The Digestive System

NSES Outcomes:
Standard A: Science as Inquiry
- Students identify questions that can be answered through scientific investigations.
- Students design and conduct a scientific investigation.
- Students use appropriate tools and techniques to gather, analyze, and interpret data.
- Students develop descriptions, explanations, and models using evidence.
- Students recognize and analyze alternative explanations and predictions.
- Students communicate scientific procedures and explanations.

Curriculum Outcomes:
- 302-5a: Describe the structure and function of the major organs (i.e., teeth, tongue, esophagus, stomach, small intestine, and large intestine) of the digestive system.
- 205-1 & 205-7: Carry out procedures to investigate how simulated saliva can start the digestion process, by breaking down substances like starch into simple sugars; and record observations using sentences or charts.

Content to Be Taught:
Students will learn that with the digestive system, one of the very first parts of the digestive process starts with the saliva. Students are aware that all humans have saliva. Students will investigate with simulated saliva (amylase) and a particular type of food to make observations about what takes place when our bodies are going through the digestive process.

Children’s Prior Knowledge and Misconceptions:
The students have learned in a prior lesson that the digestive system is a huge part of providing energy for the body and its functions. They understand the major organs that are included in the digestive system (i.e., teeth, tongue, esophagus, stomach, small intestine, and large intestine) and their function. A common misconception is that in order to digest food properly, we need some sort of a liquid.

Performance Objective:
Students will each be given a soda cracker and a styrofoam cup filled with water. There will also be some iodine in the middle of the table with eyedroppers for each student (condition). Students will put their soda cracker into the water in the paper cup and then add one drop of iodine. Students will be expected to record in their
science journal what happens (performance) i.e., When they add the iodine to the soda cracker and water, the iodine should turn a dark blue color which means that there is starch present in their solution. Students should ask why it turns a dark blue color (criteria). Secondly, students will be given their amylase (simulated saliva) and more eyedroppers and they will be asked to add one drop of amylase to their solution. Students again will be expected to record in their science journal what happens (performance). When they add the amylase the dark blue coloring should disappear. This is because the simulated saliva breaks down the starch into sugars (criteria).

**Concept Development:**

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<tr>
<td><strong>Materials:</strong> Newspapers, styrofoam cups filled with water, eyedroppers, soda crackers, and iodine.</td>
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<th>Safety: Since there is water involved, provide paper towels to clean up spills. Put layers of newspapers on the tables so if iodine does get spilled it will not soak through as bad and leave stains on the table. Caution: Iodine is poisonous. Be sure to tell your students and tell them to keep it away from their eyes and mouth.</th>
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<tr>
<th>Procedure: Ask the students to predict what they think will happen when they add the soda cracker to the water. Ask the students to quietly and individually write in their science journals what they believe will happen. Once this is completed, ask students for their thoughts and predictions and record them on the board.</th>
</tr>
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Now tell students to drop the soda cracker into the water and record what happens in their science journal. Ask students to raise their hands to show if their prediction was right. Tell students to record in their journal if their prediction was right. Even for the students whose predictions were wrong, they were at least invested in the question.

Now ask students to predict what they think will happen when we add one drop of iodine to the soda cracker and water mix. Tell them to record in their journal what they believe will happen then ask students for their predictions and record them on the board.

Tell students they can now take their eyedropper and get a small amount of iodine with their eyedropper and add one drop of iodine into their mixture. Ask students what happens? Tell them to once again record in their journal what happens. The teacher will write on the board that the mixture turned to a dark blue.

To challenge students, ask: “Why do you think the mixture turned dark blue?” This question and the solution will become the basis of the rest of the lesson.

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<td><strong>Materials:</strong> Each student’s mixture, new eyedroppers, and the simulated saliva solution (amylase).</td>
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**Safety:** Students will definitely be curious and wonder or even try to use their own saliva. Put much emphasis on this safety part of the lesson. Tell students: “There are a lot of germs in our saliva and there could even be germs that we could get very sick off of, germs that can cause disease, and because of this we are not using real saliva. A substance called “amylase” is going to be used instead of real saliva and it is going to show you the exact same thing that our real saliva can do.”

**Procedure:**

*Part 1 -* Ask each student to record in their science journal why they think the mixture turned dark blue. Then ask students to share their answers with the class and record a few of the student’s predictions on the board.

*Part 2 -* Ask students what they think the iodine reacted with to turn dark blue? Ask: Do you think it was just the water? Just the soda cracker? Or the water and the soda cracker? Have the students share their predictions in their groups at their table and then have a few students share with the class what they believe the iodine reacted with.

*Part 3 -* Ask students what ingredients are in a soda cracker? Students may or may not come up with the ingredient of starch. If they do not, then tell them and tell them that the reason the mixture turns dark blue when iodine is added to it is because the iodine is reacting with the starch in the mixture.

*Part 4 -* Finally, place the amylase and eye droppers on each student’s group tables and explain to them what it is while you are handing it out. Tell them to not touch it until you tell them it is okay to.

*Part 5 -* Ask the students to again write in their science journals what they predict will happen when they add the amylase to their water, soda cracker, and iodine mixture. Once students have recorded this, ask them to share their answers with the class and record it on the board for all students to see.

*Part 6 -* Tell students to take an eyedropper and get a small amount of amylase and put one drop into their mixture. Ask the students: “What happened?” Then instruct the students to write in their science journals what happened and to draw a picture of the mixture before they added the amylase to it and after they added the amylase to it. Then ask them to write in their science journal why they think the dark blue color disappeared. *Be sure to write these last directions on the board of what you would like them to do in their science journal* Tell students that the instructions of what to do in their science journals are on the board.

**EXPLANATION**

**Materials:** Video, question & answer handout, pencils, colored pencils

**Procedure:** Ask the students, “Can anyone tell me why they think the dark blue iodine color disappeared?” Tip to tell students: “Think of the role of saliva in your mouth and how it helps the digestive process.” Have students tell you some of their conclusions and write them on the board.
Explain to students: “We are going to watch a short video that helps us understand what we just investigated in our experiments with the soda cracker, water, iodine, and amylase. After watching this video, you should have a better idea of how our body digest's food.”

Show students the video on this website: http://science.nationalgeographic.com/science/health-and-human-body/human-body/digestive-system-article.html

After the watching video, ask the students these questions and write the questions and answers on the board:

“What part of the digestive system does the food end up in? In the large intestine or small intestine?”

“When the food is being chewed, what is it being mixed with?”

“Why does it help to mix the food with saliva?”

“Before the food gets into the stomach, what is the tube-like body part that the food travels down?”

Individual reflection: Give students a copy of the questions and answers about the video. Have students create a chart or a diagram in their science journals of the digestive process. Make sure to tell them to label their chart or diagram with the parts of the digestive system (i.e. teeth, tongue, esophagus, stomach, small intestine, and large intestine). Once students have finished drawing and labeling their chart or diagram, have them choose a food to digest and a write a few sentences of how it would end up in the large intestine (i.e. the process it would go through).

Summarize: Demonstrate your own chart/diagram of the digestive process and the parts that are always involved when we digest a food. Explain to the students that the reason the blue iodine disappeared when we added our amylase (simulated saliva) to the mixture is because the saliva helps to break down the starch into sugars, which are much easier to digest because of their smaller particles (smaller size).

ELABORATION

Have a class discussion with students and propose some questions about the role of our teeth in the digestive process. Students may claim that chewing things speeds up digestion, if so you can have another class discussion with them about this.

EVALUATION

Materials: Styrofoam cups, soda crackers, iodine, eye droppers, amylase, timers

Procedure: Ask the students this main question: “Will smaller pieces of food digest faster than larger pieces?” After the students are given the instructions, each student can individually test this by repeating the simulated saliva experiment using a whole
cracker in one paper cup, and a crunched up cracker in another paper cup. This would not only relate back to the previous question about the role of teeth in the digestive process, but it would also simulate the result of teeth action when doing this experiment. Students can time how long it takes for the blue iodine color to fade away. (See attached sheet.)

### ACCOMMODATIONS

One way to accommodate this lesson is to help students with the instructions that have difficulty reading by reading the instructions to them. For students with learning disabilities, instead of writing their predictions and answers in their science journal they could answer the questions orally and tell the teacher their answer/prediction. Throughout the experiment, students can also be assigned a partner if they are struggling.

Children who are visual and kinesthetic learners will benefit from this lesson because of the hands-on experience.

One possible accommodation if you were running short for time would be to have the children simply watch the teacher do this experiment at the front of the room; however, this would obviously not be as engaging as having the students do it themselves.
Instructions:
1. You will be given two styrofoam cups, one with water and a whole soda cracker in it and the other with water and crumbled pieces of soda cracker in it.
2. Add one drop of iodine to each mixture.
3. Add one drop of amylase to each mixture.
4. With your timer, time how long it takes for the iodine to fade in color in the mixture with the crumbled soda crackers.
5. In your science journal, record the time it takes for the crumbled soda cracker mixture’s iodine to fade.
6. Draw a picture of each mixture in the space below.

Explain:
I think the simulated saliva (amylase) makes the iodine disappear because....
Lesson Name: The Excretory System

NSES Outcomes:
Standard A: Science as Inquiry

Curriculum Outcomes:
302-5b: Describe the structure and function of the major organs (i.e., kidneys, bladder, ureters and urethra, as well as the skin and lungs) of the excretory system.

107-8: Describe examples of the products/technologies that have been developed in response to the need for the disposal, control, and containment of excrement.

Content to Be Taught: Students will learn about the excretory system and will be able to answer the question: “What does our body do with waste?” by exploring the function of the kidneys and the bladder. They will learn that without proper functioning of either of these body parts, our bodies would not function properly in excrement. Students will also learn the excretory system deals with getting rid of harmful or useless materials from the body. Waste materials from the blood are collected in the kidneys, and are then sent to the bladder through the ureters, and excreted through the urethra. They will learn that the skin also plays a role in the excretory system because many chemicals are eliminated through our sweat. Lastly, students will learn that there have been products/technologies developed to aid in the excrement of waste.

Children's Prior Knowledge and Misconceptions:
This is the first time that children are looking at the excretory system as they have not looked at it in the earlier elementary years. Students are aware that they excrete urine and waste, but they are not sure how. When students think about it, they are aware of everyday items used by humans to help with excrement (i.e., toilet paper, toilet, diapers, etc.) Students at this age are beginning to understand the concept of body odor and sweat from our skin.

A common misconception for students may be that urine and feces is made up of left over liquids our body did not use.

Performance Objective:
Students will be given the proper materials to model the excretory system (condition) and will explain in writing (performance) each of the parts of the excretory system and how our bodies rid itself of waste (criteria).

**Concept Development:**

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<td><strong>Materials:</strong> Computer, SmartBoard, Website</td>
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<td>Explain to students that we are going to be learning about the excretory system. Ask the students if anyone knows what the excretory system is.</td>
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<td>Explain to students the following: “As your body performs the many functions that it needs in order to keep itself alive, it produces wastes. These wastes are chemicals that are toxic and that if left alone would seriously hurt or even kill you. For example, as your cells break down amino acids, they produce a dangerous toxin known as urea. The cells of your body excrete this urea into your blood.”</td>
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<tr>
<td>Explain to the students that in our excretory systems, we each have the following major organs that help to rid our bodies of waste: Kidneys, bladder, ureters and urethra.</td>
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<tr>
<td>On this website, it talks about your kidneys and your bladder. Let’s have a look.</td>
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<tr>
<td>Explain to students: “This is the process your kidneys go through: As your blood travels along within your body, it becomes more and more polluted with urea and other wastes. Eventually the blood enters a special filter, an organ known as your kidneys. As the blood enters your kidneys it is cleansed. Your kidneys remove the urea from the blood, sending it to your bladder for storage in the form of urine, commonly known as pee. It takes about 45 minutes for your kidneys to completely filter all of the blood in your body.”</td>
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<td>Explain to students: “This is the process your bladder goes through: Slowly your bladder fills up with the urine being produced by your kidneys. Eventually as it becomes full, you will feel a sensation telling your brain that you need to remove it from your body. Urine leaves your body through the process of urination, you may know it as: peeing.”</td>
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<td><strong>Materials:</strong> Pictures, Website</td>
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<tr>
<td><strong>Procedure:</strong> Part 1: Show picture of the kidneys and the picture of the bladder/urethra on the SmartBoard. Leave the pictures up and have the students draw their own picture in their science journal of each (the kidneys and the bladder/urethra) and label the parts.</td>
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</table>
Part 2: Give students the worksheet on *Did you know these facts about the excretory system?* With a shoulder partner, have students read the facts one by one and pick out the most interesting fact to them. Have each pair of students present their fact to the class and tell 1. Why they think it’s interesting and 2. Why it might be beneficial to know.

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<td><strong>Materials:</strong> Laptops, Website</td>
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<td><strong>Safety:</strong> Make sure to tell children that they should only be on the website given to them and that if they are doing anything else on the computer that they shouldn’t be then the computer will be taken away from them and their partner.</td>
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| Procedure: |
| As a whole class, watch the video on the bladder/kidneys on the following website: [http://kidshealth.org/kid/htbw/htbw_main_page.html](http://kidshealth.org/kid/htbw/htbw_main_page.html) |

Ask students if they have any questions.

Ask students to pick a partner and handout lap tops to each pair of students.

Write the website above on the board and tell the students to click on the icon that says “Kidneys” to explore more about the excretory system. They can do the quiz on this website (explain that this is a must and that when students have finished the quiz to raise their hand so that the teacher can check, before they move on to the other things on the website) and also word finds, activities, and articles. Students will browse this website and work together for the remainder of class time.

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<th>ELABORATION</th>
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<td><strong>Materials:</strong> “Did you know?” worksheet</td>
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| Procedure: |
| Have students complete the worksheet. |

| EVALUATION |
| **Materials:** Kidney beans, big marshmallows, straws, uncooked spaghetti, glue, tape and the human body worksheet/card stock. |
| **Safety:** Tell students to not eat any of the materials they are working with. |

| Procedure: |
| Ask students: “What processes does your body have to get rid of liquids?” |

Ask students: “From what you know already, how does this happen?”

Explain to students “Today we will model the excretory system.”

Explain to the students: “You will be working individually. Each pair of students will share a pan with all of their materials in it so they don’t fall off the table onto the floor.”

Write the materials on the board that each student needs to grab out of each bag. Students will be responsible for getting their own materials and make sure to tell them only to take the amount of each material that is written on the board because
there needs to be enough for everyone. Make sure that you tell the students that you brought enough materials into class today so everyone could participate in this activity, so if there are not enough for some students then you will know someone took more than they were supposed to.

**Write the following on the board:**
Each student needs:
- 2 Kidney Beans (Represents the Kidneys)
- 2 Spaghetti pieces (Represents the Ureters)
- 2 Marshmallows (Represents the Bladder)
- 2 Straw pieces (Represents the Urethra)

One of each item will be used for the legend at the top of the cardstock. Use tape to attach the materials to the top of the card stock. This will be the legend.

**Making the Model:** Walk the students through this activity orally and pause after each step to make sure students were in the correct place. The teacher will go around the room to make sure that the students are on the right track.

**The Steps:**
1. Glue on the kidney beans. They should be about the height of the elbows on either side of the middle line of the back, the spine.
2. Insert the approximately 1 inch long spaghetti lengths into the mini-marshmallow at an angle. This represents the ureters draining down into the bladder.
3. Insert the approx. 1 centimeter long piece of straw into the bottom of the marshmallow. This represents the urethra. Place glue on the marshmallow only.
4. The students now have a wonderful model of the excretory system.
5. Students are expected to describe to a partner just exactly what happens in the Excretory System.
Did You Know?
Facts about the Excretory System

- Your body doesn’t use everything you eat
- Your body must get rid of waste
- Waste includes such things as: Carbon dioxide, water, feces, urine, and sweat
- Your excretory system includes the kidneys, ureters, a bladder and a urethra
- Your kidneys help to clean blood and get rid of waste
- Your two kidneys are each about the size of one of your fist
- Your kidneys control the fluid levels in your body
- The more liquid in your body, the more urine you produce
- Ureters – these are the tubes that your urine from your urine from kidneys flow down
- Your ureters empty urine into your bladder
- From your bladder, your urine leaves your body through the urethra

Other Interesting Facts

*Did you know that your bladder can only hold up to 600 ml...that is close to a bottle of Pepsi.

*Your kidneys help balance your body's vitamin and mineral levels so your other organs and bones can do their best work.

*Your kidneys help in the production of red blood cells and produce a form of vitamin D, which promotes healthy bones.

*Kidneys keep your blood pressure at a healthy level.

*When you feel thirsty, your brain is telling you to get more fluids to keep your body as balanced as possible.

*You might notice that sometimes your urine is darker in color than other times. Remember, urine is made up of water plus the waste that is filtered out of the blood.

*If you don't take in a lot of fluids or if you're exercising and sweating a lot, your urine has less water in it and it appears darker.

*If you're drinking lots of fluids, the extra fluid comes out in your urine, and it will be lighter.
Excretory System Worksheet

Please label this diagram of the excretory system.

*Students would use this to make their model excretory system.
Lesson Name: The Respiratory System (Part 1)

NSES Outcomes:
Standard A: Science as Inquiry
- Students use appropriate tools and techniques to gather, analyze and interpret data.
- Students develop descriptions, explanations, and models using evidence.

Curriculum Outcomes:
- Describe the structure and function of the major organs of the respiratory system (302-5c)

Content to Be Taught:
- Students will understand the important names and the functions of the respiratory system.

Children's Prior Knowledge and Misconceptions:
- Students have not studied the human body since grade 2 where they learned how to maintain a healthy lifestyle.
- Misconception: Students may think there are only three parts involved in the respiratory system, the nose, mouth, and lungs.

Performance Objective:
- Students will partake in a class discussion responding to questions involving breathing. They will then obtain important information through teacher instruction and self-discovery. Finally, the students will need to apply the information they have gathered to a high level thinking activity.

Concept Development:

<table>
<thead>
<tr>
<th><strong>ENGAGEMENT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials:</strong> chart paper and markers</td>
</tr>
<tr>
<td>Ask the students: Why do we need to breathe? Record the answers. The teacher will explain the important parts of the respiratory system, including the diaphragm and the trachea.</td>
</tr>
<tr>
<td><strong>Essential Questions</strong></td>
</tr>
<tr>
<td>- Why do we need to breathe?</td>
</tr>
</tbody>
</table>
- What does the respiratory system consist of?

### EXPLORATION

**Materials:** Teacher's guide, page 53, Website: [http://leavingbio.net/Respiratory%20System/THE%20RESPIRATORY%20SYSTEM.htm](http://leavingbio.net/Respiratory%20System/THE%20RESPIRATORY%20SYSTEM.htm)

Students will need their science journals and pencils.

- The teacher will explain all the parts of the respiratory system: the nasal cavity, the pharynx, the trachea and the lungs. Use the teacher's guide on page 53.
- In pairs, students will use the classroom computer to visit the website: [http://leavingbio.net/Respiratory%20System/THE%20RESPIRATORY%20SYSTEM.htm](http://leavingbio.net/Respiratory%20System/THE%20RESPIRATORY%20SYSTEM.htm)

Here, they will discover and find out more information about the respiratory system. They will record one important fact about each part in their science journal.

### EXPLANATION

**Materials:** Students may need markers/pencil crayons for their mini-presentation.

Staying in pairs, students will think, pair and share.
The pairs will discuss the question: Can we breathe without a diaphragm?
They will think of their answers with their partner and create a mini-presentation on their answers. They can use pictures and facts to present.

### ELABORATION

**Materials:** exit slip

In an exit slip students will answer the following question:
How can smoking have an effect on our respiratory system?

### EVALUATION

Students will be given participation points for their exit slip.

### ACCOMMODATIONS

**Differentiation:** Intrapersonal (taking notes), interpersonal (sharing notes), visual and auditory (looking at the online resource).

Students with learning disabilities will be observed and provided extra help if need.

Students will be working with the whole class, individually and in pairs.
Lesson Name: The Respiratory System (Part 2)

NSES Outcomes:
Standard A: Science as Inquiry
- Students use appropriate tools and techniques to gather, analyze and interpret data.
- Students develop descriptions, explanations, and models using evidence.

Curriculum Outcomes:
- Describe the structure and function of the major organs of the respiratory system (302-5c)

Content to Be Taught:
- Students will learn the important names of the respiratory system and apply them to the structure of the respiratory system.

Children’s Prior Knowledge and Misconceptions:
- Students have learned the names and functions of the respiratory system.
- Misconception: students may think the parts of the respiratory system are all on the outside of the body other than the lungs.

Performance Objective:
- Students will partake in a class discussion responding to questions involving breathing.
- Students will attempt to create the respiratory structure with plasticine.

Concept Development:

<table>
<thead>
<tr>
<th>ENGAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials:</strong> chart paper and markers</td>
</tr>
<tr>
<td>Have a discussion with students asking them the essential questions. Record students’ answers on chart paper.</td>
</tr>
<tr>
<td><strong>Essential Questions</strong></td>
</tr>
<tr>
<td>- What body parts do we use when we breathe?</td>
</tr>
<tr>
<td>- What organs do we use?</td>
</tr>
<tr>
<td>- Does everyone’s respiratory system looks the same?</td>
</tr>
</tbody>
</table>

| EXPLORATION |
**Materials:** Youtube video: The Respiratory System - [http://www.youtube.com/watch?v=VcxyVN49QtI&feature=related](http://www.youtube.com/watch?v=VcxyVN49QtI&feature=related)

YouTube video: Respiratory System - [http://www.youtube.com/watch?v=VcxyVN49QtI&feature=related](http://www.youtube.com/watch?v=VcxyVN49QtI&feature=related)

Science recording journals

Pencils

- The teacher will remind the students of what they had discussed and learned in the previous lesson about the names of the respiratory system.
- The teacher will play the YouTube videos: **The Respiratory System** and **Respiratory System**. Explain to students that they should take note of what the respiratory system looks like and what important parts are included in the structure. They will be asked to jot down notes they believe as important. They will be encouraged to draw what they see as well as write what they hear.

**EXPLANATION**

**Materials:** N/A

**Think, Pair, Share:** With the notes they have written down from the YouTube videos the students will find a partner and share their material. They will compare their notes and see the similarities and differences. They will add to their own personal notes if needed.

The teacher will have a whole group discussion:
- Have your opinions of how we breathe changed? If so, how?
- Can you describe what the structure of the respiratory system looks like now?
- What do you think are the most important parts of the respiratory system?

**ELABORATION**

**Materials:** Plasticine, recipe cards, diagram of respiratory system

Using plasticine students will create a 3D structure of the respiratory system. They will need to include all major parts they have learned about through the video and group discussion. Students should use a different color of plasticine for each important part of the structure. If students are having trouble the teacher will provide a printed diagram of the structure.

Once the structure is created students will use a recipe card to support why they made their respiratory structure the way they did. They will label each different organ by their color and name.

**EVALUATION**

Students will be evaluated on the structure of their respiratory system and the information they provide on the recipe card. Please see the rubric attached for grading system.

**ACCOMMODATIONS**

**Differentiation:** a variety of multiple intelligences will be used through out the lesson- kinesthetic (creating the structure out of plasticine), intrapersonal (taking notes), interpersonal (sharing notes), visual and auditory (watching the YouTube video).

Students with learning disabilities will be observed and provided extra help if need.

Students will be working with the whole class, individually and in pairs.
<table>
<thead>
<tr>
<th>Rubric for Respiratory Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td>Time and Effort</td>
</tr>
<tr>
<td>Planning and Explanation</td>
</tr>
<tr>
<td>Color Match</td>
</tr>
<tr>
<td>Understood Lesson</td>
</tr>
</tbody>
</table>
Diagram of the Respiratory system for those students who need it.
Lesson Name: The Circulatory System

NSES Outcomes:
Standard A: Science as Inquiry
- Students use appropriate tools and techniques to gather, analyze and interpret data.
- Students develop descriptions, explanations, and models using evidence.

Curriculum Outcomes:
- Describe the structure and function of the major organs of the circulatory system (302-5d)

Content to Be Taught:
- Students will understand the important names and structure of the circulatory system.

Children’s Prior Knowledge and Misconceptions:
- Students have just finished lessons on the structure and functions of the respiratory system.
- Students have little knowledge on the circulatory system.
- Misconception: Students may think that our blood is always red, even inside of our body.

Performance Objective:
- Students will listen to a rap song and take notes on the lyrics.
- Students will retrieve more information on the circulatory system through different resources, where they will then present the information to the class in small groups.
- Students will be able to complete a creative project that they will pass in to be marked.

Concept Development:

<table>
<thead>
<tr>
<th>ENGAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials:</strong> Rap Song: <a href="http://www.educationalrap.com/song/circulatory-system.html">http://www.educationalrap.com/song/circulatory-system.html</a> and lyrics (found on same website) printed out for students.</td>
</tr>
<tr>
<td>Play the rap song for students called “The Circulatory System.” When students have listened to it once, hand out the lyrics and have them pay close attention to the words.</td>
</tr>
</tbody>
</table>
Ask students to think about two important things they have learned from the rap song and have a group discussion.

**EXPLORATION**

**Materials:**
- Magazines, books, and laptops with access to internet.
- Large pieces of white paper.
- Markers, pencil crayons and crayons.

Students will use resources such as the internet, books and health magazines to find information on the circulatory system. In groups of 3 or 4 students will create a mini-presentation based on the facts they found out about the circulatory system. They will need to include drawings, symbols and facts.

**EXPLANATION**

**Materials:** N/A

Students will present the information they have found to the class. They will show what they know by sharing with their peers. The students who are not presenting will take notes on any information they may have not put on their own presentation.

**ELABORATION**

**Materials:** Access to a computer and fancy letter paper.

Students will be able to show what they have learned through the choice of a creative project.

**Choice Activity #1:**
Working individually, students will create a poem about the circulatory system. Students must include the key components of the circulatory system.

**Choice Activity #2:**
Working individually students will write a letter to a heart surgeon explaining why they should be able to operate on a heart. Students must include the key components of the circulatory system.

**EVALUATION**

Students will be formatively assessed through observation on their mini-presentations to their peers.
Students will be evaluated on the key information they include in their creative projects.

*Students will be given a checklist before they complete the creative project so they are aware of what they need to include.*

**ACCOMMODATIONS**

**Differentiation:**
- Students will be working with the whole class, individually and in pairs.
- Students are given a choice for creative assignments.
- The lesson is designed to reach out to different learners, auditory, hands on and visual.
Checklist for Creative Project:

<table>
<thead>
<tr>
<th>Students have:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Described the role of blood in their creative project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Described the role of the heart in their creative project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Described the role of blood vessels in their creative project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Described the main function of the circulatory system.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lyrics: Circulatory System

Chorus
Taking blood from the heart to the cells and back
Dealing with all things vascular and cardiac
Capillaries, arteries, and veins
All I’m saying is circulation is the name of the game

Verse I
Now let me start from the heart, ’cause that seems smart
It’s not hard to see that it’s the most important part
The first step is to gather up oxygen
Sends blood to the lungs, back to the heart again

Next up, we’ll talk about the arteries
They take blood from the heart to where it’s gotta be
The biggest artery, the main transporter
Right next to the heart, it’s called the aorta

Chorus

Verse II
From the arteries into the capillaries
All your organs and muscles become the beneficiaries
Of all the oxygen and nutrients they bring through
Very tiny vessels inside the body tissue

And now the oxygen’s gone
But first we have some carbon dioxide waste to take on
Then it’s into the veins, and back to the heart again
And let the whole cycle start again
Lesson Name: Breathing and Heart Rate

NSES Outcomes:
Standard A: Science as Inquiry
- Students use appropriate tools and techniques to gather, analyze and interpret data.
- Students think critically and logically to make the relationships between evidence and explanations.

Curriculum Outcomes:
- Propose questions about the factors that affect breathing and heartbeat rate and rephrase these questions in a testable form (204-1, 204-2).

Cross-Curricular Outcome:
Math-SP2 Construct and interpret double bar graphs to draw conclusions.

Content to Be Taught:
- The circulatory and respiratory systems will be investigated using pulse and breathing rates.

Children’s Prior Knowledge and Misconceptions:
- Students have had lesson on the respiratory and circulatory systems. They investigated the structure and function of each.

Performance Objective:
- Students will record and evaluate their own pulse and breathing rates. They will discuss their findings with a peer and compare what each of their findings are.
- Students will create a graph showing their data they recorded.

Concept Development:

<table>
<thead>
<tr>
<th>ENGAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials: N/A</td>
</tr>
<tr>
<td>The teacher will conduct a whole group discussion with the class.</td>
</tr>
</tbody>
</table>

| Essential Question: |
| How do you think exercising effects our breathing and pulse rates? |

| EXPLORATION |
**Materials:** CD: Sigur Ros, stop watch, paper and a pencil

**Activity #1 completed individually: Pulse Rate**

1. Have all students sitting comfortably in their chairs. Tell them we are going to relax for 3 minutes. Play a slow, peaceful song: Andvari-Sigur Ros.
2. Show students how to locate their pulse. (Model this)
   a) Turn your left palm upside down.
   b) Place the first two fingers of your right wrist directly below your left wrist. Move your fingers around until you feel your pulse.
   c) Once you have found a good spot, press lightly and hold your fingers there.
3. Set a timer and have the students record their pulse for one minute by counting the number of pulses they feel.
4. Have students walk slowly for 3 minutes on the spot. Immediately have them record their pulses.
5. Have the students run on the spot for 3 minutes. Immediately record their pulses.

**Activity #2 completed in pairs: Breathing Rate**

1. Students are sitting comfortably in their chairs. Finish the song: Andarvi-Sigur Ros so students can relax.
2. For 30 seconds one partner will count how many times their partner breathes. They will do this by counting the number of times the chest moves up. (Model this).
3. Partners switch roles. Repeat for 30 seconds.
4. One partner runs on the spot for 1 minute. Record their breathing.
5. Partners switch roles.

**EXPLANATION**

**Materials:** N/A

In pairs, students will discuss their individual findings on their pulse rates and breathing rates. They will discuss the question: Why do you think your pulse rate and breathing rate increased as you were exercising? Have your thoughts changed from our initial discussion?

**ELABORATION**

**Materials:** Graph paper and pencils, rulers, pencil crayons

Students will draw a graph to illustrate their results. They will need to include their pulse rates at rest and after exercise, as well as breathing rates at rest and after exercise.

**EVALUATION**

Students will be assessed formatively through observation while they are calculating their heart and breathing rates.

Use the rubric attached to grade the students’ graphs.

*Students will be given the rubric before the begin creating their graphs so they are aware of what to include.

**ACCOMMODATIONS**

**Differentiation:**
- The teacher will use flexible grouping.
- The activities are hands on for kinesthetic learners.
- Accommodation: If some student’s are having difficulty in recording their pulse rate they can work in partners.
**Rubric for graph:**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labeling of X axis:</td>
<td>The X-axis has a clear, neat label that describes the units used for the independent variable (e.g., days, months, participants' names).</td>
<td>The X-axis has a clear label that describes the units used for the independent variable.</td>
<td>The X-axis has a label.</td>
<td>The X-axis is not labeled.</td>
</tr>
<tr>
<td>Labeling of Y axis:</td>
<td>The Y-axis has a clear, neat label that describes the units and the dependent variable (e.g., % of dog food eaten; degree of satisfaction).</td>
<td>The Y-axis has a clear label that describes the units and the dependent variable (e.g., % of dog food eaten; degree of satisfaction).</td>
<td>The Y-axis has a label.</td>
<td>The Y-axis is not labeled.</td>
</tr>
<tr>
<td>Data Table:</td>
<td>Data in the table is well organized, accurate, and easy to read.</td>
<td>Data in the table is organized, accurate, and easy to read.</td>
<td>Data in the table is accurate and easy to read.</td>
<td>Data in the table is not accurate and/or cannot be read.</td>
</tr>
<tr>
<td>Criteria</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------------------------------</td>
<td>----------------------------------------</td>
<td>----------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Neatness and Attractiveness:</td>
<td>Exceptionally well designed, neat, and attractive. Colors that go well together are used to make the graph more readable. A ruler and graph paper (or graphing computer program) are used.</td>
<td>Neat and relatively attractive. A ruler and graph paper (or graphing computer program) are used to make the graph more readable.</td>
<td>Lines are neatly drawn but the graph appears quite plain.</td>
<td>Appears messy and &quot;thrown together&quot; in a hurry. Lines are visibly crooked.</td>
</tr>
</tbody>
</table>
Teacher: Emily Coady  
School/District: N/A  
Subject Area(s): Science  
Grade Level: 5  
Date: N/A  
Lesson Duration: 60 minutes

Lesson Name: The Skeletal, Muscular, and Nervous Systems (Part 1)

NSES Outcomes:
Standard A: Science As Inquiry
Students develop descriptions, explanations, and models using evidence.
Students use appropriate tools and techniques to gather, analyze, and interpret data.

Curriculum Outcomes:
Students will be expected to;
- Describe the structure and function of the major organs of the nervous systems (302-5e)
- Demonstrate how the skeletal, muscular, and nervous systems work together to produce movement (302-6)

Content to Be Taught:
- Students will understand the important names and structure of the Skeletal System.

Children’s Prior Knowledge and Misconceptions:
- Students have not studied the human body since grade 2 where they learned how to maintain a healthy lifestyle.
- Students have already learned about the respiratory, circulatory, digestive, and excretory systems.

Performance Objective:
- Students will work together in small groups to create a life-size diagram that illustrate and label the major bones of the body.

Concept Development (1st lesson of four):

<table>
<thead>
<tr>
<th>ENGAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials:</strong> YouTube video: The Skeletal System – <a href="http://www.youtube.com/watch?v=8d-RBe8JBVs">http://www.youtube.com/watch?v=8d-RBe8JBVs</a>, science recording journals, pencil, chart paper, markers</td>
</tr>
</tbody>
</table>
To engage students, show them a YouTube video on the skeletal system. Have them write down notes as they watch (questions will be asked after video). Following the video ask students to answer the following question in their science recording journal. What is the main purpose of our bones? Give them a few minutes to record their answer and then begin a class discussion asking them the same question followed by some follow up questions such as, How many bones do we have in our body? Would we be able to stand without bones or hold a glass of milk? How many types of bones are there and what are the different shapes? Record students’ answers on chart paper. The teacher will go over some important information that was mentioned in the video that should be repeated before starting the activity - Adults have 206 bones. Babies are born with about 300 bones, but many fuse together as the baby grows. There are four types of bone: *long bones*, which are strong, compact and slightly curved; *short bones*, which are spongy; *flat bones*, which consist of layers of compact and spongy bone; and *irregular bones*, which contain various proportions of compact and spongy bone. These main types of bones, connected by joints, make up the human skeleton – skull, spine, ribs, limbs.

**EXPLANATION**

**Materials:** x-rays (skull, hand, foot, ribs, arm, hip, and leg), science recording, journals, pencils

**Activity:**
Explore by showing students different x-rays of the major bones of the human body. Give students choice of x-ray they would like to observe – skull, hand, foot, ribs, arm, hip, leg. Form group based on x-ray chosen. Once groups are made, students will be asked to draw and identify the x-ray in their science recording journals (group discussion is encouraged). The teacher will monitor the class and offer assistance. After they are finished recording, give each group the matching x-ray that belongs to the x-ray they currently have. As a group, determine what is different about the two x-rays? Record findings in science journal.

**EXPLANATION**

**Think, Pair, Share:** With the notes they have written down from the x-ray activity, students will find a partner and share their material (the teacher will put x-rays on board for all to see). They will compare their observations and ask and answer any questions that arise. They will also record the findings of their partner’s x-ray.

Short whole-class presentation –
In partners (same as above) share with class the observations made. Each partner presents the other partner’s findings.

**ELABORATION**

**Materials:** mural paper, markers, coloured pencils, scissors, glue/tape, pencils, erasers
Activity:
• Students will be put into groups of 3-5 people.
• Each group will be given two pieces of mural paper.
• They will create a life-size human body by tracing the body of two group members on each sheet. One will be labeled, Anterior (front view), the other Posterior (back view).
• Everyone in the class will be given a handout of the Skeletal System.
• By observing the handout, they will draw and label the bones of the body
• Each bone should be coloured a different colour so to distinguish it from the rest.
• Bones should be made life-size.

EVALUATION
Students will be evaluated on the structure of their skeletal system. See checklist below.

ACCOMMODATIONS
Differentiation: a variety of multiple intelligences will be used throughout the lesson- kinesthetic (creating the skeletal system on larger mural paper), intrapersonal (taking notes), interpersonal (sharing notes), visual and auditory (watching the YouTube video).

Students will be working with the whole class, individually and in pairs.

Checklist

<table>
<thead>
<tr>
<th>Student Name:</th>
<th>There</th>
<th>Almost there</th>
<th>Not there yet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All major bones are illustrated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bones are represented in different colours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All bones are labeled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bones are identifiable</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Skeletal System

Anterior

Skull

Clavicle

Sternum

Humerus

Ribs

Vertebral Column

Pelvic Girdle

Radius

Ulna

Carpals

Metacarpals

Phalanges

Femur

Patella

Tibia

Fibula

Posterior

Scapula

Ilium

Ischium

Pubis

Tarsals

Phalanges

Metatarsals
Lesson Name: The Skeletal, Muscular, and Nervous Systems (Part 2)

NSES Outcomes:
Standard A: Science As Inquiry
Students develop descriptions, explanations, and models using evidence.
Students use appropriate tools and techniques to gather, analyze, and interpret data.

Curriculum Outcomes:
Students will be expected to;
- Describe the structure and function of the major organs of the nervous systems (302-5e)
- Demonstrate how the skeletal, muscular, and nervous systems work together to produce movement (302-6)

Content to Be Taught:
- Students will identify the two kinds of muscle action--voluntary and involuntary--and give an example of each.

Children's Prior Knowledge and Misconceptions:
- Students have completed a lesson about the skeletal system.

Performance Objective:
As humans, our sense of well-being and ease in our bodies is determined in large measure by our “sense” of our muscles. For instance, we may say we feel “stiff”, “achy”, or “tense” in our shoulders or back when we play or work those muscles too much. We think of our muscles as being “in shape” or “out of shape.”

There are three kinds of muscle:
1. Smooth – Found in the hollow walls of the body organs (colon, small intestine, rectum, etc.), the blood vessels, and the respiratory passageways.
2. Cardiac - These are the muscles of the heart.
3. Skeletal - These are the muscles that attach to bones and produce movement at the joints. Skeletal muscles attach on the rough places, protrusions, and hollows on the bones that students learned about in Grade 3: The Skeletal System.

There are about 600 skeletal muscles in the body. Skeletal muscles alone make up about 40% of body weight. Muscles usually act in pairs or groups to accomplish movement. The muscles in your face are attached to the skin. These are the facial muscles that put a smile on your face when you are laughing, or wrinkle your brow when you are puzzled.
Muscles come in many shapes, sizes, and thicknesses. The smallest muscles are in the middle ear. The largest muscle is the gluteus maximus that forms the buttock. Another unusual muscle is the diaphragm. This muscle is attached along the edge and inside of the ribcage. The diaphragm is the primary muscle for breathing.

Muscular action is categorized as voluntary (operates under conscious control) or involuntary (operates automatically, without conscious decision or direction.)
- Smooth muscle and cardiac muscle are INVOLUNTARY. These are the muscles, operating automatically, without conscious effort, that control the internal systems of the body—the digestive, circulatory, urinary, and reproductive systems. These muscles work “automatically” to keep us healthy even when we are asleep.
- Skeletal muscle is VOLUNTARY, because it operates under conscious control.

**Interesting information about muscles to share with the students:**
- Muscle makes up the vast majority of everything underneath the skin.
- Muscles account for about half of a person’s total body weight. Connect to math – have students weigh themselves and determine what that half amounts to for each of them.
- There are about 600 skeletal muscles in the body.
- Muscles come in many shapes, sizes, and thicknesses.
- The smallest muscles are in the middle ear.
- The largest is the gluteus maximus muscle that forms the buttock.
- There is a very interesting muscle called the diaphragm. This muscle is attached along the edge and inside of the ribcage. The diaphragm is the primary muscle for breathing.
- While most muscles attach to bones, the muscles in your face are attached to the skin. Facial muscles are the muscles that put a smile on your face when you are laughing, or wrinkle your brow when you are puzzled.

**Concept Development (2^nd lesson of four):**

<table>
<thead>
<tr>
<th>ENGAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials:</strong> N/A</td>
</tr>
<tr>
<td>Invite a lunch worker to the classroom. Ask them to bring with them a piece of chicken and/or red meat. Ask students; “What is this?” (meat) “Besides meat, what is this in the body?” (is it bone, fat, etc.?) Write down predictions in science journal. Once everyone has an answer, share responses. Ask students; “Can we see the bone?” (No) “How do we know this isn’t bone?” (Colour, hardness.) “What do we think this is?” (Muscle) “What do muscles do for our body?” Why do we need it?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXPLORATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials:</strong> Handout, scissors</td>
</tr>
</tbody>
</table>
Activity:
Give students a list of muscles, body organs, and the heart (See Figure 1 below). Have the students cut out each word/body part and then group things that are alike together. Come together and share how they grouped things together. Now explain to the students that each part listed is a muscle. Some of these muscles move all the time without us telling them to. Other muscles we can control. We can tell those muscles when to move. Have the students group the muscles, organs, and heart again, this time according to muscles we control and muscles that we can’t control. Have the students share which muscles and organs they put in the “Voluntary” group and which ones they classified as “Involuntary.”

EXPLANATION
An important function of muscle is movement. Muscle movement can be voluntary or involuntary. Voluntary muscles operate under conscious control. Involuntary muscles operate automatically without conscious decision or direction. These are the muscles that control the internal systems of the body—the digestive, circulatory (heart and blood vessels), and reproductive systems. These muscles work “automatically” to keep us healthy, even when we are asleep.

ELABORATION
Materials: blank chart to fill out, pencil
Students will be given a blank chart (see below, figure 2) to answer the following question in groups;

“Why are some muscles voluntary and some involuntary? How are voluntary muscles helpful? How are involuntary muscles beneficial to us?”

(How chart should look)

<table>
<thead>
<tr>
<th>Types</th>
<th>Example</th>
<th>Action</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smooth</td>
<td>Intestines</td>
<td>Involuntary</td>
<td>Allows you to digest your lunch while at school, and breath while you’re asleep.</td>
</tr>
<tr>
<td></td>
<td>Stomach</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lungs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac</td>
<td>Heart</td>
<td>Involuntary</td>
<td>Keeps heart beating when you’re asleep.</td>
</tr>
<tr>
<td>Skeletal muscle</td>
<td>Muscles of the upper arm, back, and leg</td>
<td>Voluntary</td>
<td>Helps you throw a baseball in the direction you want, bend over and touch your toes, or kick a soccer ball and score a goal.</td>
</tr>
</tbody>
</table>

1. **Skeletal**—Ask students to think about where these muscles attach to bones, and to consider that when all the bones are put together we are looking at the skeleton (skeletal muscles.) These are the muscles that attach to bones and produce movement at the joints. Skeletal muscles attach on the rough places, protrusions, and hollows on the bones that students learned about in Grade 3: The Skeletal System.
2. **Cardiac**—Ask students what kind of muscle makes up the heart muscle. Explain that another word associated with the heart is cardiac, so cardiac muscles are the muscles of the heart.
3. **Smooth**—Use the charts from the Kit (optional) for the Cardiovascular, Digestive, and Urinary Systems. Ask the students to examine the pictures of the stomach, intestines, and urinary tract and to explain what they think the surface of the muscle is like. Try to get them to come up with the word *smooth.* These smooth muscles are found in the hollow walls of the body organs (colon, small intestine, rectum, etc.), the blood vessels, and the respiratory passageways.

**EVALUATION**

Students will be evaluated on Figure 2. See checklist below.

**ACCOMMODATIONS**

**Differentiation:** a variety of multiple intelligences will be used throughout the lesson - kinesthetic (cutting and manipulating), intrapersonal (taking notes), interpersonal (sharing notes), visual (watching lunch worker with meat)

Students will be working with the whole class, individually and in groups.
**Checklist**

<table>
<thead>
<tr>
<th>Student Name:</th>
<th>There</th>
<th>Almost there</th>
<th>Not there yet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chart includes all accurate information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examples are provided for each type of muscle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action is correct for each type of muscle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least one benefit is given for each</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1**

<table>
<thead>
<tr>
<th>Heart</th>
<th>Small Intestines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Intestines</td>
<td>Arm Muscles</td>
</tr>
<tr>
<td>Back Muscles</td>
<td>Leg Muscles</td>
</tr>
<tr>
<td>Lung Passages</td>
<td>Hand Muscles</td>
</tr>
<tr>
<td>Stomach</td>
<td>Blood Vessels</td>
</tr>
</tbody>
</table>
**Figure 2**

<table>
<thead>
<tr>
<th>Types</th>
<th>Example</th>
<th>Action</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smooth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skeletal muscle</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lesson Name: The Skeletal, Muscular, and Nervous Systems (Part 3)

NSES Outcomes:
Standard A: Science As Inquiry
Students develop descriptions, explanations, and models using evidence.
Students use appropriate tools and techniques to gather, analyze, and interpret data.

Curriculum Outcomes:
Students will be expected to:
- Describe the structure and function of the major organs of the nervous systems (302-5e)
- Demonstrate how the skeletal, muscular, and nervous systems work together to produce movement (302-6)

Content to Be Taught:
In this lesson students will understand the important names and structure of the Muscular System.

Children's Prior Knowledge and Misconceptions:
Students have completed two lessons about the muscular and skeletal systems.

Performance Objective:
Students will build on their life size diagram illustrating the major muscles of the body. After learning about how the human body is structured and how our posture is so important, students will present their diagrams to the class and perform an exercise identifying all of the bones and muscles involved in that exercise.

Concept Development (3rd lesson of four):

<table>
<thead>
<tr>
<th>ENGAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials: Pencil, Figure 1</td>
</tr>
<tr>
<td>Have the students analyze an experience with posture and support in their own bodies.</td>
</tr>
<tr>
<td>Have students fill out chart below (Figure 1)</td>
</tr>
</tbody>
</table>

1. Ask the students to notice their posture exactly as they are sitting right now. Without moving, have them describe their posture. 
Ask students:
“How are you sitting? Are you leaning? Are you slouched down in your chair/desk?
OBSERVE: how does your back feel? Your shoulders?, Your neck? What muscles are you feeling the most right now? Observe how the muscles feel. How are you breathing?”
Notice if you feel tense, achy, or at ease. Where are you feeling that in your body?”

Have students write their description and observations in the first and second columns.

Ask the students to move themselves to a position that gives their body more support.
You can give the students the following cues to guide them in changing their posture:
• Place both feet on the floor.
• Straighten your spine.
• Arrange your shoulders so they feel as if they are over your hips and not leaning forward, backward, or to the side.
• Drop your chin just a little.
• Take a breath, letting your shoulders drop.
• Lift the top of your head towards the ceiling, taking an easy, soft and full breath IN, followed by a slow breath OUT.

3. Ask the students to notice how they are feeling now.
Say: “Observe: How do your back, shoulders, and neck feel? What muscles are you feeling the most right now? Observe how the muscles feel. How are you breathing? Notice if you feel tense or achy. Where are you feeling at ease in your body?” Have students write their description and observations in the third and fourth columns.

4. Ask the students to say why they think they felt differently in the two postures. What was happening with their muscles and their skeleton between the first posture and the second posture?

**EXPLORATION**

**Materials:** Sticks, scissors, tape, plasticine, rubber bands

**Activity:**
A second important function of the Skeletal Muscles is maintaining posture and support.
Divide class into smaller groups and have students build a skeleton. Give each group a bucket of sticks (no extra materials). Tell the students they need to build a skeleton that is able to stand erect. Ask students:
“What do you think the sticks represent?” (Bones.)
Let the students begin building. Right away the students will notice a problem - There is no way to get their skeleton to stand up. When they recognize that it’s not possible to build a skeleton this way, have one group share why that is impossible and what they need to make it possible.
Ask students; “What do our bones need so we can maintain posture and support?” (Muscles.)

Now give each group one kind of connecting material such as tape, plasticine, and rubber bands (which the group can cut). Each group should be given only one type of connecting material and each group should have a different kind of connecting material from that of the other groups.

Tell students the connecting materials represent muscles. Have each group construct a skeleton with the sticks and connecting material. Clarify for the students the number of
sticks they should use for their skeleton: •Feet (two) •Legs (two for each side) •Hips (one) •Spine (one) •Ribs (three or four for each side) •Shoulders (two) •Arms (two for each side) •Head (one)

After each group has completed their skeleton, have them present it to the class. Ask each group to demonstrate their skeleton bending over and bending the leg or arm. Many will discover that they can’t do this or the skeleton will break. Discuss the reasons for this. Save the rubber band group for last. That group should be able to bend the skeleton over and back. What does this illustrate? (Muscles are elastic; they move the body and they maintain posture.)

**EXPLANATION**

- **Materials:** YouTube video: The Muscular System – http://www.youtube.com/watch?v=RsWNyqnHQ2I

Show how the posture is maintained. As you bend the whole body over it stays connected; it doesn’t fall apart. Explain that muscles hold the body together as you move. Next, consider what would happen if you didn’t have muscles. When you bent over or bent a joint, the skeleton would not move and would probably fall apart.

Ask students;

“From this, what can we conclude?” (That muscles help us move and maintain posture/support.) Reinforce the notion that the muscles of the back, shoulder, chest, neck and abdomen are some of the muscles involved in posture.

Use a skeleton model to show students the bony structure under the muscles and indicate where the muscles of back, neck and abdomen would be. Show students a YouTube video on the Muscular System.

**ELABORATION**

- **Materials:** mural paper, construction paper, markers, colour pencils, scissors, glue/tape

**Activity – adding muscles to their life-size skeletal frame**

- Students will get back into the same groups they worked on the life-size human body with.
- Using handout for guidance (see figure 2&3 below), students will make the major muscles of the body by cutting them out of construction paper. Each muscle needs to be labeled and represented in a different colour. They will identify muscles of both the anterior and posterior body.
- They will attach the muscles to the body using tape or glue.
- When finished, students will present their human body to the class. As a group they will demonstrate one of the following exercises; squat, push-up, sit-up, glute bridges, wall sits, scapula adduction exercises. They will identify the bones and muscles being used for the exercise they have chosen.

**EVALUATION**

Students will be evaluated on the structure of their muscular system and presentation. See checklist below.

**ACCOMMODATIONS**
**Differentiation:** a variety of multiple intelligences will be used throughout the lesson- kinesthetic (creating a skeletal structure out of sticks and adhesive material as well as cutting out muscles and building them onto their skeletal system), intrapersonal (taking notes), interpersonal (sharing notes), visual and auditory (watching and listening a YouTube video as well as their peers presentations)

Students will be working with the whole class, individually and in groups

**Checklist**

<table>
<thead>
<tr>
<th>Student Name: ___________________________</th>
<th>There</th>
<th>Almost there</th>
<th>Not there yet</th>
</tr>
</thead>
<tbody>
<tr>
<td>All major muscles are illustrated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscles are represented in different colours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All muscles are labeled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscles are identifiable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every bone and muscle is identified that corresponds with the exercise presented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Posture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted Posture</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 5-1. Skeletal and facial muscles, anterior view.
Figure 3

Figure 5-2. Skeletal and facial muscles, posterior view.
Lesson Name: The Skeletal, Muscular, and Nervous Systems (Part 4)

NSES Outcomes:
Standard A: Science As Inquiry
Students develop descriptions, explanations, and models using evidence.
Students use appropriate tools and techniques to gather, analyze, and interpret data.

Curriculum Outcomes:
Students will be expected to:
- Describe the structure and function of the major organs of the nervous systems (302-5e)
- Demonstrate how the skeletal, muscular, and nervous systems work together to produce movement (302-6)

Content to Be Taught:
In this lesson students will understand the important names and structure of the Nervous System.

Children’s Prior Knowledge and Misconceptions:
- Students have now completed 3 lesson plans about the muscular and skeletal systems.
- Students probably have no idea what the nervous system is.

Performance Objective:
Students will work in groups and individually to become familiar with how the nervous system works. They will complete a small homework assignment, illustrating motor and sensory nerves. In groups they will create a learning station that focuses on one particular topic of the nervous system, including all necessary information and present it to their peers.

Concept Development (4th lesson of four):

ENGAGEMENT
Materials: erasers, stopwatch/timer, paper, pencil
**Activity:**
Have students work in groups of three to do a quick experiment on reflexes. Each group will be given a small object, such as an eraser, to be caught and held with one hand. They will also be given a stopwatch or timer to record their results.

In the experiment one student will hold the object in front of the other student. The object will be held at about shoulder height of the second student and at about arm’s length away. The second student will have their arms down by their sides. The first student will softly count to five and let the object go. When they let go they say “drop”. The second student must catch the object with their dominant hand. When the student catches the object they must say “catch”. The third student watches the time and starts recording when they hear “drop” and stops recording when they hear the word “catch”. This is repeated two more times and recorded. Then the object is dropped and the student attempts to catch it with their non-dominant hand. This is done 3 times and recorded. Repeat for the second and third student. Each student should get a turn to drop, catch, and record the time. Find averages.

Have the class discuss their results and the differences, if any, between the dominant and non-dominant hands. Use this simple experiment to introduce the brain and nervous system involvement in eye-hand coordination, reflexes, and left and right sidedness.

**EXPLORATION**
Organize the students to work together in groups of 5. Give each group three simply objects different in colour and shape such as an apple, orange, and banana. Ask one student from the group to draw the fruit. Ask the other group members to pay attention to all the activities going on in the drawer’s body that helps them draw the fruit and keeps their body working while they draw the fruit. Have the students take notes in their science journal about what they notice. Ask them to notice everything large and small, voluntary and involuntary, that the drawer’s body does. After 5 minutes, have each group make a master list of everything the group thought of. Have each group record which body systems are involved. One student in the group should be the recorder. Another student can present their information to the class.

Possible answers:
- Sensory signals from the eye about fruit color, shape, etc.,
- Image recognition, memory access,
- Motor signals to the hand and fingers holding the pencil, to direct the pencil to draw the image,
- Motor signals for sitting position remaining upright, leaning on the desk, crossing the legs, etc.
- Heart muscle pumping
- Breathing
- Temperature sense on skin-cold or warm in the room
- Smells they are aware of
- Sounds in the room or outside
- Digestion after lunch, or hunger pangs if before meal break
- Other unconscious body activities such as scratching nose or ear, sneezing, etc.
Have each group’s presenter tell the class what they discovered. Teacher records the answers on the board.

EXPLANATION

**Materials:** YouTube video: Nervous System – [http://www.youtube.com/watch?v=GTv2mRH1Wac](http://www.youtube.com/watch?v=GTv2mRH1Wac), signs

Ask students;

“What part of our body makes all this happen? What body system controls our body?”
(Brain and nervous system)

The nervous system is the master coordinator of the body. The nervous system coordinates each body system within its own system and with all the other systems. All movements and sensation as well as thoughts, emotions, and memory are controlled by the nervous system. Since conditions within and without the body are constantly changing, the nervous system monitors changes or stimuli, stores information and/or initiates response impulses throughout affected body systems for action and sensation, emotion, thought, and memory.

Show students short YouTube video on the nervous system.

**Activity - Role Play**

Act out the parts of the nervous system and what each one’s function is in a skit. One student will be the brain, acting as the “control center”. This student will send messages to students acting as five senses and other body parts on note cards, and receive information on note cards from those body parts and senses. Students acting as the spinal cord will pass along the messages, and the rest of the students will run messages and incoming information along the nerves. A diagram will be taped on the floor of the nervous systems and their locations.

ELABORATION

**Materials:** poster board, cardboard, large drawing paper, paint, string, modeling clay, tubes, beads, markers, coloured pencils

**Activity - Learning Stations about the Brain and Nervous system**

Have students work together in groups and choose the subject they want to learn more about.

Suggested topics are: parts of the nervous system, parts of a neuron, sensory neurons, motor neurons, how neurons work, what neurotransmitters are, is there only one kind of neurotransmitter, spinal cord, whole body layout of the nervous system.

The assignment for each group is to:

1. Create a model or drawing of their subject.
   a. Explain its function, what it does,
   b. Explain its role in a healthy body
   c. Indicating the different parts and function

3. Divide the tasks among themselves to complete their Learning Station.

Have each group do research on basic information about their subject: how big is it, how
much does it weigh, how long is it, where is it in the body, what is around it, what does it do?
Have materials available for them to choose from.
Encourage the groups to create a simple experiment to demonstrate how their subject works, to measure and record its activity, and/or to test a question about it. The students can create their own experiment or go online to find suggestions.

**EVALUATION**

For homework, students are to complete the handout below. During the following class, students will present their learning stations. Students will be evaluated based on the checklist below

**ACCOMMODATIONS**

**Differentiation:** a variety of multiple intelligences will be used throughout the lesson - kinesthetic (reflex activity, role play), intrapersonal (taking notes), interpersonal (sharing notes), visual and auditory (watching the YouTube video along with observing the learning stations of their peers).

Students will be working with the whole class, individually and in groups.

---

**Checklist**

<table>
<thead>
<tr>
<th>Student Name: __________________________</th>
<th>There</th>
<th>Almost there</th>
<th>Not there yet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model or drawing is accurate and represents their topic.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function of topic is accurate and clearly stated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role of topic is accurate and clearly explained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Different parts of the function are indicated and correct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homework assignment is completed with all of the necessary information indicated</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Nervous System

Name ______________________________

1. Choose to two colours of marker or pencil
2. Draw lines with arrows on them showing motor nerves carrying messages out to the muscles, and sensory nerves carrying information from the outside would to the brain.
3. Complete the color key below with your colors and labels (motor nerve, sensory nerve).
Lesson Name: Maintaining a Healthy Body: Food Power!

NSES Outcomes:
Standard A: Science as Inquiry
- Students identify questions that can be answered through scientific investigations.
- Students use appropriate tools and techniques to gather, analyze, and interpret data.

Curriculum Outcomes:
- Describe nutritional and other requirements for maintaining a healthy body (302-9)

Content to Be Taught:
- Students will become familiar with Canada’s Food Guide.
- Students will have an understanding of the necessary diet to maintain a healthy body.
- Students will be aware that exercise is also a requirement for maintaining a healthy body.

Children’s Prior Knowledge and Misconceptions:
- Students will have learned about healthy lifestyles in grades K-2 (You and Your World)
- Students may not realize that eating a healthy diet means more than just eating vegetables.

Performance Objective:
- Students will watch the video “Brandon’s Story” and participate in a class discussion.
- Students will plan a healthy meal based on the requirements outlined by Canada’s Food Guide.

Concept Development:

<table>
<thead>
<tr>
<th>ENGAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials:</strong> SmartBoard, Brandon’s Story (video)</td>
</tr>
<tr>
<td>- Using the SmartBoard, play Brandon’s Story (<a href="http://kidshealth.org/kid/stay_healthy/weight/brandon_vd.html#cat20290">http://kidshealth.org/kid/stay_healthy/weight/brandon_vd.html#cat20290</a>) for students. Engage in a whole-class discussion about what Brandon does to stay</td>
</tr>
</tbody>
</table>
healthy.

*Essential Questions*
- What kind of food should we be eating?
- How much food should we eat each day?

**EXPLORATION**

**Materials:** Canada’s Food Guide and Rainbow
- Pass out Canada’s Food Guide to students and allow them some time to look at it and discuss with their group members.

**EXPLANATION**

**Materials:** N/A
- After students have had time to look at the Food Guide, engage in a full-class discussion. Allow each group to share their thoughts: whether or not they were surprised, are they eating enough of the right foods, etc.

**ELABORATION**

**Materials:** “Go Slow, and Whoa! A Kid’s Guide to Eating Right,” copy of Canada’s Food Guide for each student, pencils, paper
- Show students “Go Slow, and Whoa! A Kid’s Guide to Eating Right” ([http://kidshealth.org/kid/stay_healthy/food/go_slow_whoa.html#cat119](http://kidshealth.org/kid/stay_healthy/food/go_slow_whoa.html#cat119)) If they have personal computers, they may look at the article themselves. Discuss the different categories of food.
- Individually or in pairs, using the two guides, have students plan a healthy meal they would eat.

**EVALUATION**
- Using the attached checklist, the meals the students planned will be used as formative assessment.

**ACCOMMODATIONS**
- Students were able to work individually or in pairs.
- The lesson had visual and audio components. Students could read or listen to the information being presented.

### Healthy Meal Plan Checklist

<table>
<thead>
<tr>
<th>Name</th>
<th>Meal was Planned</th>
<th>Included 4 Food Groups</th>
<th>Portion Sizes are Listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student A (actual name would be here)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student B</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lesson Name: Maintaining a Healthy Body: Who Can Help?

NSES Outcomes:
Standard A: Science as Inquiry
- Students identify questions that can be answered through scientific investigations.
- Students use appropriate tools and techniques to gather, analyze, and interpret data.
- Students develop descriptions, explanations, and models using evidence.
- Students think critically and logically to make the relationships between evidence and explanations.

Curriculum Outcomes:
- Describe nutritional and other requirements for maintaining a healthy body (302-9)
- Describe and compare the techniques used by different people in their community and region, to address their health requirements (107-2)

Content to Be Taught:
- Students will be aware that along with nutrition, exercise is also a requirement for maintaining a healthy body.
- Students will learn that there are people in their community who can help them achieve and maintain a healthy lifestyle.

Children’s Prior Knowledge and Misconceptions:
- Students will have learned about healthy lifestyles in grades K-2 (You and Your World)
- Students will have learned about Canada’s Food Guide in the previous lesson.

Performance Objective:
- Students will watch and listen to guest speakers’ presentations.
- Students will be able to describe how people within their community help them achieve and maintain a healthy lifestyle.
- Students will keep a journal, in which they will record what they eat, their physical activity, and who helps them maintain a healthy lifestyle.

Concept Development:
**ENGAGEMENT**

**Materials:** SmartBoard, Brandon’s Story (video)

- Remind students of the video (Brandon’s Story) that they watched during the previous lesson. Ask them what Brandon did to become healthier. If they say they don’t know or don’t remember, play the video again.
- Using the SmartBoard, play Brandon’s Story ([http://kidshealth.org/kid/stay_healthy/weight/brandon_vd.html#cat20290](http://kidshealth.org/kid/stay_healthy/weight/brandon_vd.html#cat20290)) for students.
- Ask students if Brandon had help to become healthy. If so, who? (Ex: family, doctors, a counselor, etc)

**Essential Questions**
- Who are some people in our community that can help us be healthier?
- How healthy is each of us?

**EXPLORATION**

**Materials:** guest speakers (doctor, guidance counselor/psychologist, physical education teacher)

- Guest speakers will talk to students; make presentations, or complete activities with them.

**EXPLANATION**

**Materials:** pencil and paper, chart paper, marker

- Students will “Think-Pair-Share” to discuss the presentations they just saw.
- Students will list (write down) at least 5 ways the guest speakers (or other members of the community) can help them to be healthier.
- Each pair will share one of the items on their list with the class. The teacher will record them on the chart paper. At the end, students will have a visual resource that demonstrates who in the community can help them be healthier and how.

**ELABORATION**

**Materials:** duotang, paper, pencil, markers, pencil crayons, crayons, rubric

- As formative and summative assessment for the unit, students will create a journal.
- In the journal, students will keep track of what they eat and their physical activity for a week (7 days). They should also have a page dedicated to people who help them be healthier. On this page, they will list the title of the person who helped them (parent, doctor, teacher, etc) and how the person helped them.

**EVALUATION**

- Using the attached rubric, students’ journals will be used as formative and summative assessment.

**ACCOMMODATIONS**

- Students were able to work individually and in pairs.
- The lesson had visual and audio components. Students could read or listen to the information being presented.
- Students may type or handwrite their journal entries.
<table>
<thead>
<tr>
<th>Personal Health Journal</th>
<th>Excellent</th>
<th>Good</th>
<th>Needs Improvement</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completeness</td>
<td>All information is included: physical activity, what you ate, and list of people who helped you.</td>
<td>Two of the components of information are included.</td>
<td>One of the components of the information is included.</td>
<td>None of the required information is included.</td>
</tr>
<tr>
<td>Presentation (Is it neat and tidy?)</td>
<td>Journal is in a notebook of some kind (duotang, campfire, etc), writing is legible, and information is easily understood (i.e. it is not crowded together all on one page)</td>
<td>Two of the criteria from the first column are met.</td>
<td>One of the criteria from the first column is met.</td>
<td>None of the criteria from the first column are met.</td>
</tr>
<tr>
<td>Well-Written (Spelling, Grammar, Punctuation)</td>
<td>There are no errors regarding spelling, grammar, or punctuation.</td>
<td>There are 1-3 errors regarding spelling, grammar, or punctuation.</td>
<td>There are 4-6 errors regarding spelling, grammar, or punctuation.</td>
<td>There are 7 or more errors regarding spelling, grammar, and punctuation.</td>
</tr>
</tbody>
</table>
Science Center Activities

Clay Body Parts
1. Using either the Digestive System or the Human Body foam diagrams, choose a structure (body part) to mold with clay.

2. Looking at the foam body part you have chosen, try to make it with the clay.

3. Is it possible to make the particular structure you have chosen?

4. Try to make as many body parts as you can with the clay.

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The Digestive System & Human Body Foam Diagrams

1. The objective of this activity is to try to see how fast you can put the chosen diagram back together.

2. First, choose a diagram.

3. Then take all the body parts out of the diagram and place them back into the attached bag.

4. Using the timer, try to see if you can put all the body parts back into the diagram where they belong.

5. How long did it take you to put it back together?

6. Record your time on the provided sheet.

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How the Body Works!

1. In this activity you will have the opportunity to see what you already know about how your body works!

2. At the top of the website, click on a body part that you think you know about or one that you would like to learn more about!

3. After you click on the body part you want, click on quiz to begin.

4. Did you know more then you thought you did about the specific body part you chose?

5. Did you learn anything new?

6. If you have time, click back and choose another body part to explore!

7. Love this website? Here is the Link to practice at home! http://kidshealth.org/kid/htbw/htbw_main_page.html

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Clay Body Parts, How the Body Works & The Digestive System & Human Body Foam Diagrams

The above three activities connect to the curriculum outcome 302-5a. 302-5a explains that students should be able to describe the specific structure and the functions of the major organs in our body (i.e., teeth, tongue, esophagus, stomach, small intestine, large intestine, etc.), of the digestive system. From the activities, students can get an idea of some of the organs and systems the body has and how we need these in order to function. These activities give students the opportunity to explore major internal organs through the use of models, diagrams, and simulations. Students can learn where these organs are located in their body. These activities give students a sneak peek into how their bodies work together, and how if we don’t take proper care of our bodies, these systems can be affected when wrong choices are made. These science activities could be cross-curricular with other areas such as Health/Personal Development, Art, and Literacy. The Clay Body Parts activity is good for kinesthetic learners. The foam diagrams are also good for visual and kinesthetic learners, and the quizzes are good for auditory and visual learners as well.
Exercise with an unhealthy lung:

• Press play on the ipod and jump, dance or run on the spot for 30 seconds.

• Take note of your breathing. Are you out of breath? Does your heart rate seem fast?

• Now put a straw in your mouth. Press play on the ipod and jump, dance or run on the spot for 30 seconds, breathing out of the straw.

• How do you feel now? Was it harder to breath?

By breathing out of the straw, you have just experienced what it is like to have an unhealthy lung.

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Healthy lung vs. Unhealthy lung:

Here is an example of a healthy lung and an unhealthy lung.

• Carefully pull on the balloon at the base of the bottle.

• Watch what happens to each lung. (The balloons inside of the bottle represent the lungs.)

• Can you guess which one is unhealthy?

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The two activities on the lungs connect to the curriculum outcome 302-5c. 302-5c explains that students should be able to describe the structure and function of the respiratory system. The curriculum also explains that the circulatory and respiratory systems should be investigated using pulse and breathing rates. These two activities allow students to investigate how the respiratory system works for a healthy and unhealthy individual. The exercise activity could be combined with physical education as well as a health lesson. The lung contraption could be combined with a health lesson.
Tracing Bodies and Identifying Muscles

Wave your arms in the air. Now, lift your pinkie finger just a tiny bit. Did you know that your muscles made you able to make those big movements with your arms and that very small movement with your pinkie? Muscles move bones and help our whole bodies move. Muscles also give us strength. They are wrapped around our bones. They work like rubber bands. They pull hard on the bones so that body parts can move. Without your muscles you could not throw a ball or color a picture. You could not even eat a cookie!

• Find a partner and trace an outline of their body onto a large sheet of paper.

• Work together to draw each of the major muscles in the body (an anterior and posterior view). Use diagram below for help.

• Represent each muscle with a different colour.

• Label the muscles.

• Put drawings on display around classroom.
Figure 5-1. Skeletal and facial muscles, anterior view.
Figure 5-2. Skeletal and facial muscles, posterior view.
**What Muscles are Used to Do a...?**

Use figure 5.1 and 5.2 to help you determine what muscles are being used to do the following exercises:

1. Do one or more push-ups and identify the muscles being used.

2. Do one or more squats and identify the muscles being used.

3. Hold a plank for 20 seconds. What muscles are being used?
Answer Key

Push-up
Pectoralis Major
These are the two large muscles of the chest. The pectoralis major are the primary pushing muscles of the upper body. When you lower and raise yourself doing a push-up, the pectoralis major does most of the work. Well-defined pectoralis major muscles are prized by bodybuilders as symbols of strength.

Triceps
This is the group of muscles on the back of the upper arm. The triceps are essential to the pushing motion of the arms. They extend your arms outward while the biceps, on top of the forearm, are used to fold the arms. The triceps do most of the arm work in push-ups, because the resistance is experienced while performing the upward motion of the exercise. Triceps make up about two-thirds of the muscle mass of the upper arms. They are more important than biceps when building arm size.

Deltoid Muscles
These are the muscles of the shoulder. The deltoids assist the pectoralis major in the pushing and lowering motions of a push-up. While the deltoids are a relatively weak muscle group, they are necessary to every motion your shoulder makes. Well-defined deltoids create the rounded shoulder look that bodybuilders prize.

Serratus Anterior
This is located under the armpits on the sides of the chest. They are sometimes referred to as "wings," because they give the look of a wide back and shoulders. The serratus anterior is used to pull the shoulder blade forward and around the rib cage during the pushing portion of the push-up.

Squat
Quadriceps Muscles
The quadriceps muscles also are known as the thigh muscles, extending
from the upper portion of your thigh at the groin to attachments at the bottom of the thigh and just above the knee. Made up of four different muscles -- the vastus intermedius, the rectus remoris, the vastus lateralis and the medialis -- these muscles allow you to extend and flex your leg. They engage when you're performing a standing or lunging squat. Without these muscles, you wouldn't be able to bend at the knee or hip joint, lift or lower your leg, or perform squats.

**Buttocks**

Your gluteus maximus, or gluteals, are your buttocks muscles, two large muscles that extend from your upper back hip down to your upper back thigh. The glutes enables you to rotate your hip, stabilize the thigh and help bear the weight of your body, according to Get Body Smart. Without your buttocks muscles, you'd find it difficult to lift or lower your thigh, stand or balance your body weight.

**Hamstrings**

The hamstrings are a group of muscles along the back of the thigh, extending from the bottom of the buttocks to the back of the knee joint. Composed of the biceps femoris, the semiteninosus and the semimembranosus, this group of muscles works in conjunction with the contraction or extension of the quadriceps. For example, when the quads extend, the hamstrings contract, and vice versa. Without the hamstrings, leg strength and stability would be severely compromised, making simple movements like squatting, walking or sitting difficult, if not impossible.

**Plank**

Erector spinae, rectus abdominus (abs), and transverse abdominus

These activities give students the opportunity to explore the major muscles through the use of diagrams, drawings, and exercises. These science activities could be cross-curricular with other areas such as Literacy, Art, and Physical Education. The tracing bodies and exercise activities are good for visual and kinesthetic learners.
Summary

The human body is an extremely important topic because it is important for children to know how their bodies work and how to keep them healthy. These lesson plans cover the majority of the curriculum outcomes for the first unit of fifth grade science. We believe that it would take approximately 2-3 months to cover all of the outcomes. This is because of the number of outcomes and because our lessons are only 45-60 minutes in length. Also, science classes generally only occur a couple of times a week.

We made the decision to cover two of the outcomes for “Growth and Development” at the very end of the unit. They are:

- Relate bodily changes, such as acne on the skin and growth of body hair, to growth and development (301-8)
- Describe how body systems help humans and other animals to grow and reproduce and to meet their basic needs (302-4)

These outcomes address material that some students may not be comfortable with yet. We believe that students will be more mature by the end of the unit and they will be more familiar with the scientific process. They will have a better understanding of how their bodies work and we hope this will help them better understand these outcomes.

Many of our lessons can be cross-linked with other curricular areas: literacy, art, physical education, math, health, and social studies. We created these lessons with these other subjects in mind so our students would be able to create connections.

Throughout this unit, we use a variety of assessment methods, both formative and summative. The assessments are outlined in greater detail and can be found with their corresponding lessons. All of the necessary resources and assessments are found with each lesson to make them easy to use.