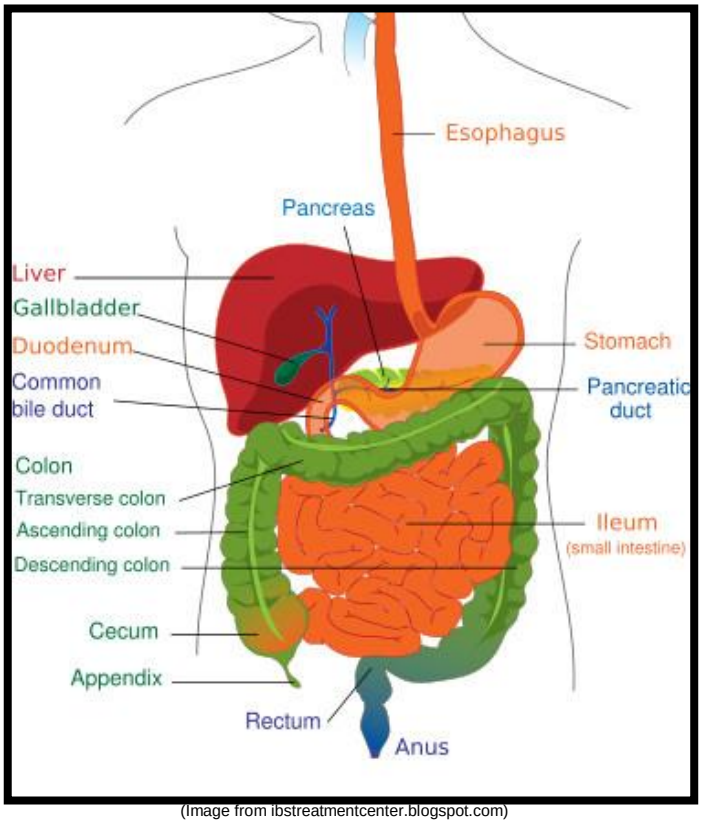
GRADE 5



(Image from ibstreatmentcenter.blogspot.com)

HUMAN ORGAN SYSTEMS
TEACHER RESOURCE BOOKLET

TO THE TEACHER

Welcome! This resource guide has been designed to help you enrich your students' learning both in the classroom and at the Toronto Zoo. All activities included in this grade 5 booklet are aligned with the Understanding Life Systems strand of The Ontario Curriculum, Grades 1-8: Science and Technology, 2007. The pre-visit activities have been developed to help students gain a solid foundation about biodiversity before they visit the Zoo. This will allow students to have a better understanding of what they observing during their trip to the Toronto Zoo. The post-visit activities have been designed to help students to reflect on their Zoo experience and to make connections between their experiences and the curriculum. We hope that you will find the activities and information provided in this booklet to be valuable resources, supporting both your classroom teaching and your class' trip to the Toronto Zoo.

WHERE DOES IT FIT IN?

Strand: Life Systems **Topic**: Human Organ Systems

Specific Expectations Met:

Understanding Basic Concepts

3.1 identify major systems in the human body
3.2 describe the basic structure and function of the major organs in the digestive system
3.3 identify interrelationships between body systems

Developing Investigation and Communication Skills

2.3 design and build a model to demonstrate how organs or components of body systems in the human body work and interact with other components
2.4 use appropriate vocabulary, including correct science and technology terminology, in describing their investigations, explorations and observations

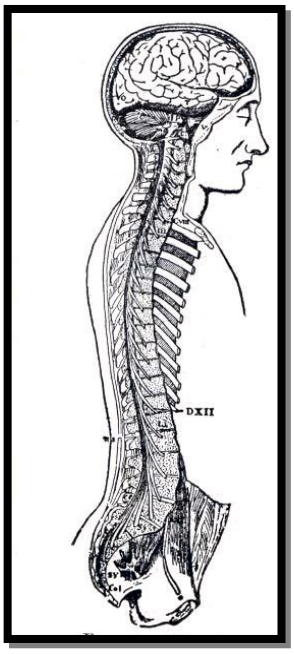
Relating Science and Technology to Society and the Environment

1.3 assess the effects of social and environmental factors on human health, and propose ways in which individuals can reduce the harmful factors and take advantage of those that are beneficial

PRE-VISIT ACTIVITIES

1. DIGESTIVE SYSTEM BODY MURAL

(adapted from a unit from the Ontario Curriculum Planner: http://educ.queensu.ca/~curr/units/)



Working in small groups, students can create life-size pictures of body organ from the digestive system.. One member of the group will lie on the floor to be traced onto mural paper. Before beginning the mural, students should submit a plan to the teacher. To represent the various parts of their organ system students should be encourage to reuse materials from home (e.g. scraps of material, egg cartons, wrapping paper, toilet paper tubes etc.) In their mural students need to include all of the major parts of their selected organ system (mouth, tongue, teeth, esophagus, stomach, small intestine, and large intestine). Once murals are complete students will present their organ system to the class, ensuring that all members of the group participate. The groups should have 2-3 questions prepared to ask the rest of the class at the close of their presentation (to review the aspects of their organ system).

Feeling Bold

This activity could be repeated with the 5 remaining major organ systems: nervous, respiratory, muscular, skeletal and circulatory.

Tying It All Together

Visual Arts:

D1.2 demonstrate an understanding of composition, using selected principles of design to create art works on a theme or topic

D1.4 use a variety of materials, tools, and techniques to determine solutions to design challenges

Language Strand: Oral Communication

2.3 communicate orally in a clear, coherent manner, presenting ideas, opinions, information in a readily understandable form

2.4 use appropriate words and phrases from the full range of their vocabulary (*vocabulary from curriculum subject areas*)

2. WORKING WITH NEW VOCABULARY

(Adapted from http://museumvictoria.com.au/education/)

A crossword and answer key have been attached. Please feel free to copy and distribute this puzzle to your students. A suggestion for this activity may be for “busy work” for those who are looking for extra activities upon completion of assigned tasks.

The word search includes 9 words that are tied directly to the workshop and this teacher resource.

Tying It All Together

Language Strand: Writing

3.3 confirm spellings and word meanings or word choice using a variety of resources appropriate for the purpose

3. BODY CHALLENGE

(Adapted from http://www.scienceworld.ca/bodyworks)

This activity will help students relate the function of their muscular and nervous systems to their physical performance.

Materials (per group of 2-4 students)

stopwatch	metre stick	large cardboard box (2' x 2')
ruler	broom	simple maze on paper templates
balance board	sticky notes	semi-heavy ball

Explain to students that they will be participating in a body challenge that will require the function of their muscular and nervous systems. Describe the following six challenges that students will be required to complete and explain that they will need to record their scores (the challenges would preferably be set up ahead of time in an open space, outside or in a gymnasium):

1. Reaction time: Rest your arm on a desk with your index finger and thumb stretched out. Have a partner hold a ruler so the '0 cm' is lined up with your finger and thumb. Your partner should drop the ruler without warning you. Try to catch the ruler as quickly as possible. Read the mark closest to your finger where you caught it.This is a measure of your reaction time.

2. Balance: How long can you balance an upside-down broom on the palm of your hand? How long can you stand upright on a balance board?

3. Endurance: How long can you hold a ball over your head?

4. Leg stretch: Hold a sticky note in your hand and jump to stick it to the wall. How high can you place the note?

5. Flexibility: Can you fit into a cardboard box?

6. Steadiness of hand: (Draw a simple maze and make copies) How long does it take to draw your way through a maze with a fat marker? Deduct points if you hit lines.

Key Questions
- How (far, much etc.) do think you will do?
- How could you improve this?

Once students have completed all six challenges and recorded their scores they may organize their results using charts, tables or bar graphs. Have students set realistic goals to improve their scores and encourage them to practice these challenges during lunch, recess etc. In 2-4 weeks repeat the Body Challenge, have students record and organize their results and compare them to their olds scores.

Tying It All Together

Health and Physical Education Strand: Movement Skills and Concepts

B1.1 perform controlled transfers of weight in a variety of situations involving static and dynamic balance, using changes in speed and levels, with and without equipment

B1.2 demonstrate this ability to jump in control for height or distance, using a variety of body actions

Math Strand: Data Management and Probability
- collect and organize primary data in charts, tables and graphs that have appropriate titles and labels
- read, interpret, and draw conclusions from data presented in charts, tables and graphs
- compare similarities and differences between two related sets of data, using a variety of strategies

FOLLOW UP ACTIVITIES

1. A HEALTHY MENU

Through this activity, your students will be able to demonstrate their understanding of the four basic food groups, appropriate serving sizes, and what composes a healthy diet.

A few days prior to the activity, you may ask your students to bring in any pictures of food that they may have at home (e.g. grocery store flyers, coupon books, magazine advertisements). Divide your students into small groups (3-4 students) and distribute the food pictures evenly among them, making sure that each table has a variety of pictures from the four food groups. In their groups, students will cut out pictures of foods that compose a healthy menu for a day, which must include foods for breakfast, lunch, dinner, and any snacks. Food selections should follow the suggested serving sizes described in Canada's Food Guide to Healthy Eating (see Resource List for Food Guide website). Menus must also include food from all four of the basic food groups. In creating their menu, students should provide the picture of the food and how much of the food should be eaten for that particular meal. A sample presentation format is as follows:

Breakfast	*Lunch*	*….etc.*
2 [picture of egg]	*2 slices of [picture of bread]*	
1 slice of [picture of bread]	*2 slices of [picture of lunch meat]*	
1 cup of [picture of orange juice]	*1 [picture of juice box]*	
	1 [picture of apple]	

Students may choose to present their menus in different formats (e.g. as a skit, on a presentation board, as a booklet, etc) as long as they clearly communicate the required elements of the project. When the menus are complete, students may present them to the class.

Feeling Bold?
You can extend this activity by finding the means for each food groups of the represented in the menus of entire class. This information can then be graphed and students can observe and discuss what healthy eating patterns look like.

Feeling EXTRA Bold?
When presentations are complete, you can have a discussion with your class on which menu they would like to try, if they felt these menus were realistic, and how this project influenced their attitudes towards eating and food. If resources allow, you can even select a meal from one of the menus to have as a class (e.g. during lunch period).

Tying It All Together
Math Stand: Data Management and Probability
- collect data by conducting a survey or an experiment to do with themselves, their environment, or issues in their school or community
- collect and organize primary data and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of the data
- demonstrate an understanding that sets of data can be samples of larger populations
- read, interpret, and draw conclusions from primary data
- calculate the mean for a small set of data and use it to describe the shape of the data

Tying It All Together
Language Strand: Writing
1.1 identify the topic, purpose and audience for a variety of writing forms
2.1 write longer and more complex texts using a variety of forms

Language Strand: Oral Communication
2.2 demonstrate an understanding of appropriate speaking behavior in a variety of situations, including paired sharing, dialogue, and small- and large- group discussions
2.3 communicate orally in a clear, coherent manner, presenting ideas, opinions, information in a readily understandable form
2.4 use appropriate words and phrases from the full range of their vocabulary

How To Assess
- ❑ Presentation is organized
- ❑ Breakfast, lunch, and dinner are represented
- ❑ Food items from the four food groups are included
- ❑ The total number of servings of each food group falls within the recommendations of the Food Guide
- ❑ Students worked cooperatively within groups
- ❑ Information is communicated clearly

2. LOOKING AT LABELS

You can use this activity to revisit and reinforce your students' understanding of nutrition labels on food packaging.

A few days prior to the lesson, have your students bring in cereal boxes. As a class, record and discuss the major components of nutrition labels (e.g. number of calories, grams of protein, carbohydrate and fat, vitamins, and minerals). Review the definitions of these terms and discuss the importance of eating breakfast (to provide your body with fuel for the rest of the day). Divide your class into groups of five or six. In these groups, students will sort their cereals according to which they think is the best in terms of nutritional value, and which they think has the least nutritional value. To help them through this process, they should consider categories such as fat, sugar, salt, and fibre content. As well, they should also consider the percentage daily intake of vitamins and minerals each cereal provides. As a group, they must work together to come to a conclusion for the best cereal in their group. Taste may also be a factor! Once groups have decided, they will present their chosen cereal. The whole class could then discuss and decide which cereal, among the ones presented, is the most nutritious of all.

Nutrition Facts

Serving Size	5 Crackers (16g)
Servings Per Container	About 28
Amount Per Serving	
Calories 80	Calories from Fat 40
	% Daily Value*
Total Fat 4.5g	**7%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Polyunsaturated Fat 1.5g	
Monounsaturated Fat 2g	
Cholesterol 0mg	**0%**
Sodium 140mg	**6%**
Total Carbohydrate 9g	**3%**
Dietary Fiber less than 1g	**1%**
Sugars 1g	
Protein 1g	
Vitamin A 0% •	Vitamin C 0%
Calcium 0% •	Iron 2%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

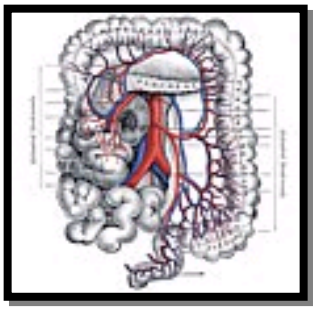
(Image taken from weloveyourheart.com)

Tying It All Together
*Health and Physical Education Strand: Healthy Livin*g
C2.1 explain how to use nutrition facts tables and ingredient lists on food labels to make healthier personal food choices

Language Strand: Oral Communication
2.2 demonstrate an understanding of appropriate speaking behavior in a variety of situations, including paired sharing, dialogue, and small- and large- group discussions

2.3 communicate orally in a clear, coherent manner, presenting ideas, opinions, and information in a readily understandable form

3. WHAT SYSTEM DO I BELONG TO?



This activity will help your students practice questioning skills and will reinforce their knowledge of organ systems.

Label each corner of the room one of four organ systems: circulatory, digestive, respiratory, and nervous system. Tape the name/picture of a component (e.g. blood vessel, lung, brain, etc) that belongs to one of the systems. The group will begin to mingle. Students must guess the organ they have 'become' by walking from person to person and asking each person a 'yes' or 'no' question about the component. Once students have discovered what they are, they must decide which system they belong to and go to the respective corner of the room. Students in each corner will discuss how they fit into the system, and will present their main points to the class.

Tying It All Together
Language Strand: Oral Communication
2.3 communicate orally in a clear, coherent manner, presenting ideas, opinions, information in a readily understandable form
2.4 use appropriate words and phrases from the full range of their vocabulary

4. LISTEN TO YOUR HEART

This activity will provide students with the opportunity to take their pulse, and investigate the effect of physical activity on their heart rate. Students should work in partners for the activity. Students will need a stopwatch, and a recording chart to keep track of the changes in their pulse rate.

Students can find their pulse by placing two fingers on the inside of their wrist below the base of the thumb, or by placing their fingers against their neck just below the jaw. They should push firmly until they feel a beat.

To find their resting heart rate students count the number of times their heart beats in 15 seconds. Have their partner time the 15 seconds while they count. Multiply the number of beats in 15 seconds by four (to find beats per minute). This is called your resting heart rate. Tell students to record this number on their recording sheet.

Have students engage in some physical activity (e.g. jumping jacks, or running a lap of the soccer field). Students should choose 5 different types of physical activity. Each activity should be done for 1 minute (one partner at a time). When finished students take their pulse again for 15 seconds, and multiply by four and record their pulse rate on their chart (in beats per minute). This process should be repeated for each activity (student must wait 2-3 minutes between each type of activity).

Once all of the activities are complete students will graph the results. Students should look at how their pulse rate changed. Why does your heart rate increase during physical activity? How does the type of physical activity affect their heart rate? How would the active heart rates of Olympic athletes differ from that of a grade 6 student?

Tying It All Together
Health and Physical Education Strand: Active Living
A2.3 assess a specific component of their health-related fitness by noting physical responses during various activities, and monitor changes over time

Math Strand: Data Management and Probability
- collect data and record the results on given spreadsheets or tally charts
- evaluate data presented on tables, charts, and graphs and use the information in discussion

5. YOUR GROSS DIGESTIVE SYSTEM!

(Adapted from www.pecentral.org)

This purpose of this activity is to help students develop a better understanding of the main components of the digestive system and how the system converts the food we eat into energy by having them act out the components themselves.

Materials

- 1 plastics sandwich bag (per student)
- 1 Arrowroot cookie (per student)
- 1 crawling tunnel
- 1 parachute
- 20 foot long thin rope
- 10 foot ling thick rope
- 10 pylons
- an individualized trampoline is nice but not necessary

Before beginning the activity review what students already know about the digestive system; the different components and the roles that they play in converting food to energy. Give each student a plastic sandwich bag with an Arrowroot cookie inside; explain that the bag represents the stomach and the cookie represents food. Add about 2 oz. of water to the bag explaining that the water symbolizes the gastric juices in the stomach. Tell students that they will be going through the digestive system themselves and as they do they will be holding on to their “stomach bag” and monitoring the breaking down of the food.

Introduce the first step of digesting food, chewing; this can be recreated by jumping on the trampoline, jumping rope or simply doing jumping jacks. It is important that the students understand what each section of the course signifies; you can do this by having students call out what is taking place. Now the students (representing the food) have been chewed and formed a bolus, they will crawl through the crawling tunnel that represents the esophagus.

Next, half of the students will crawl under the parachute (which represents the stomach) while the other half shakes it, digesting the food. After thirty seconds to a minute have students switch roles so that they are all allowed the opportunity to be ‘digested properly’. The food will then travel to the small intestine, which is the 20 foot long skinny rope. Place the rope on the ground in a tightly curved path. At various points along this rope create a large circle and place the five pylons representing the nutrients being absorbed into the bloodstream. The students will march through the small intestine following the rope pathway.

Choose about half of the students to be nutrients. On your signal they are to leave the small intestine and jog around the circle of pylons. This is where the food passes through the walls of the intestines and into the bloodstream.

The remaining students then move on to the large intestine represented by the 10 foot long thicker rope. The rope is on the ground surrounding the small intestines in a shape similar to the real thing. This part of the food was not needed in the body and will be removed as waste. Your students will really have a great time jumping out at the end of the large intestine as you know what!

Now that the students have travelled all the way through the digestive system have them examine the ‘stomachs’ that they have been carrying with them through the course. The ‘food’ should have been completely broken down and represents what food looks like after it has been digested in the stomach and is ready to move on to the small intestine.

Tying It All Together

Health and Physical Education Strand: Movement Competence

B1.1 perform controlled transfers of weight in a variety of situations invlocing static and dynamic balance, using changes in speed and levels, with and without equipment

B1.2 demonstrate the ability to jump in control for height or distance, using a variety of body actions

B1.3 explore different combinations of locomotor movements with and without equipment, alone and with others, moving at different speeds and levels, and using different pathways

VOCABULARY

carbohydrates	provide energy for our bodies. Simple carbohydrates provide energy to our bodies quickly but the energy dies not last for long. Complex carbohydrates provide lasting energy.
chemical digestion	involves breaking the chemicals (nutrients) found in the food into smaller molecules
daily intake	the amount and type of food a person consumes in one day
digestive system	the system that breaks down the food we eat into smaller pieces so they may be used as system an energy source for the body
esophagus	food passes from the mouth to stomach via this tube
fats	a concentrated energy; protects body organs and insulates body
gram	a unit to measure how much something weighs
large intestine	absorbs water and minerals into the bloodstream
mechanical digestion	the type of digestion that involves physically breaking food down into smaller pieces
minerals	help strengthen our body parts so they can function properly (e.g. calcium, iron)
mouth	digestive process begins here; teeth and tongue break up the food after it has been softened by saliva
nutrients	chemical substances obtained by our bodies from food during digestion; needed to build and maintain body cells, regulate body processes and supply energy
protein	organic compound composed of amino acids that works like a building block to build and repair hair, skin, and muscles
small intestine	breaks food down into small units that pass through the walls of the intestine into the bloodstream
stomach	contains gastric juice that is made up of mild acid which breaks the food down into a paste similar to porridge; stomach muscles also physically churn the food
vitamins	help control body growth and functions
water	cools our bodies, transports things throughout our bodies and helps the digestion process

RESOURCE LIST

*__S__ = student friendly site
*__T__ = teacher appropriate site

www.edu.gov.mb.ca/k12/cur/science/found/5to8/5c1.pdf
Link to an amazing pdf file that contains a whole unit plan on the Human Organ Systems with tons of hands on activities, worksheets, rubrics, assessment strategies and more.

http://library.thinkquest.org/10348/find/content/circulatory.html **(S)**
General information about the human circulatory system, with diagrams and an interactive quiz.

http://www.innerbody.com/htm/body.html **(S&T)**
Interactive site on human systems. Includes diagrams, fact sheets, and lots of pictures.

http://teacher.scholastic.com/mathhunt/StartGame.asp?QuizID=8 **(S)**
An interactive site connecting math knowledge with topics about human organ systems. Includes a teachers guide for how to use the game.

http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php **(T&S)**
Government website for Canada's Food Guide to Healthy Eating. Includes information on how to use the guide, what the symbols mean, and recommended strategies for using the guide. Also includes Food Guide Servings Trackers available to download for students to track their eating habits.

http://www.bbc.co.uk/science/humanbody/body/index_interactivebody.shtml **(T&S)**
Excellent interactive site from the BBC. Games on organs, muscles, skeleton, senses and nervous system.

http://sciencenetlinks.com/lessons/systems-of-the-human-body/ **(T&S)**
great game that tests students knowledge on the different organ systems: digestion, circulatory/respiratory, skeletal, muscular, nervous (including 5 senses). Also has accompanying worksheet and detailed lesson plan

http://www.lung.ca/children/grades4_6/respiratory/index.html **(T&S)**
descriptions of the respiratory systems of amphibians, birds, fish, insect, mammals, plants and reptiles. Include TONS of worksheets.

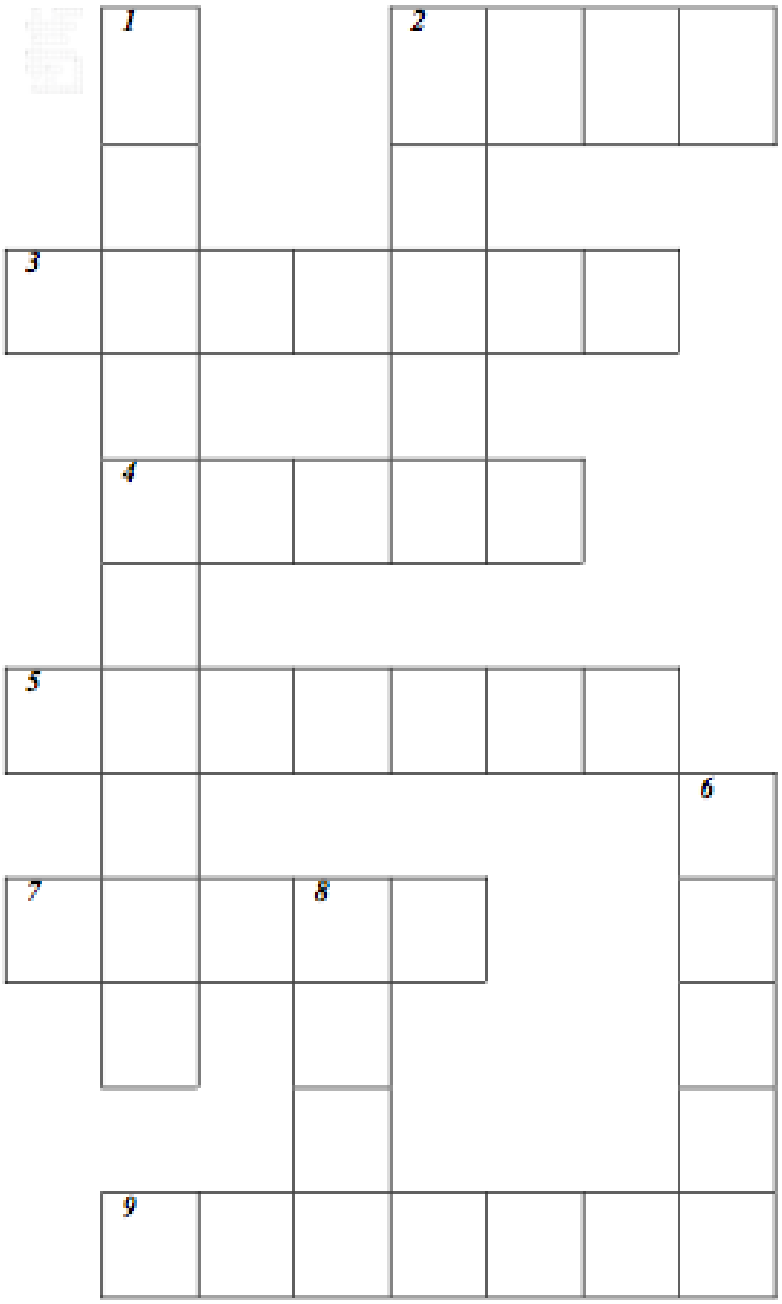
Books

Cole, Joanna (1990). The Magic School Bus Inside The Human Body. Scholastic Press.
Frizzle shrinks the bus and her students—except Arnold who swallows them. As a class they explore Arnold's digestive, respiratory, circulatory, nervous and muscular systems from the inside out.

Colombo, Luann (2003). Uncover the Human Body: An Uncover It Book. Silver Dolphin Books.
A fascinating three-dimensional presentation allows in-depth, hands-on exploration of the subject of human organ systems. This unique 'model' is easily built, deconstructed and re-built layer by layer, system by system just by turning a page. Children get to look at each system on a different page, then by closing the book, combine them into a whole.

Parker, Steve (2007). The Human Body Book. Dorling Kindersley.
Revealing and detailing all aspects of the body, from the secrets of DNA to the functions of every major body system, this encyclopedic volume is packed with stunning and detailed visuals and includes a DVD that reveals all of the body's inner workings.

HUMAN BODY PARTS



Across

2. I am a very hard substance that makes up your skeleton.

3. I mix up and break down your food after you chew and swallow it.

4. I support your body and keep it tall and straight. I also protect your spinal cord.

5. We filter your blood and keep it nice and clean.

7. I pump blood around your body.

9. When we move, you move too.

Down

1. I am a long tube that lets very, very tiny food pieces move across my wall and into the body. The left-over food continues through me and is expelled out of the end as waste.

2. I am needed so that you can think and remember things.

6. We take the air that you breathe into us and put it into the body.

8. We are hard and thin and we protect your important body parts inside your chest.

HUMAN BODY PARTS
(ANSWER KEY)

Across

2. **BONE** — I am a very hard substance that makes up your skeleton.

3. **STOMACH** — I mix up and break down your food after you chew and swallow it.

4. **SPINE** — I support your body and keep it tall and straight. I also protect your spinal cord.

5. **KIDNEYS** — We filter your blood and keep it nice and clean.

7. **HEART** — I pump blood around your body.

9. **MUSCLES** — When we move, you move too.

Down

1. **INTESTINES** — I am a long tube that lets very, very tiny food pieces move across my wall and into the body. The left-over food continues through me and is expelled out of the end as waste.

2. **BRAIN** — I am needed so that you can think and remember things.

6. **LUNGS** — We take the air that you breathe into us and put it into the body.

8. **RIBS** — We are hard and thin and we protect your important body parts inside your chest.