GRADE 5: HUMAN ORGAN SYSTEMS BOOKLET

TO THE TEACHER

Welcome! This booklet has been designed to help teachers enhance the educational value and enjoyment of the 'Human Organ Systems' workshop. We recommend that workshop visits coincide with classroom studies of human organ system. This collection of activities has been designed to meet several expectations of the Grade Five Science Curriculum. Our pre-visit activities have been designed to help students gain a foundation to help them more thoroughly understand what they will experience during the workshop. Additionally, follow-up activities have been provided to help students synthesize their observations and experiences. Most of the activities include working in cooperative groups, hands-on elements or provide a variety of choices in order to accommodate the needs of diverse learners. We hope you find this information useful and easy to incorporate into your classroom. Enjoy!

SCIENCE CONNECTIONS

Strand: Life Systems
Topic: Human Organ Systems
Specific Expectations Met:

Understanding Basic Concepts

- describe the basic structure and function of the major organs in the digestive system

Developing Skills of Inquiry, Design, and Communication

- use appropriate vocabulary, including correct science and technology terminology, in describing their investigations, explorations and observations

Relating Science and Technology to the World Outside the School

- describe the types of nutrients in foods and their function in maintaining a healthy body
- identify a balanced diet as one containing carbohydrates, proteins, fats, minerals, vitamins, fibre and water

AGENDA

Please note that the order or location of some of these activities may change due to construction, weather or animal health concerns.

10:00	Welcome to the zoo and outline of agenda Discussion of the importance of nutrition, nutrients and food groups. Discuss role of zoo Animal Nutritionists.
11:00	Tour the Animal Nutrition Centre (zoo kitchen).
12:00	Lunch. **Please have everyone bring a lunch**. There will be no opportunity to go to the restaurant
12:30	Discussion: Human digestive system and compare it to animals, examine various animal teeth and jaws.
1:00	Tour
1:50	Certificate presentation and close of program

PRE-VISIT ACTIVITIES

1. How's My Diet?

For one week prior to your visit to the zoo, have your students keep a journal of all of the foods they ate for lunch. Student can record this in their notebooks in a chart listing the four food groups. For every item they eat for lunch they will record it under the appropriate category. At the end of the week they will calculate the mean number of foods eaten from each food group per day. They can create a pictograph of their means and compare their graph with their classmates' graphs.

Feeling Bold?
You can extend this activity by finding the means for each food groups of the entire class. This information can then be graphed and students can observe and discuss the eating patterns of their class.

Tying It All Together
Math Stand: Data Management and Probability
-display data on graphs by hand
-explain the choice of symbols on a pictograph
-calculate the mean of a set of data
-evaluate data on tables, charts and graphs and use the information in discussion

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?
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
Language Strand: Writing
-use writing for various purposes and in a range of contexts, including school work
-produce pieces of writing using a variety of forms, narrative techniques, and materials from other media
-routinely introduce new words from their reading into their writing

Language Strand: Oral and Visual Communication
-communicate information, explain a variety of ideas and procedures, and follow the teacher's instructions
-contribute and work constructively in groups
-create a variety of media works

Physical Education Strand: Healthy Living
-analyse information that has an impact on healthy eating practices

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.

Tying It All Together
*Physical Education Strand: Healthy Livin*g
-identify critical content information on food labels

Language Strand: Oral and Visual Communication
-contribute and work constructively in groups

-contribute ideas to help solve problems, and listen and respond constructively to the ideas of others when working in a group

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 for 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 one '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 and Visual Communication
-use vocabulary learned in other subject areas in a variety of contexts

4. Eating Habits Survey

To learn more about the eating habits of people, students can survey other classrooms in their school. The survey could investigate how well student lunches meet the requirements of the Canada Food Guide. The students need to design questions and recording tools that will allow them to effectively record this information. Students may work in groups of 4, each group visiting different classrooms. Once the surveys are complete the students can graph the information on bar graphs so that different classrooms can be compared.

Tying It All Together
Math Strand: Data management and Probability
-design surveys, organize the data into self-selected categories and ranges, and record the data on spreadsheets or tally charts
-construct bar graphs by hand
-evaluate data presented on tables, charts, and graphs and use the information in discussion

Physical and Health Education Strand: Healthy Living
-analyse personal eating habits in a variety of situations

5. Body Murals

(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 systems. Students should be divided into 6 groups so that each organ system (digestive, nervous, respiratory, muscular, skeletal, circulatory) are represented. One member of the groups 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 (e.g. digestion includes: 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).

Tying It All Together
Visual Arts:
-select the most appropriate tools, materials, and techniques for a particular purpose, and use them correctly
-produce two-dimensional works of art that communicate a range of thoughts, feelings and ideas for specific purposes and to specific audiences

6. 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 your two fingers on the inside of your wrist below the base of the thumb, or by placing your fingers against your neck just below the jaw. Push firmly until you feel a beat.

To find their resting heart rate students count the number of times your heart beats in 15 seconds. Have your partner time the 15 seconds while you count. Multiply the number of beats in 15 seconds by four (to find beats per minute). This is called your resting heart rate. Record this number on your 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 pule 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
Physical and Health Education Strand: Active Participation
-monitoring pulse before and after active games

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

SUMMARY

The following is a summary of the major concepts covered in the workshop.

Nutrients
Nutrients are needed to build and maintain our body cells, regulate our body processes, and supply us with energy. They can be classified into six major categories: proteins, carbohydrates, fats, vitamins, minerals and water. We acquire these nutrients through food. The four major food groups are grain products, fruits and vegetables, milk products, and meat and alternatives. Canada's food guide contains suggestions of how many servings of each food group we should eat daily to stay healthy.

Digestion
The human digestive system is considered to be simple digestion. Some herbivores (e.g. zebras, rhinos and elephants) have more specialized digestive systems due to their diets which consist of large amounts of plant matter. Their digestive systems are considered to be monogastric, meaning 'one stomach'. Other herbivores (e.g. camels, giraffe, and goats) have more than one stomach, and are called ruminents. Ruminents often have big tongues which allow them to take food into their mouths where they only chew it briefly.

The digestive systems of birds are specialized depending on the type of food the bird eats (e.g. fish, seeds, fruit, insects). Most birds have a crop that acts as a storage container and allows the bird to eat large amounts of food quickly and fly to safety to digest it.

Teeth

Herbivore
- -front teeth slightly pointed to snap branches off trees
- -molars at the back of mouth to grind up plant matter

Carnivore
- -sharp teeth for biting through skin and flesh
- -large canines, and sharp cutting teeth at back of mouth

Omnivore
- -sharper teeth at front that cut through matter
- -molars at back to grind matter

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

Organ Systems
http://www.alfy.com/teachers/teach/thematic_units/Human_Body/HB_1.asp (S)
Scroll down the page to find links to 'The Virtual Body', 'Digestion' and 'Bones and Organs'. These links are interactive and filled with animations. The text is easy to read and great for getting some general information.

http://library.thinkquest.org/J0112964/ (S&T)
The website is fun and educational from a kid's point of view. It is organized the five main parts of the human body and its systems: digestive, nervous, respiratory, skeletal, and muscular. Lots of pictures and interactive.

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

http://sln.fi.edu/biosci/TOC.biosci.html
Excellent site. Very informative. Contains everything you ever wanted to know about the heart.

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

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

Nutrition
http://www.hc-sc.gc.ca/hppb/nutrition/pube/foodguid/
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.