

Adult Basic Education
Science

Science 3105
From Life to Lifestyle
Study Guide

Credit Value: 1

Prerequisites: None

Text: *science.connect1; Colbourne, Fernandez, et al; McGraw-Hill Ryerson; 2002.*

Science Courses [General College Profile]

Science 2100A
Science 2100B
Science 2100C
Science 3101
Science 3102
Science 3103
Science 3104
Science 3105
Science 3106

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To the Student

I. Introduction to Science 3105

Science 3105, *From Life to Lifestyle*, is the first of two courses at this level that covers Life Science topics. You begin by learning about microscopes and how they are used. You are introduced to the basic structures and functions of cells and the life functions common to living things. You will progress to an understanding of the importance of nutrition and lifestyle in helping your body carry out life functions and maintain homeostasis.

You should have your instructor check your written work when you complete the Study Guide questions for each unit. You should also submit any lab reports and assignments that are required for the course. Check with your instructor to see if there is any other work that needs to be passed in.

The text for this course is *science.connectI*; Colbourne, Fernandez, et al; McGraw-Hill Ryerson; 2002.

To the Student

II. Use of Science Study Guides

Before beginning this course, ensure you have the text and any other resources needed (*see the information in the Introduction to this course for specifics*). As you work through the Study Guide, you will see that it is divided according to the Units listed in the Table of Contents. When you open a unit it will have the following components:

Reading for this Unit:

Here you will find the chapters, sections and pages of the text you will use to cover the material for this unit. Skim the sections of the textbook, look at the titles of the sections, scan the figures and read any material in the margins. Once you have this overview of the unit, you are ready to begin. Do not be intimidated by the content. You will work through the text, section by section, gaining knowledge and understanding of the material as you go.

References and Notes	Work to Submit
<p>This left hand column guides you through the material to read from the text. Read any highlighted notes that follow the reading instructions. The symbols   direct you to the questions that you should complete when finished a reading assignment..</p>	<p>You come across three (4) headings in this right hand column.</p> <p>Writing: This section comprises your notes for the unit. Here you will find either written questions or references to specific questions or problems from your text. You may want to write out each question followed by the answer. This material should be checked by your instructor before moving on to the next unit. Mathematical problems should have their solutions checked <u>as you go</u>.</p> <p>Laboratory: This section indicates if there is a Core Lab that should be completed for the unit. Let the instructor know in advance that you will be ready for the lab. A lab report should be submitted for each Core Lab. Your instructor will provide guidelines as to how s/he wants the report written.</p> <p>Assignment: This section indicates if there is an assignment that should be completed for the Unit. The information in the “References and Notes” column will indicate how you obtain the assignment. These assignments frequently relate the science content to technology, society and the environment.</p> <p>Computer: This section indicates that you will use a computer and a printer to complete some of the required work for the course. Ask your instructor for help if you are not sure how to use the computer. You will be required to print out some material each time you do the computer work and the printouts should be included with the written notes.</p>

To the Student

III. Recommended Evaluation

Written Notes	10%
Labs/Assignments	20%
Test(s)	20%
Final Exam (<i>entire course</i>)	<u>50%</u>
	100%

The overall pass mark for the course is 50%.

Unit 1 - Plant and Animal Cells

To fulfill the objectives of this unit, students should complete the following:

Reading for this unit: *science.connect1*; Chapter 8, pages 156 - 177.

References and Notes	Work to Submit																						
<p><i>Study pages 158 - 159 and use the glossary if you like to answer questions 1.1 - 1.2.  </i></p> <p><i>Study the parts and functions of a compound microscope on pages 160 - 161. Then answer questions 1.3 and 1.4.  </i></p>	<p>Writing:</p> <p>1.1 What is a microscope and what is it used for?</p> <p>1.2 a) What is the difference between a compound microscope and an electron microscope? b) Which of these types is used in most schools today?</p> <p>1.3 Complete the diagram of the microscope in Appendix A.</p> <p>1.4 Copy and complete the following chart:</p> <table border="1" data-bbox="693 1087 1387 1721"><thead><tr><th data-bbox="693 1087 979 1129">Microscope Part</th><th data-bbox="979 1087 1387 1129">Function</th></tr></thead><tbody><tr><td data-bbox="693 1129 979 1172">Light source</td><td data-bbox="979 1129 1387 1172"></td></tr><tr><td data-bbox="693 1172 979 1214">Diaphragm</td><td data-bbox="979 1172 1387 1214"></td></tr><tr><td data-bbox="693 1214 979 1256">Stage</td><td data-bbox="979 1214 1387 1256"></td></tr><tr><td data-bbox="693 1256 979 1298">Stage Clips</td><td data-bbox="979 1256 1387 1298"></td></tr><tr><td data-bbox="693 1298 979 1341">Objective Lens</td><td data-bbox="979 1298 1387 1341"></td></tr><tr><td data-bbox="693 1341 979 1383">Tube</td><td data-bbox="979 1341 1387 1383"></td></tr><tr><td data-bbox="693 1383 979 1425">Eye Piece</td><td data-bbox="979 1383 1387 1425"></td></tr><tr><td data-bbox="693 1425 979 1467">Course Adjustment Knob</td><td data-bbox="979 1425 1387 1467"></td></tr><tr><td data-bbox="693 1467 979 1510">Fine Adjustment Knob</td><td data-bbox="979 1467 1387 1510"></td></tr><tr><td data-bbox="693 1510 979 1552">Arm and Base</td><td data-bbox="979 1510 1387 1552"></td></tr></tbody></table>	Microscope Part	Function	Light source		Diaphragm		Stage		Stage Clips		Objective Lens		Tube		Eye Piece		Course Adjustment Knob		Fine Adjustment Knob		Arm and Base	
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Unit 1 - Plant and Animal Cells

References and Notes	Work to Submit												
<p><i>Load the CD-ROM into your computer, launch the Microscope lesson and follow the instructions to work your way through it. Complete 1.5.</i> </p> <p>Note: If you don't have a computer, see your instructor for directions for the Computer sections in this Study Guide.</p> <p><i>Study the information in the box on page 163. Then answer question 1.6.</i> </p> <p><i>Study pages 164 - 165 and use the glossary, if you like, to answer questions 1.7 - 1.10.</i> </p>	<p>Computer:</p> <p>1.5 Print out the Microscope Parts Printout and the Certificate (with your name on it). Include these with your notes.</p> <p>Writing:</p> <p>1.6 Copy and complete the following chart:</p> <table border="1" data-bbox="665 967 1383 1284"><thead><tr><th data-bbox="665 967 910 1100">Magnification of Eyepiece</th><th data-bbox="910 967 1155 1100">Magnification of Objective Lens</th><th data-bbox="1155 967 1383 1100">Total Magnification</th></tr></thead><tbody><tr><td data-bbox="665 1100 910 1174">10x</td><td data-bbox="910 1100 1155 1174">4x</td><td data-bbox="1155 1100 1383 1174"></td></tr><tr><td data-bbox="665 1174 910 1237">10x</td><td data-bbox="910 1174 1155 1237">10x</td><td data-bbox="1155 1174 1383 1237"></td></tr><tr><td data-bbox="665 1237 910 1284">10x</td><td data-bbox="910 1237 1155 1284">40x</td><td data-bbox="1155 1237 1383 1284"></td></tr></tbody></table> <p>1.7 Write a definition for each of the following:</p> <ul style="list-style-type: none">- cell- organelle- tissue- organ- organ system- organism	Magnification of Eyepiece	Magnification of Objective Lens	Total Magnification	10x	4x		10x	10x		10x	40x	
Magnification of Eyepiece	Magnification of Objective Lens	Total Magnification											
10x	4x												
10x	10x												
10x	40x												

Unit 1 - Plant and Animal Cells

References and Notes	Work to Submit
<p><i>Study pages 166 - 167 and use the glossary, if you like, to answer questions 1.11 - 1.13.</i></p> <p> </p> <p>Note: You may want to get extra copies of the diagrams from your instructor for practice.</p>	<ol style="list-style-type: none">1.8 Make a table with 2 columns.<ul style="list-style-type: none">• In the first column, list the levels of organization in living organisms beginning with cells.• In the second column, give an example of each level1.9 Define theory.1.10 State the three hypotheses of the cell theory.1.11 Describe the role of the following cellular structures:<ol style="list-style-type: none">(i) cell membrane(ii) cytoplasm(iii) nucleus(iv) endoplasmic reticulum(v) mitochondrion(vi) chloroplast(vii) vacuole(viii) golgi body(ix) cell wall1.12 Which of the structures listed in question 1.11 is found only in plant cells?1.13 Label the diagrams of the plant and animal cells found in Appendix A.

Unit 1 - Plant and Animal Cells

References and Notes	Work to Submit
<p><i>Refer to Investigation 8-B, Plant Cell Organelles, pages 168 - 170 to do the laboratory.  </i></p> <p><i>Note: See your instructor to find out what needs to be included in your Lab Report.</i></p> <p><i>This is the end of Unit 1. See your instructor to see if there is any more work that you need to do for this unit.</i></p>	<p>Laboratory:</p> <p>Note: Before you start the Investigation, you should get copies of the handouts, <i>Preparing a Wet Mount Slide</i> and <i>Making a Stained Slide</i>, from your instructor and work through them. Check with your instructor to see if there is anything that you need to pass in for doing this work.</p> <p>1.14 Complete Investigation 8-B. Pass your Lab Report in to your instructor for marking.</p>

Unit 2 - Life Functions

To fulfill the objectives for this unit, students should complete the following:

Reading for this unit: Chapter 9, page 178 - 195.

References and Notes	Work to Submit
<p><i>Study pages 180 - 182. Then answer questions 2.1 - 2.3.  </i></p> <p>Note: <i>Life functions can also be called life processes.</i></p> <p><i>Study pages 183 - 185. Then answer questions 2.4 - 2.7.  </i></p> <p>Note: <i>Plants and animals need energy to carry out their life functions.</i></p>	<p>Writing:</p> <p>2.1 Define life functions.</p> <p>2.2 Name the seven life processes common to living things.</p> <p>2.3 a) What does it mean when we say cells and tissues are specialized? b) Give 2 examples of a specialized plant or animal system.</p> <p>2.4 a) Where do animals get energy? b) How do plants get energy?</p> <p>2.5 a) Define photosynthesis. b) Name the organelle where photosynthesis takes place. c) Copy and complete the following chemical equation for the process of photosynthesis:</p> <p>carbon dioxide + _____ + _____ \rightarrow glucose + _____</p>

Unit 2 - Life Functions

References and Notes	Work to Submit
<p><i>Load the CD-ROM into your computer, launch the Photosynthesis lesson and follow the instructions to work your way through it. Complete 2.8.  </i></p> <p><i>Study pages 186 - 189. Then answer questions 2.9 - 2.14.  </i></p>	<p>Writing:</p> <p>2.6 a) Define cellular respiration. b) Name the organelle where cellular respiration takes place. c) Write the chemical equation for the process of cellular respiration.</p> <p>2.7 Draw a clearly labeled diagram to show how photosynthesis and cellular respiration work in a cycle.</p> <p>Computer:</p> <p>2.8 Print your Certificate (with your name on it) at the end of the exercises. Include the certificate with your notes.</p> <p>Writing:</p> <p>2.9 Describe the functions of the following human organ systems: <i>digestive system, circulatory system, urinary system and nervous system</i>.</p> <p>2.10 Complete the following flow chart to show the path that food travels through the digestive tract:</p> <p>mouth → _____ → _____ → _____ → _____ → _____ → anus</p>

Unit 2 - Life Functions

References and Notes	Work to Submit
<p>Note: You will need to refer to the Digestive System handout in Appendix A to help with question 2.11.</p> <p><i>Study pages 190 - 191. Then answer question 2.15. □□</i></p> <p><i>This is the end of Unit 2. See your instructor to see if there is any more work that you need to do for this unit.</i></p>	<p>Writing:</p> <p>2.11 a) Describe the function of the following parts of the human digestive system: <i>salivary glands, esophagus, stomach, small intestine, large intestine, rectum, anus.</i></p> <p>b) Label the diagram of the digestive system on the Digestive System handout, found in Appendix A.</p> <p>2.12 a) Describe the function of the following parts of the human circulatory system: <i>heart, arteries, veins, capillaries.</i></p> <p>b) Label the diagram in the handout, The Blood Route, found in Appendix A.</p> <p>2.13 Explain how the circulatory system works.</p> <p>2.14 Explain how the circulatory system and the digestive system work together</p> <p>2.15 Describe the role of each of the following in diagnosing injury and/or disease: <i>blood pressure cuff, stethoscope, X ray, CAT scan, EKG, EEG.</i></p>

Unit 3 - Nutrition

To fulfill the objectives of this unit, students should complete the following:

Reading for this unit: Chapter 10, pages 196 - 213.

References and Notes	Work to Submit																					
<p><i>Study pages 196 - 200. Then answer questions 3.1 - 3.3.  </i></p>	<p>Writing:</p> <p>3.1 Define nutrition and nutrient.</p> <p>3.2 a) Define malnutrition.</p> <p>b) Describe the effects of malnutrition.</p> <p>3.3 Copy and complete the following table:</p> <table border="1" data-bbox="687 937 1393 1396"><thead><tr><th data-bbox="687 937 817 1015">Nutrient</th><th data-bbox="817 937 1209 1015">Function(s)</th><th data-bbox="1209 937 1393 1015">Food Source(s)</th></tr></thead><tbody><tr><td data-bbox="687 1015 817 1094"></td><td data-bbox="817 1015 1209 1094"></td><td data-bbox="1209 1015 1393 1094"></td></tr><tr><td data-bbox="687 1094 817 1172"></td><td data-bbox="817 1094 1209 1172"></td><td data-bbox="1209 1094 1393 1172"></td></tr><tr><td data-bbox="687 1172 817 1250"></td><td data-bbox="817 1172 1209 1250"></td><td data-bbox="1209 1172 1393 1250"></td></tr><tr><td data-bbox="687 1250 817 1328"></td><td data-bbox="817 1250 1209 1328"></td><td data-bbox="1209 1250 1393 1328"></td></tr><tr><td data-bbox="687 1328 817 1396"></td><td data-bbox="817 1328 1209 1396"></td><td data-bbox="1209 1328 1393 1396"></td></tr><tr><td data-bbox="687 1396 817 1442"></td><td data-bbox="817 1396 1209 1442"></td><td data-bbox="1209 1396 1393 1442"></td></tr></tbody></table>	Nutrient	Function(s)	Food Source(s)																		
Nutrient	Function(s)	Food Source(s)																				

Unit 3 - Nutrition

References and Notes	Work to Submit
<p>Refer to Investigation 10 -A, Testing for Nutrients, pages 201 - 203 to do the laboratory.</p> <p>Lab Report</p>	<p>Laboratory:</p> <p>3.4 Complete Investigation 10-A. Pass your Lab Report in to your instructor for marking.</p>
<p>Note: See your instructor to find out what needs to be included in your Lab Report.</p>	
<p>Study pages 204 - 206. Then answer questions 3.5 - 3.9.</p> <p>Lab Report</p> <p>Study pages 207 - 209. Then answer questions 3.10 - 3.15.</p> <p>Lab Report</p>	<p>Writing:</p> <p>3.5 Define diet.</p> <p>3.6 Name the four food groups classified in <i>Canada's Food Guide</i>.</p> <p>3.7 Describe the five guidelines of <i>Canada's Food Guide</i>.</p> <p>3.8 What categories of information do nutrition labels provide?</p> <p>3.9 Complete the activity, Comparing Food Labels, on page 205. Use the Handout in the Appendix to record your information.</p> <p>3.10 Name and briefly describe the three processes involved in digestion.</p> <p>3.11 Define enzyme.</p>

Unit 3 - Nutrition

References and Notes	Work to Submit
<p><i>Load the CD-ROM into your computer, launch the Digestion lesson and follow the instructions to work your way through it. Complete 3.16.  </i></p> <p><i>Refer to page 210 to complete 3.17 in the assignment.  </i></p> <p>Note: You will need to keep a record of everything that you eat for one full day before you start the assignment. Include this with your assignment.</p>	<p>Writing:</p> <p>3.12 Describe the digestive process (both mechanical and chemical) that happens in the mouth.</p> <p>3.13 Describe the digestive process (both mechanical and chemical) that happens in the stomach.</p> <p>3.14 Describe the chemical digestion of carbohydrates, protein and fat in the small intestine.</p> <p>3.15 a) Where does most absorption of nutrients occur? b) In which other organ does absorption of nutrients occur?</p> <p>Computer:</p> <p>3.16 Print your Certificate at the end of the exercises (with your name on it). Include the certificate with your notes.</p> <p>Assignment:</p> <p>(The assignment consists of questions 3.17 and 3.18.)</p> <p>3.17 Complete Investigation 10-B, Analyze Your Diet, page 210.</p> <p>Note: Use the Handout, Data Collection Sheet: Food Record, included in the Appendix.</p>

Unit 3 - Nutrition

References and Notes

Use **Canada's Food Guide** to complete 3.18 in the assignment.



Note: Pass the completed assignment in to your instructor for marking.

This is the end of Unit 3. See your instructor to see if there is any more work that you need to do for this unit.

Work to Submit

Assignment: (continued)

3.18 Plan a well balanced diet for yourself for 1 day. Explain your choices.

Unit 4 - Maintaining Homeostasis

To fulfil the objectives of this unit, students should complete the following:

Reading for this unit: Chapter 11, pages 214 - 233.

References and Notes	Work to Submit
<p><i>Study pages 216 - 217. Then answer questions 4.1 - 4.2.  </i></p>	<p>Writing:</p> <p>4.1 Define homeostasis.</p> <p>4.2 Describe how the body tries to maintain homeostasis for each of the following:</p> <ul style="list-style-type: none">a) enzyme levelsb) waste product levelsc) blood sugar leveld) concentration of substances in bloode) heart ratef) water balance
<p>Note: Factors that interfere with the balance of body systems can be categorized into three areas, lifestyle, diet and genetics.</p> <p><i>Study pages 221 - 222. Then answer questions 4.3.  </i></p>	<p>4.3 Classify each factor listed in Fig.11.6 as being related to lifestyle, diet, genetics, or a combination of these.</p>
<p><i>Study pages 225 - 227. Then answer question 4.4.  </i></p>	<p>4.4 For each of the following diseases or disorders; <i>diabetes, ulcers, anorexia nervosa, bulimia nervosa, heart attack</i>:</p> <ul style="list-style-type: none">i) indicate whether the cause is related to lifestyle, diet, genetics, or a combination of theseii) give a brief description of the disease/disorderiii) possible treatments for the disease/disorder

Unit 4 - Maintaining Homeostasis

References and Notes	Work to Submit
<p><i>Study pages 228 - 229. Then answer questions 4.5 - 4.7.  </i></p>	<p>Writing:</p> <p>4.5 a) Why would someone need kidney dialysis? b) Briefly explain how kidney dialysis works</p> <p>4.6 Describe the following forms of technology, and the conditions they are used to treat: <i>angiogram</i> <i>pacemaker</i></p> <p>4.7 What is a colonoscopy and what is it used to diagnose?</p>
<p><i>See your instructor to get a copy of the Technology Challenge exercise to do 4.8.  </i></p>	<p>4.8 Complete the Technology Challenge exercise.</p>
<p><i>This is the end of Unit 4. See your instructor to see if there is any more work that you need to do for this unit.</i></p>	

Appendix

The Microscope

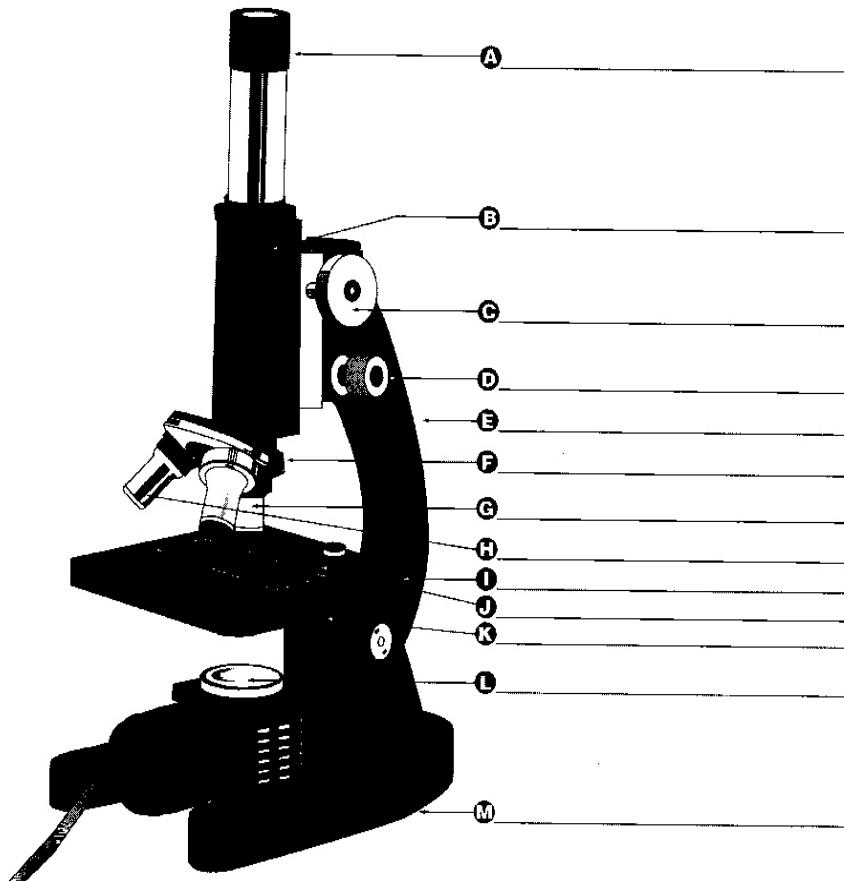
Name: _____

Date: _____

Use the terms below to label the parts of the microscope.

- Check each part of the microscope that has a blank line attached.
- Label the microscope by printing the correct name of the part on the line.

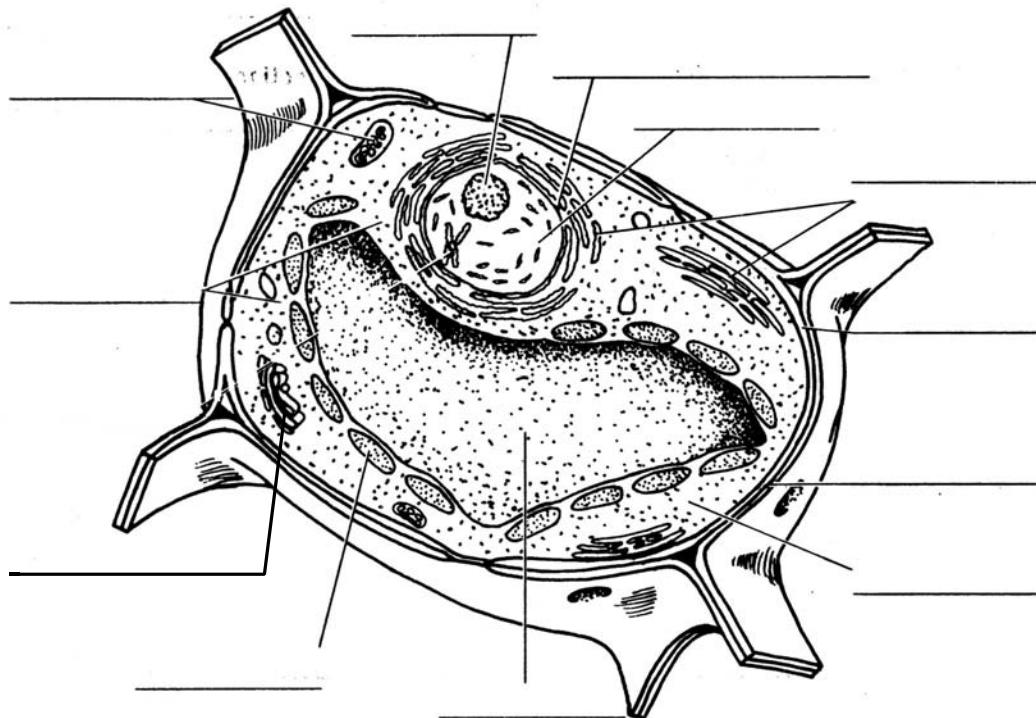
arm	fine-adjustment knob	stage
base	high-power objective lens	stage clips
coarse-adjustment knob	light-source	tube
diaphragm	low-power objective lens	
eye piece	revolving nosepiece	



Plant Cell

Name: _____

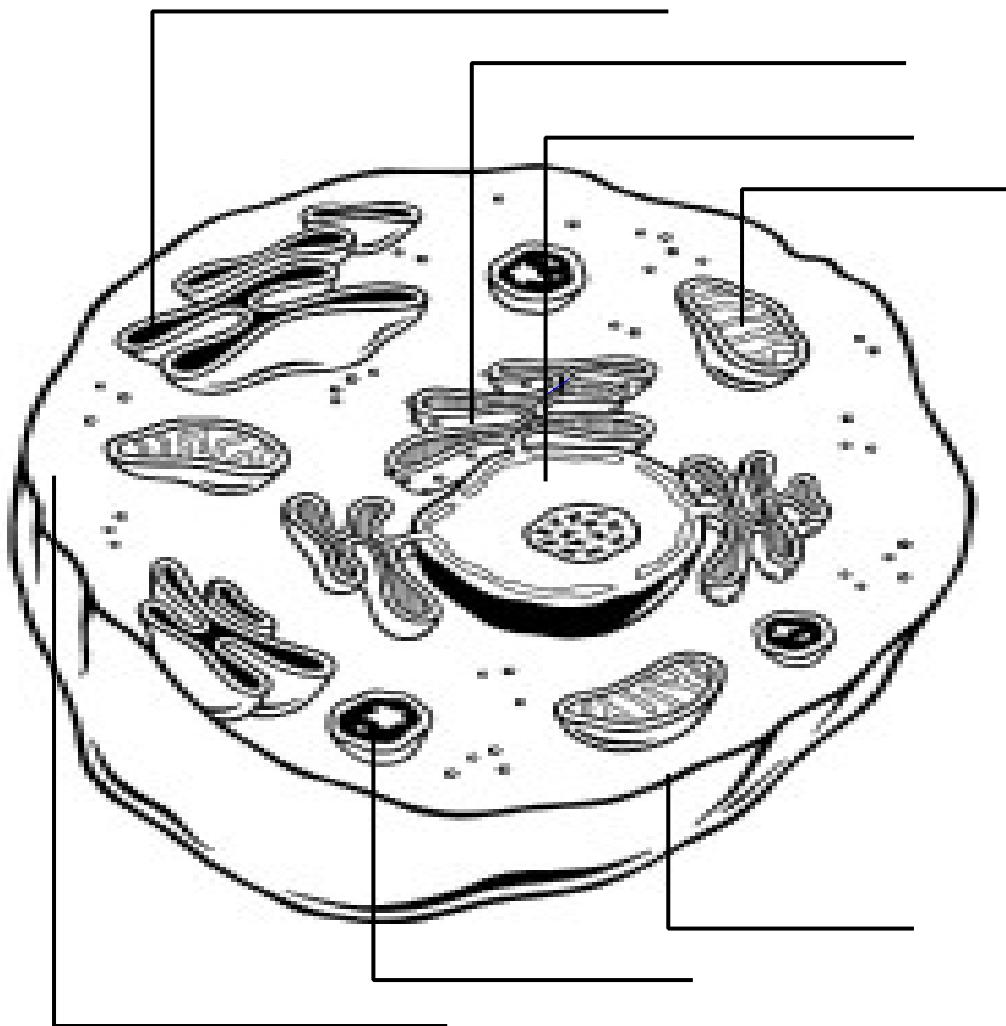
Date: _____



Animal Cell

Name: _____

Date: _____



Comparing Food Labels

Name: _____ Date: _____

Use this chart to organize your information for Find Out Activity: Comparing Food Labels.

Nutritional Information	Food Label 1	Food Label 2	Food Label 3
Energy			
Protein			
Fat			
Carbohydrates			
Vitamins			
Minerals			
Daily Value			

Data Collection Sheet: Food Record

Name: _____

Date: _____

Use this worksheet to record the foods you ate.

- Classify each item as a grain product, vegetable or fruit, meat or meat alternative, or milk product.
- Record the number of servings you ate of each item.
- Record the number of calories of each item.
- Total the number of servings and the number of calories you ate from each food group.
- Total the calories from all your food groups.

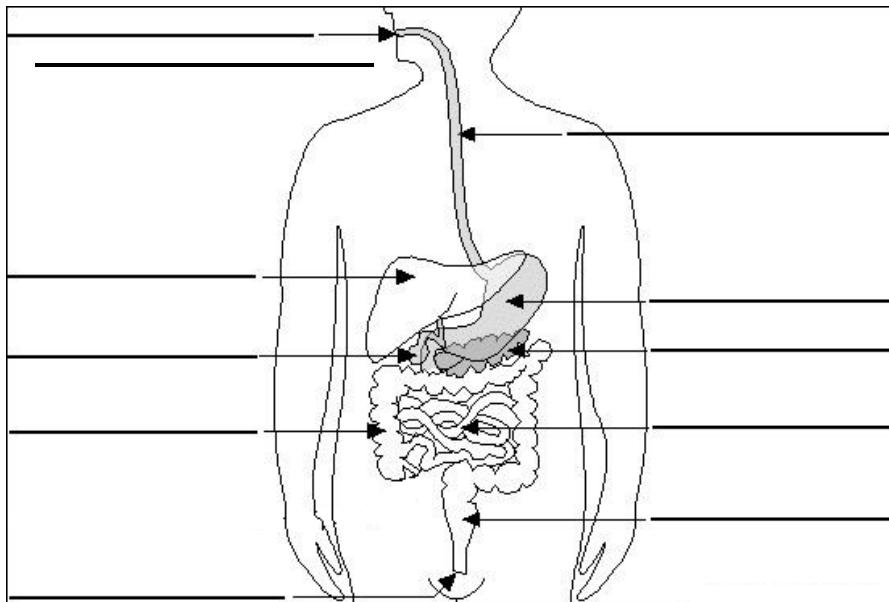
Food	Grain Products		Vegetables & Fruit		Meat & Alternative Products		Milk Products	
	Servings	Calories	Servings	Calories	Servings	Calories	Servings	Calories
Example: Apple			1	70				
Totals								
Recommended Number of Servings	5 - 12		5 - 10		2 - 3		2 - 4	

Total Number of Calories: _____

Digestive Processes

Name: _____ Date: _____

Study the diagram and label the parts, using the list below.



mouth - where food enters body; contains teeth and salivary glands

teeth - chew food into smaller pieces for swallowing

salivary glands - moisten food with enzymes that begin chemical breakdown

esophagus - pushes food to stomach through wave-like muscle spasms

stomach - muscles contract to mix food; releases acids that activate chemicals to digest food; dissolves food into liquid form

small intestine - has chemicals to digest food; neutralizes stomach acid; absorbs 80 to 90 percent of nutrients

large intestine - absorbs vitamins, minerals and water

gall bladder - stores bile

pancreas - provides much digestive enzymes; produces insulin to extract nutrients from food

rectum - stores solid waste (undigested food)

anus - discharges solid mass of undigested food called feces

The Blood Route

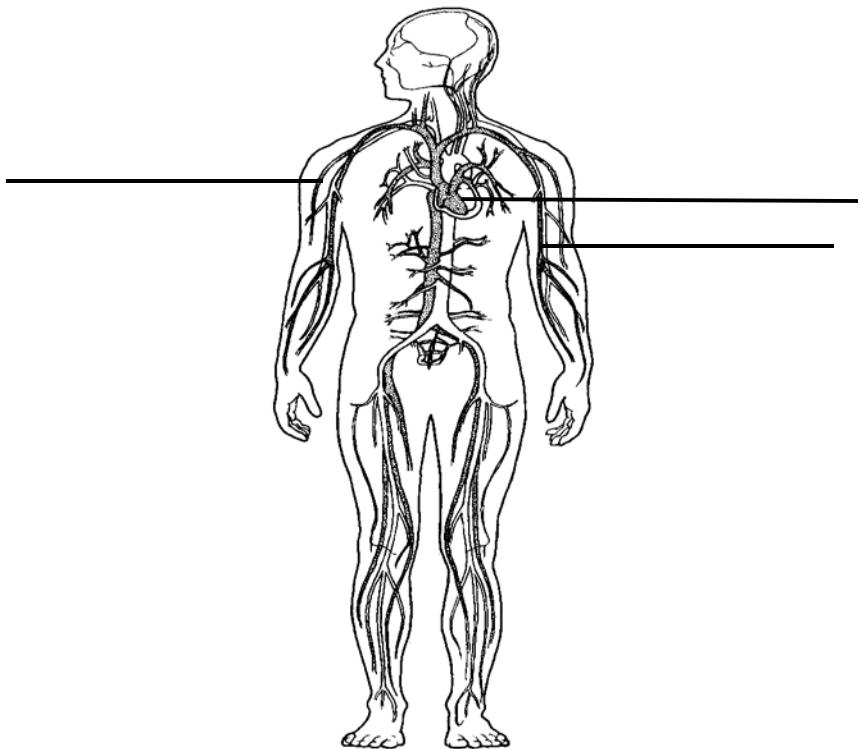
Name: _____

Date: _____

What to Do:

Trace the route that blood takes on its journey through the body. Colour the arteries red, to represent the oxygenated blood they carry. Colour the veins blue, to represent the deoxygenated blood they carry.

Pay special attention to the heart and lungs - remember that these organs contain both oxygenated and deoxygenated blood. How could you best represent this on the diagram?



Although the lungs are considered part of the respiratory system, they play a crucial role in the circulatory system. Without lungs, the blood circulating through your body would have no way of replenishing its oxygen supply or getting rid of waste gases - processes that are vital for survival. The circulatory system relied on the lungs to "refresh" the blood. Without this constant refreshment, the blood in this closed transport system would soon be toxic, delivering more harm than good to the body's cells.

How exactly do your lungs work? They are made up of millions of small air chambers

called alveoli. Alveoli have a large surface area to allow for maximum gas exchange. A vast network of tiny blood vessels surrounds the alveoli, and it is across the membranes of these blood vessels that oxygen and carbon dioxide are exchanged.

Then, as you know, the oxygen is carried by the blood to the cells of your tissues, while the carbon dioxide is carried by the blood away from the cells, back to your lungs. When you exhale, the carbon dioxide travels from the lungs out through your nose and mouth and is released into the environment.