

Adult Basic Education  
**Science**

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**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



## Table of Contents

To the Student .....	v
Introduction to Science 3105 .....	v
Use of Science Study Guides .....	vi
Recommended Evaluation .....	vii
Unit 1 - Plant and Animal Cells .....	Page 1
Unit 2 - Life Functions .....	Page 5
Unit 3 - Nutrition .....	Page 8
Unit 4 - Maintaining Homeostasis .....	Page 12
Appendix .....	Page 15



## 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.connect1*; 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**

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..

#### **Work to Submit**

You come across three (4) headings in this right hand column.

##### **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 as you go.

##### **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.

##### **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.

##### **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.

## 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

*Study pages 158 - 159 and use the glossary if you like to answer questions 1.1 - 1.2. ▶▶*

*Study the parts and functions of a compound microscope on pages 160 - 161. Then answer questions 1.3 and 1.4. ▶▶*

### Work to Submit

#### Writing:



- 1.1 What is a **microscope** and what is it used for?
- 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?
- 1.3 Complete the diagram of the microscope in Appendix A.
- 1.4 Copy and complete the following chart:

Microscope Part	Function
Light source	
Diaphragm	
Stage	
Stage Clips	
Objective Lens	
Tube	
Eye Piece	
Course Adjustment Knob	
Fine Adjustment Knob	
Arm and Base	







## Unit 1 - Plant and Animal Cells

### References and Notes

Load the CD-ROM into your computer, launch the **Microscope** lesson and follow the instructions to work your way through it. Complete 1.5.  

**Note:** If you don't have a computer, see your instructor for directions for the **Computer** sections in this Study Guide.

Study the information in the box on page 163. Then answer question 1.6.  

Study pages 164 - 165 and use the glossary, if you like, to answer questions 1.7 - 1.10.  

### Work to Submit

#### Computer:

- 1.5 Print out the **Microscope Parts Printout** and the **Certificate** (with your name on it). Include these with your notes.


#### Writing:

- 1.6 Copy and complete the following chart:

Magnification of Eyepiece	Magnification of Objective Lens	Total Magnification
10x	4x	
10x	10x	
10x	40x	

- 1.7 Write a definition for each of the following:
- cell
  - organelle
  - tissue
  - organ
  - organ system
  - organism

## Unit 1 - Plant and Animal Cells

References and Notes	Work to Submit
<p data-bbox="203 720 597 827"><i>Study pages 166 - 167 and use the glossary, if you like, to answer questions 1.11 - 1.13.</i></p> <p data-bbox="203 831 267 861"></p> <p data-bbox="203 1383 633 1491"><i>Note: You may want to get extra copies of the diagrams from your instructor for practice.</i></p>	<p data-bbox="662 390 1393 569">1.8 Make a table with 2 columns.</p> <ul data-bbox="662 426 1393 569" style="list-style-type: none"><li data-bbox="662 426 1393 495">• In the first column, list the levels of organization in living organisms beginning with cells.</li><li data-bbox="662 499 1393 569">• In the second column, give an example of each level</li></ul> <p data-bbox="662 611 951 644">1.9 Define <b>theory</b>.</p> <p data-bbox="662 684 1333 718">1.10 State the three hypotheses of the cell theory.</p> <p data-bbox="662 835 1305 1234">1.11 Describe the role of the following cellular structures:</p> <ul data-bbox="760 909 1149 1234" style="list-style-type: none"><li data-bbox="760 909 1045 942">(i) cell membrane</li><li data-bbox="760 947 987 980">(ii) cytoplasm</li><li data-bbox="760 984 954 1018">(iii) nucleus</li><li data-bbox="760 1022 1149 1056">(iv) endoplasmic reticulum</li><li data-bbox="760 1060 1045 1094">(v) mitochondrion</li><li data-bbox="760 1098 1000 1131">(vi) chloroplast</li><li data-bbox="760 1136 954 1169">(vii) vacuole</li><li data-bbox="760 1173 993 1207">(viii) golgi body</li><li data-bbox="760 1211 964 1245">(ix) cell wall</li></ul> <p data-bbox="662 1276 1380 1346">1.12 Which of the structures listed in question 1.11 is found <b>only</b> in plant cells?</p> <p data-bbox="662 1388 1373 1457">1.13 Label the diagrams of the plant and animal cells found in Appendix A.</p>

## Unit 1 - Plant and Animal Cells

### References and Notes

Refer to Investigation 8-B, **Plant Cell Organelles**, pages 168 - 170 to do the laboratory. ▢/▢

**Note:** See your instructor to find out what needs to be included in your **Lab Report**.

*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.*

### Work to Submit

#### Laboratory:

**Note:** Before you start the Investigation, you should get copies of the handouts, *Preparing a Wet Mount Slide* and *Making a Stained Slide*, 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.



1.14 Complete Investigation 8-B. Pass your **Lab Report** in to your instructor for marking.

## 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

Study pages 180 - 182. Then answer questions 2.1 - 2.3.  

**Note:** Life functions can also be called life processes.

Study pages 183 - 185. Then answer questions 2.4 - 2.7.  

**Note:** Plants and animals need energy to carry out their life functions.





### Work to Submit

#### Writing:


- 2.1 Define **life functions**.
- 2.2 Name the seven life processes common to living things.
- 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.
- 2.4
- a) Where do animals get energy?
  - b) How do plants get energy?
- 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:

carbon dioxide + \_\_\_\_\_ + \_\_\_\_\_ → glucose + \_\_\_\_\_

## Unit 2 - Life Functions

References and Notes	Work to Submit
<p><i>Load the CD-ROM into your computer, launch the <b>Photosynthesis</b> 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><b>Writing:</b></p> <p>2.6 a) Define <b>cellular respiration</b>.</p> <p>b) Name the organelle where cellular respiration takes place.</p> <p>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><b>Computer:</b></p> <p>2.8 Print your <i>Certificate</i> (with your name on it) at the end of the exercises. Include the certificate with your notes.</p> <p><b>Writing:</b></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 data-bbox="203 457 634 604"><i>Note: You will need to refer to the <b>Digestive System</b> handout in Appendix A to help with question 2.11.</i></p> <p data-bbox="203 1201 578 1272">Study pages 190 - 191. Then answer question 2.15. </p> <p data-bbox="203 1457 613 1604"><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 data-bbox="662 386 786 420"><b>Writing:</b></p> <p data-bbox="662 462 1398 604">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 data-bbox="756 646 1406 751">b) Label the diagram of the digestive system on the <b>Digestive System</b> handout, found in Appendix A.</p> <p data-bbox="662 793 1398 898">2.12 a) Describe the function of the following parts of the human circulatory system: <i>heart, arteries, veins, capillaries.</i></p> <p data-bbox="756 940 1377 1012">b) Label the diagram in the handout, The Blood Route, found in Appendix A.</p> <p data-bbox="662 1054 1305 1087">2.13 Explain how the circulatory system works.</p> <p data-bbox="662 1129 1312 1201">2.14 Explain how the circulatory system and the digestive system work together</p> <p data-bbox="662 1243 1382 1348">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

*Study pages 196 - 200. Then answer questions 3.1 - 3.3. ▶▶*

### Work to Submit


#### Writing:

- 3.1 Define **nutrition** and **nutrient**.
- 3.2 a) Define **malnutrition**.  
b) Describe the effects of malnutrition.
- 3.3 Copy and complete the following table:


Nutrient	Function(s)	Food Source(s)


## Unit 3 - Nutrition

### References and Notes

Refer to Investigation 10 -A, *Testing for Nutrients*, pages 201 - 203 to do the laboratory. 

**Note:** See your instructor to find out what needs to be included in your **Lab Report**.

Study pages 204 - 206. Then answer questions 3.5 - 3.9. 

Study pages 207 - 209. Then answer questions 3.10 - 3.15. 

### Work to Submit

#### Laboratory:

3.4 Complete Investigation 10-A. Pass your **Lab Report** in to your instructor for marking.

#### Writing:

3.5 Define **diet**.

3.6 Name the four food groups classified in *Canada's Food Guide*.

3.7 Describe the five guidelines of *Canada's Food Guide*.

3.8 What categories of information do nutrition labels provide?



3.9 Complete the activity, *Comparing Food Labels*, on page 205. Use the Handout in the Appendix to record your information.

3.10 Name and briefly describe the three processes involved in digestion.

3.11 Define **enzyme**.



## Unit 3 - Nutrition

References and Notes	Work to Submit
<p><i>Load the CD-ROM into your computer, launch the <b>Digestion</b> 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><b>Note:</b> 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><b>Writing:</b></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?</p> <p>b) In which other organ does absorption of nutrients occur?</p> <p><b>Computer:</b></p> <p>3.16 Print your <b>Certificate</b> at the end of the exercises (with your name on it). Include the certificate with your notes.</p> <p><b>Assignment:</b></p> <p>(The assignment consists of questions 3.17 and 3.18.)</p> <p>3.17 Complete Investigation 10-B, <b>Analyze Your Diet</b>, page 210.</p> <p><b>Note:</b> Use the Handout, <b>Data Collection Sheet: Food Record</b>, 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><b>Note:</b> <i>Factors that interfere with the balance of body systems can be categorized into three areas, <b>lifestyle, diet and genetics.</b></i></p> <p><i>Study pages 221 - 222. Then answer questions 4.3. ▶▶</i></p> <p><i>Study pages 225 - 227. Then answer question 4.4. ▶▶</i></p>	<p><b>Writing:</b></p> <p>4.1 Define <b>homeostasis</b>.</p> <p>4.2 Describe how the body tries to maintain homeostasis for each of the following:</p> <ul style="list-style-type: none"><li>a) enzyme levels</li><li>b) waste product levels</li><li>c) blood sugar level</li><li>d) concentration of substances in blood</li><li>e) heart rate</li><li>f) water balance</li></ul> <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>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"><li>i) indicate whether the cause is related to lifestyle, diet, genetics, or a combination of these</li><li>ii) give a brief description of the disease/disorder</li><li>iii) possible treatments for the disease/disorder</li></ul>

## Unit 4 - Maintaining Homeostasis

### References and Notes

Study pages 228 - 229. Then answer questions 4.5 - 4.7.  

See your instructor to get a copy of the **Technology Challenge** exercise to do 4.8.  

*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.*

### Work to Submit

#### Writing:

- 4.5 a) Why would someone need kidney dialysis?  
b) Briefly explain how kidney dialysis works
- 4.6 Describe the following forms of technology, and the conditions they are used to treat:  
*angiogram*  
*pacemaker*
- 4.7 What is a colonoscopy and what is it used to diagnose?
- 4.8 Complete the **Technology Challenge** exercise.

# **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

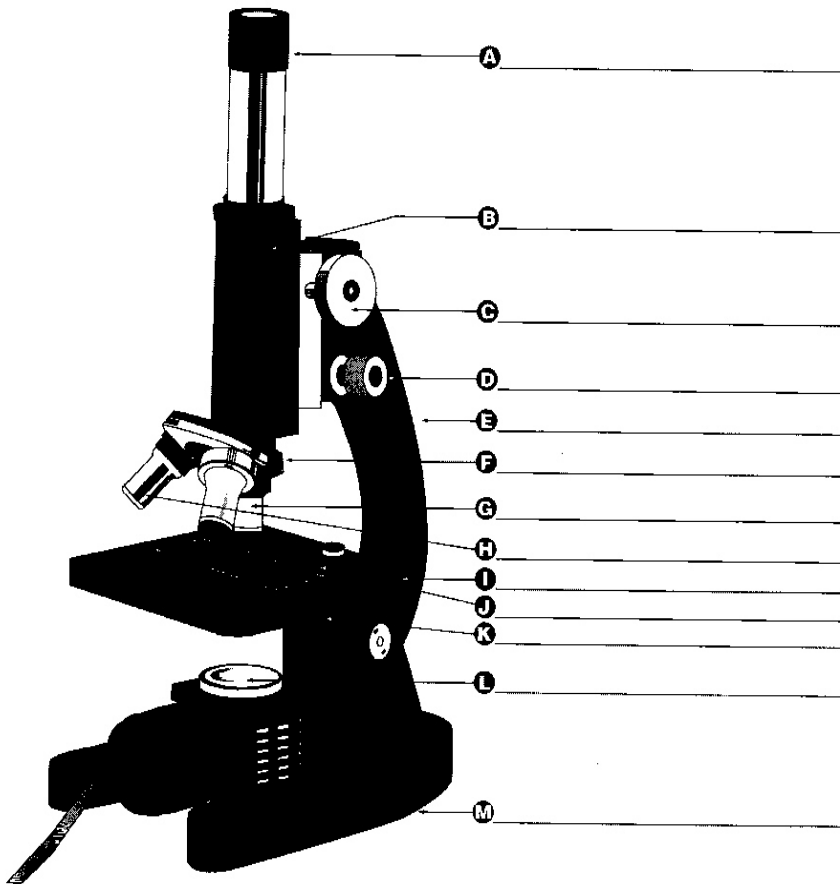
tube

diaphragm

low-power objective lens

eye piece

revolving nosepiece



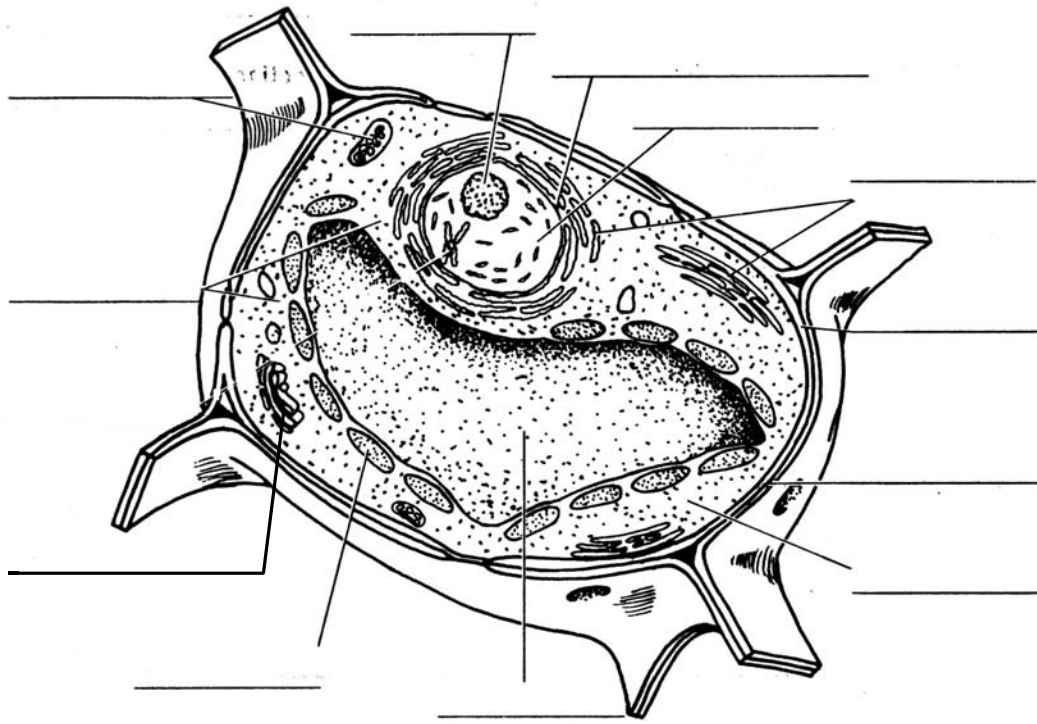




# Plant Cell

Name: \_\_\_\_\_

Date: \_\_\_\_\_

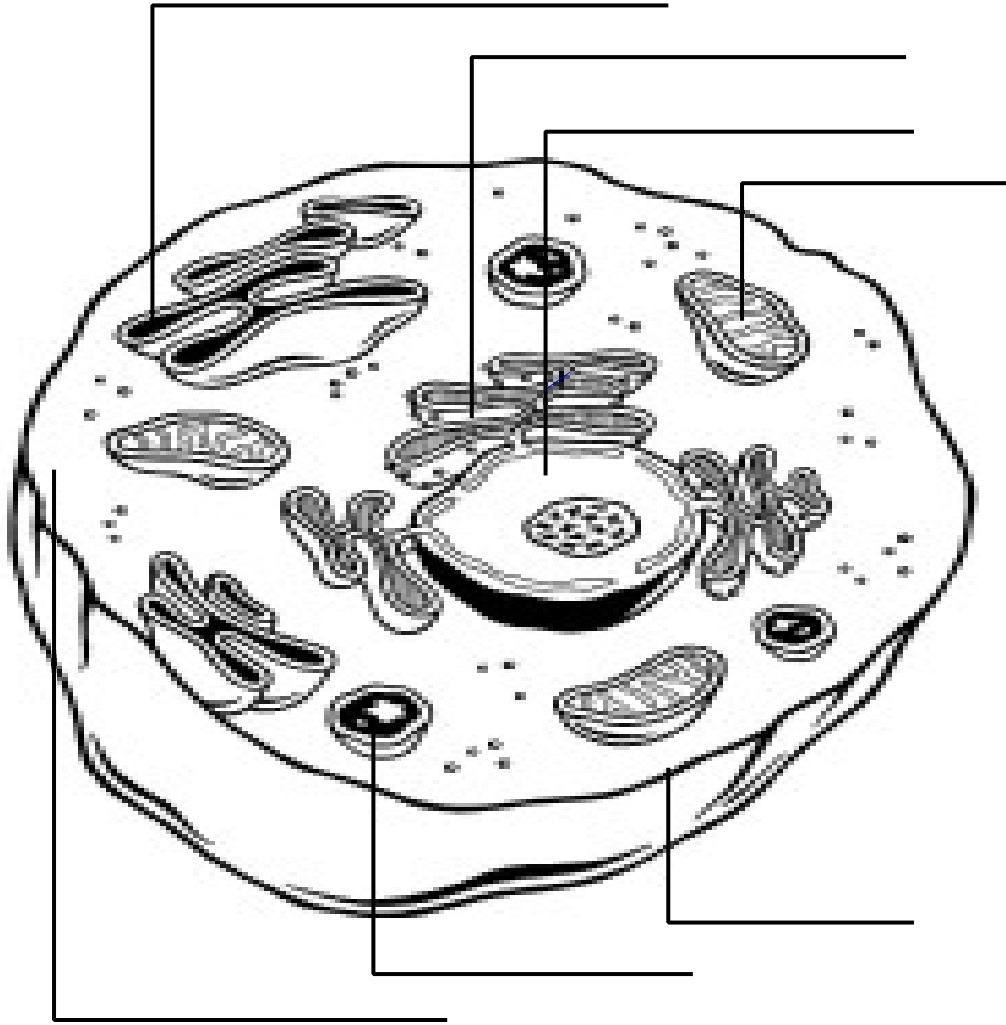




# Animal Cell

Name: \_\_\_\_\_

Date: \_\_\_\_\_





# Comparing Food Labels

Name: \_\_\_\_\_

Date: \_\_\_\_\_

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

<b>Nutritional Information</b>	<b>Food Label 1</b>	<b>Food Label 2</b>	<b>Food Label 3</b>
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: \_\_\_\_\_



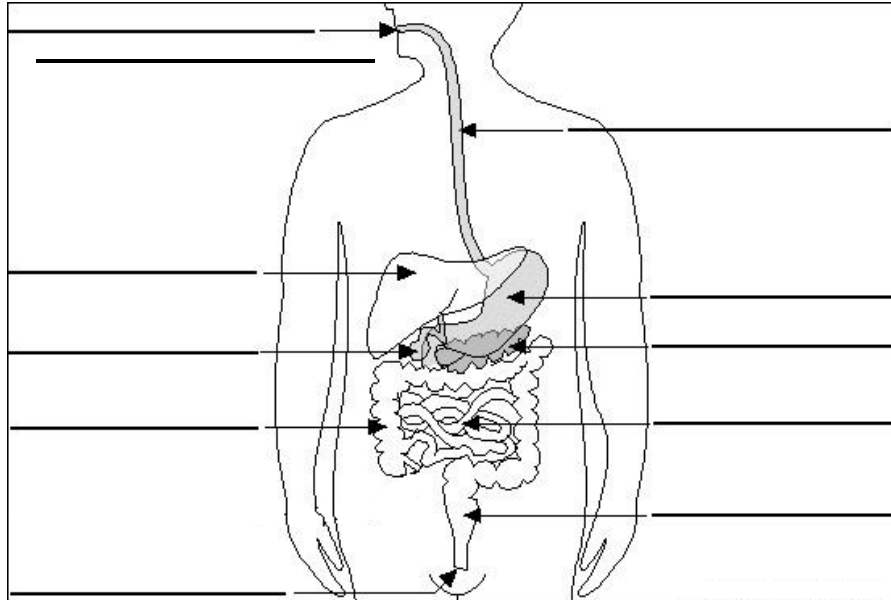


# Digestive Processes

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

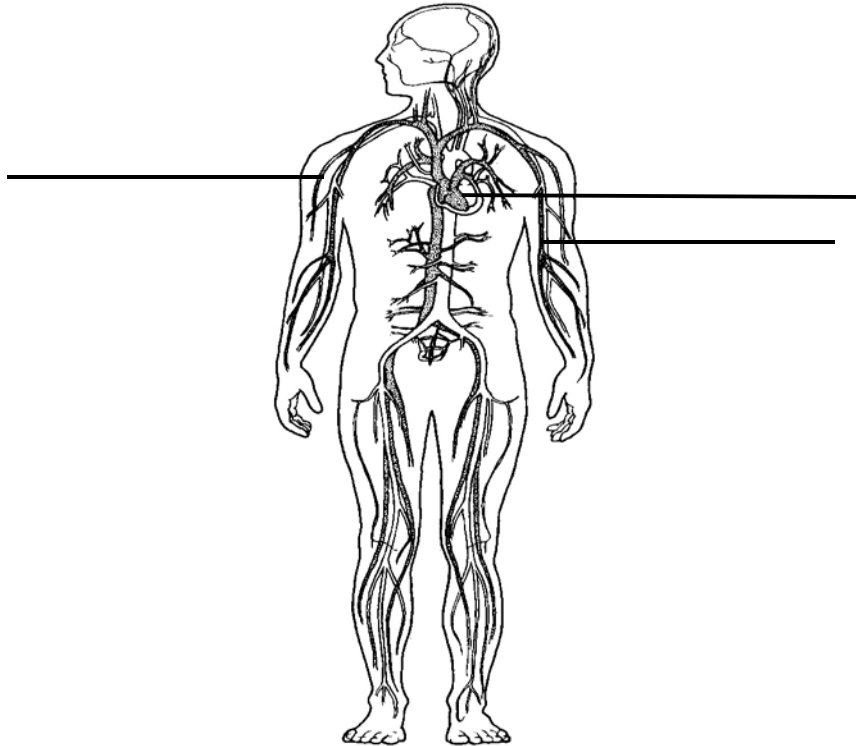
Name: \_\_\_\_\_

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.

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.

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