

Adult Basic Education

Science

Science 3105

From Life to Lifestyle

Curriculum Guide

Prerequisites: None

Credit Value: 1

<p>Science Courses [General College Profile]</p> <p>Science 2100A</p> <p>Science 2100B</p> <p>Science 2100C</p> <p>Science 3101</p> <p>Science 3102</p> <p>Science 3103</p> <p>Science 3104</p> <p>Science 3105</p> <p>Science 3106</p>

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To the Instructor

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. Students begin by learning about microscopes and how they are used. They are introduced to the basic structures and functions of cells and the life functions common to living things. They progress to an understanding of the importance of nutrition and lifestyle in helping their bodies carry out life functions and maintain homeostasis.

Students will be required to complete one **Assignment** in this course. However, there are many topics included in the course that students may be interested in exploring further. They could be given the opportunity to investigate topics in group work or complete additional assignments . Coordination with the English program is possible in assigning and evaluating additional work.

This will prove to be a lengthy course for some students. In order to reduce the amount of material that students will need to study for testing purposes, the Outcomes for Unit 4 may be covered with an additional assignment (see the **Suggestions for Assessment** for Unit 4 for elaboration).

Students will be required to complete two **Core Labs** in this course. Additional laboratory investigations may be added.

To the Instructor

II. Curriculum Guides

Each new ABE Science course has a Curriculum Guide for the instructor and a Study Guide for the student. The Curriculum Guide includes the specific curriculum outcomes for the course. Suggestions for teaching, learning, and assessment are provided to support student achievement of the outcomes. Each course is divided into units. Each unit comprises a **two-page layout of four columns** as illustrated in the figure below. In some cases the four-column spread continues to the next two-page layout.

**Curriculum Guide Organization:
The Two-Page, Four-Column Spread**

Unit Number - Unit Title		Unit Number - Unit Title	
Outcomes Specific curriculum outcomes for the unit.	Notes for Teaching and Learning Suggested activities, elaboration of outcomes, and background information.	Suggestions for Assessment Suggestions for assessing students' achievement of outcomes.	Resources Authorized and recommended resources that address outcomes.

III. Study Guides

The Study Guide provides the student with the name of the text(s) required for the course and specifies the sections and pages that the student will need to refer to in order to complete the required work for the course. It guides the student through the course by assigning relevant reading and providing questions and/or assigning questions from the text or some other resource. Sometimes it also provides important points for students to note. (See the *To the Student* section of the Study Guide for a more detailed explanation of the use of the Study Guides.) The Study Guides are designed to give students some degree of independence in their work. Instructors should note, however, that there is much material in the Curriculum Guides in the *Notes for Teaching and Learning* and *Suggestions for Assessment* columns that is not included in the Study Guide and instructors will need to review this information and decide how to include it.

To the Instructor

IV. Resources

Essential Resources

Student text: science.connect1; Colbourne, Fernandez, et al; McGraw-Hill Ryerson; 2002. ISBN: 0070890927 (Includes Student Multimedia CD-ROM.)

science.connect1 Teacher's Resource, Unit C.

Laboratory Supplies and Equipment.

Recommended Resources

science.connect1 web site:

<http://www.mcgrawhill.ca/school/booksites/science.connect+1/>

Computer with CD-ROM and Internet connection

Note: In addition to the text, this course is designed to make use of multimedia, in the form of CD-ROM and the Internet, to help reinforce important concepts. **Disc Connects** refer to the use of the CD-ROM that accompanies the text. It uses interactive methods that most students will find interesting and useful. **Internet Connects** (ICT's) refer to the use of internet sites to assist in learning about topics covered in the course. ICT Masters are provided in the Teacher's Resource or at the text web site to assist in identifying important information.

V. Recommended Evaluation

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

From Life to Lifestyle

Unit 1 - Plant and Animal Cells

Outcomes

1.1 Identify the microscope as an important tool for biological study.

1.2 Use instruments effectively and accurately for magnification.

1.2.1 Identify microscope parts and their functions.

1.2.2 Demonstrate general care, focusing techniques and safety concerns for using a microscope.

1.2.3 Prepare, stain, and observe a wet mount of a specimen.

1.2.4 Observe prepared microscopic samples.

1.3 Display information collected through the use of a microscope.

1.3.1 Sketch biological specimens viewed through a microscope.

1.3.2 Calculate magnification.

1.4 Describe the appearance and function of cellular structures.

1.4.1 Define organelle

Notes for Teaching and Learning

Many students would have had previous experience with the use of microscopes and the first part of this unit will provide review. However, this will be the first exposure to the microscope for other students and they will need more time and practice to master the concepts covered at the beginning of this unit. Before students start working with the microscope, you can prepare them by showing and discussing a video, if one is available. Alternately, you can demonstrate parts, function and safe use of the microscope.

Students will be expected to properly label diagrams of the microscope and to know how to use the microscope safely. BLM's 8-1 and 8-2 can assist in achieving these goals.

Students could be directed to complete the **Internet Connect (ICT)** on page 159 to learn more about the Scanning Electron Microscope.

Note: Instructions and questions to accompany the Internet Connects are available in the *Teacher's Resource*.

Students are directed to complete the **Disc Connect** Microscope applet as a review of the microscope parts and functions.

Note: It is suggested that instructors have the CD-ROM installed on a server or on individual computers and that the computers that the students will be using are connected to a printer.

Unit 1 - Plant and Animal Cells

Suggestions for Assessment

BLM 8-1, *Microscope Usage*, can be used to review the proper and safe use of the microscope.

BLM 8-2, *The Microscope*, can be used for practice in labeling the parts of the microscope. A copy of this BLM has been included for students in the Study Guide.

BLM 8-3, *Calculating Magnification*, can be used for practice in calculating magnification.

Note: Blackline Masters (BLM's) and answers to all the Blackline Masters are found in the Teacher's Resource.

Students could complete Investigation 8-A, *Big, Bigger, Biggest!*, but it is not required.

Instructors should review all student answers to the questions in the *Study Guide* for this unit, including the **Microscope Parts Printout** and the **Certificate** from the *Microscope* applet.

Their written work should be assigned a mark to be used as part of the final evaluation for the course. (Note: An overall mark of 10% is the recommended for the written work from the Study Guide, excluding lab reports and assignments. An overall mark of 20% is recommended for the labs and assignments.)

Students will be introduced to many new terms throughout this course. Instructors could suggest that students start a vocabulary list and add to it regularly as they work through the unit. The glossary can be used to provide definitions.

Students could be provided with a copy of ICT 8-1 to complete to learn more about the Scanning Electron Microscope.

Resources

science.connect1,
Chapter 8, pages 156 -
177.

science.connect1
Teacher's Resource, Unit
C.

science.connect1 web
site:
<http://www.mcgrawhill.ca/school/booksites/science.connect+1/>

science.connect1
Student Multimedia CD-ROM, *Microscope* applet.

BLM 8-1, *Microscope Usage*.

BLM 8-2, *The Microscope*.

BLM 8-3, *Calculating Magnification*.

BLM 8-4, *Making a Scientific Drawing or Sketch*.

ICT 8-1, *Scanning Electron Microscope*.

Unit 1 - Plant and Animal Cells

Outcomes

1.4.2 Describe the role of the following cellular structures:

- (i) cell membrane
- (ii) cytoplasm
- (iii) nucleus
- (iv) endoplasmic reticulum
- (v) mitochondrion
- (vi) chloroplast
- (vii) vacuole
- (viii) golgi body
- (ix) cell wall

1.4.3 Compare plant and animal cells in terms of the type of organelles present.

1.5 Describe the levels of organization in living organisms.

1.5.1 Define cell.

1.5.2 Describe the relationship among cells, tissues, organs, organ systems, and organisms.

1.6 Explain the cell theory.

1.6.1 Define theory.

1.6.2 State the three hypotheses of the cell theory.

Notes for Teaching and Learning

Students should be able to label diagrams of plant and animal cells using the diagrams included in Appendix A of the Study Guide. Answer sheets are provided in the appendix of this curriculum guide.

BLM 8-9 can be used as an overhead or handout to help explain levels of organization.

BLM's 8-13 and 8-17 can be used for review and reinforcement of plant and animal cells.

Students could be directed to complete the **Internet Connect (ICT)** on page 165 to enrich and reinforce the information presented in the text on plant and animal cells.

Unit 1 - Plant and Animal Cells

Suggestions for Assessment

Students are required to complete **Core Lab #1, Plant Cell Organelles**. This is the first time that students will be preparing their own slides. Ensure that they do BLM's 8-6 and 8-7 **before** starting this lab. Students are not directed in the Study Guide to pass in a lab report for these BLM's, but you may require them to submit one to be included with the report for the Core Lab. Students **are** directed to submit a lab report for the Core Lab. Instructors should clearly communicate to students what is expected to be included for the lab report.

Students should be given a copy of BLM 8-4 to learn about how to make a proper scientific drawing. It should be reviewed with them before they complete the lab.

Students should use BLM 8-14 to sketch their observations during the lab.

BLM's 8-11 and 8-12 can be used as review and reinforcement of the units of life and how they are organized.

Students could be asked to complete Investigation 8-D, *Who Did It?*. BLM 8-16 can be used with this investigation.

BLM 8-18 can be used for review of the unit.

Questions from the Chapter 8 Review on pages 176 -177 could be assigned for review.

Instructors may give a test at the end of Unit 1. BLM 8-19 can be used as a basis for the test. The mark for the test would be used as part of the final mark for the course. Alternately, a test may be given at the end of unit 2, which is half way through the course, to cover units 1 and 2.

Resources

Core Lab #1:
Investigation 8-B, *Plant Cell Organelles*.

BLM 8-5, *Data Collection Sheet #1*.

BLM 8-6, *Preparing a Wet Mount Slide*.

BLM 8-7, *Making a Stained Slide*.

BLM 8-9, *Flowchart: Levels of Organization*.

BLM 8-11, *Organization of Life*.

BLM 8-12, *Word Scramble*.

BLM 8-13, *Parts of a Cell*.

BLM 8-14, *Data Collection Sheet #2*.

BLM 8-16, *Using Hair to Solve Crimes*.

BLM 8-17, *Organelle Crossword*.

BLM 8-18, *Word Search*.

BLM 8-19, *Chapter 8, Chapter Test*

Unit 2 - Life Functions

Outcomes

2.1 Identify and compare, in general terms, the life functions common to living systems.

2.1.1 Define life functions (processes).

2.1.2 Identify life processes common to living systems.

2.1.3 Describe how cell structure has been adapted for specific life functions.

2.1.4 Identify organs and systems that carry out life functions in plants and animals.

2.2 Describe the relationship between photosynthesis and cellular respiration in terms of biological energy storage.

2.2.1 Explain the importance of the processes of photosynthesis and cellular respiration for individual organisms.

2.2.2 Demonstrate, using equations, that photosynthesis and cellular respiration are complementary processes.

2.3 Describe the major human organ systems that carry out life functions.

Notes for Teaching and Learning

If students are working as a group, they could be introduced to this unit by being asked to identify the life functions represented by the pictures in Fig. 9.1 on page 180. Suggested answers are provided in the Teacher's Resource.

It is important that students understand the difference between *cellular respiration* and *respiration* (breathing). Instructors should clarify the difference and review the body parts involved in each process. Remind students that cellular respiration occurs in **both** plants and animals.

Many students may be familiar with photosynthesis from earlier schooling. However, they will need help with understanding the equations for both photosynthesis and respiration. They may not have had exposure to chemical equations previously.

Draw attention to the fact that photosynthesis and respiration complement each other. Have students compare the two equations. A comparison chart similar to the one below may be used.

	sun or light energy ↓↓↓ →→photosynthesis→→	
water + carbon dioxide	←←cellular respiration←←	glucose + oxygen
	↓↓↓ energy for life functions	

Unit 2 - Life Functions

Suggestions for Assessment

Instructors should review all student answers to the questions in the *Study Guide* for this unit, including the **Certificate** from the *Photosynthesis* applet. Their written work should be assigned a mark to be used as part of the final evaluation for the course.

(Note: An overall mark of 10% is the recommended for the written work from the Study Guide, excluding lab reports and assignments.)

Students should continue to add to their vocabulary list for the course.

BLM's 8-10 and 9-2 can be used to reinforce the information that students are learning about life processes.

Students could be asked to complete Investigation 9-A, *What is My Role?*, on page 182, to investigate further how cell structure is adapted to function. BLM 9-5 could be used here.

Students are directed to complete the **Disc Connect** *Photosynthesis* applet to review and reinforce their understanding of photosynthesis and respiration and the relationships between them.

BLM 9-7 can be used for review and reinforcement of photosynthesis and respiration.

Resources

science.connect1,
Chapter 9, pages 178 -
195.

science.connect1
Teacher's Resource, Unit
C.

science.connect1 web
site:
<http://www.mcgrawhill.ca/school/booksites/science.connect+1/>

science.connect1
Student Multimedia CD-ROM,
Photosynthesis
applet.

BLM 8-10,
Characteristics of Life.

BLM 9-2, *Life Processes*.

BLM 9-5, *Cell Adaptations Data Chart*.

BLM 9-7, *Photosynthesis and Cellular Respiration*.

Unit 2 - Life Functions

Outcomes

- 2.3.1 Describe the functions of the following systems: digestive system, circulatory system, urinary system and nervous system.
- 2.4 Describe the interaction of the digestive and circulatory systems in the maintenance of balance in the human organism.
- 2.4.1 Trace the path of food through the human digestive system.
- 2.4.2 Describe the function of parts of the digestive system. Include: esophagus, stomach, small intestine, large intestine, anus.
- 2.4.3 Describe the function of parts of the circulatory system. Include: heart, arteries, veins, capillaries.
- 2.4.4 Describe the interaction between the human digestive and circulatory systems.
- 2.5 Identify and describe the role of modern technology in monitoring critical life functions in humans.

Notes for Teaching and Learning

Instructors could show a video that illustrates the organ systems of the body and their connections to life functions.

If there are one or more models of the human body or any of its organs or organ systems available, instructors could use them to have students identify organ systems.

Students could be directed to complete the **Internet Connect** (ICT) for the heart on page 189 to enrich and reinforce the information presented in the text on the human circulatory system

Students are directed in the Study Guide to complete the handouts, Digestive System (BLM 9-10), and The Blood Route (BLM 9-11). They should label the diagrams and be prepared to be able to label similar diagrams for testing purposes. The other information in the handouts is not required for testing purposes.

If you have a nurse at your campus, or if a community nurse is available, you could invite her/him in to demonstrate how to take blood pressure and offer students the opportunity to have their blood pressure checked.

Unit 2 - Life Functions

Suggestions for Assessment

BLM's 9-13 and 9-15 can be used for review and reinforcement.

Questions from the Chapter 9 Review on pages 194 -195 could be assigned. Questions could also be assigned from Check Your Understanding at the end of each section in the text.

BLM 9-16 can be used as a basis for a test on this unit or combined with questions from Unit 1 for a single test on Units 1 and 2. The mark for the test would be used as part of the final mark for the course.

Resources

BLM 9-10, The Digestive System.

BLM 9-11, The Blood Route.

BLM 9-13, Body Parts Crossword.

BLM 9-15, Word Search.

BLM 9-16, Chapter 9 Chapter Test.

Unit 3 - Nutrition

Outcomes

3.1 Describe how nutrition affects body functions.

3.1.1 Define nutrition, and nutrients.

3.1.2 Define and describe the effects of malnutrition.

3.1.3 Identify the six classes of nutrients.

3.1.4 Describe the function(s) of the six classes of nutrients.

3.1.5 Identify food sources for the nutrients.

3.2 Investigate specific nutrients found in various foods.

3.3 Analyze the influence of diet on human body functions.

3.3.1 Define diet.

3.3.2 Identify the four food groups.

3.3.3 Describe the guidelines of Canada's Food Guide.

3.4 Assess the nutrient components of prepared foods.

3.4.1 Read and compare food labels for nutrition information.

Notes for Teaching and Learning

Instructors could provide students with BLM 10-1 to review some common myths about healthy and unhealthy food choices and diets.

Instructors should provide students with copies of Canada's Food Guide. These are available on the Health Canada web site at:

http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index_e.html

Students should be provided with copies of BLM's 10-3 and 10-4 for information purposes.

Outcome 3.2 is achieved by completion of Investigation 10-A on page 201 of the text. Instructors should refer to the Teacher's Resource for helpful information regarding the investigation and for answers to the questions.

A dietician could be invited to speak to the students about proper nutrition, healthy food choices, and meal planning. Students should plan questions in advance of the visit.

Students are directed in the Study Guide to complete the Find Out Activity, *Comparing Food Labels*, on page 205. You may provide students with the food labels needed for the activity or ask them to bring some in from home. BLM 10-9 is included in the Appendix of Study Guide for students to use when working on this activity.

Unit 3 - Nutrition

Suggestions for Assessment

Instructors should review all student answers to the questions in the *Study Guide* for this unit. Their written work should be assigned a mark to be used as part of the final evaluation for the course. (Note: An overall mark of 10% is the recommended for the written work from the Study Guide, excluding lab reports and assignments.)

Students are required to complete **Core Lab #2**, *Testing For Nutrients*, and to submit a lab report. Instructors should clearly communicate to students what is expected to be included for the lab report. Students should be provided with BLM 10-5 to record their observations.

Students could be required to use BLM 10-6, *Testing Foods for Nutrients*, to extend Investigation 10-A. Refer to the Teacher's Resource for information about this activity.

Students should be provided with copies of BLM 10-2 and asked to complete it to reinforce understanding of food sources and functions and the effects of deficiencies.

Resources

science.connect1,
Chapter 10, pages 196 -
213.

science.connect1
Teacher's Resource, Unit
C.

science.connect1 web
site:
<http://www.mcgrawhill.ca/school/booksites/science.connect+1/>

Core Lab #2:
Investigation 10-A,
Testing For Nutrients,
pages 201 - 203.

Health Canada web site:
http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index_e.html

BLM 10-1, *Test Your Nutrition Knowledge*.

BLM 10-2, *Nutrition Summary Worksheet*.

BLM 10-3, *Vitamin Summary Sheet*.

BLM 10-4, *Mineral Summary Sheet*.

Unit 3 - Nutrition

Outcomes

3.5 Describe, in general terms, the intake of matter and its processing by the digestive system.

3.5.1 Describe the three process involved in digestion.

3.5.2 Define enzyme.

3.5.3 Describe the processing of food as it moves through the digestive tract.

3.6 Analyze diet in terms of daily nutrient and energy requirements.

3.6.1 Assess your nutrient and caloric intake.

3.6.2 Plan a well balanced diet.

Notes for Teaching and Learning

There is more information about the digestive process available at the web site for the text at <http://www.mcgrawhill.ca/school/booksites/science.connect+1/>

Students are directed to complete the **Disc Connect Digestion** applet to review and reinforce their understanding of the functioning of the organs of the digestive system.

Students could be directed to complete the **Internet Connect (ICT)** for digestion, found in the Teacher's Resource, to enrich and reinforce the concepts presented in the Digestion applet. They should be given copies of this to complete as they work through the applet.

As part of the assignment for this unit, students are given the opportunity to examine their own diet by completing Investigation 10-B. In order to complete the assignment, students will need to use Canada's Food Guide. Instructors should review the use of the guide with students. They will also need to read and interpret information about caloric values for foods. For specific information on this, instructors should direct students to the Health and Fitness Information Network web site at: <http://www.health2fit.com/protein.html> or the Health Canada web site at: http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/nutrition/nvscf-vnqau_e.pdf or provide this information from another source.

Note: Students should be asked to record what they eat over a period of a day in order to complete the assignment.

Unit 3 - Nutrition

Suggestions for Assessment

Outcome 3.6 is covered by completing the Assignment (3.17 and 3.18) as outlined in the Study Guide. A mark should be given for the assignment and the mark should be used to contribute to the final mark for the course. The material covered in the assignment should **not** be tested. Students will use BLM10-15 to record their data. It has been included in the Appendix of the Study Guide.

Students can be asked to evaluate their choices for the daily menu that they are asked to develop in the assignment by completing BLM 10-8. They may be asked to submit it as part of the assignment.

BLM 10-12 can be used as a vocabulary check for this unit.

BLM 10-14 can be used for review and reinforcement of the processes of digestion.

Students could be asked to complete the Find Out Activity, **Digestion is Mechanical and Chemical**, on page 208.

Questions from the Chapter 10 Review on pages 212 - 213 could be assigned for review. Questions could also be assigned from Check Your Understanding at the end of each section in the text.

BLM 10-17 can be used for review and reinforcement of some of the terms introduced in this unit.

Instructors may give a test at the end of Unit 3. BLM 10-18 can be used as a basis for the test. The mark for the test would be used as part of the final mark for the course.

Resources

science.connect1
Student Multimedia CD-ROM, Digestion applet.

BLM 10-5, *Data Collection Sheet: Testing for Nutrients*.

BLM 10-6, *Testing Foods for Nutrients*.

BLM 10-7, *Canada's Food Guide*.

BLM 10-8, *Essential Nutrients in Canada's Food Guide*.

BLM 10-9, *Comparing Food Labels*.

BLM 10-12, *Diet Crossword*.

BLM 10-14, *Digestive Processes*.

BLM 10-15, *Data Collection Sheet: Food Record*.

BLM 10-17, *Word Scramble*.

BLM 10-18, *Chapter 10 Chapter Test*.

Unit 4 - Maintaining Homeostasis

Outcomes

4.1 Describe how the human body maintains its balance by responding to changing conditions.

4.1.1 Define homeostasis.

4.1.2 Describe ways that the human body attempts to maintain homeostasis.

4.2 Explore factors that affect homeostasis.

4.2.1 Identify lifestyle choices that affect homeostasis.

4.2.2 Explain how diet affects homeostasis.

4.2.3 Recognize genetics as a factor that affects homeostasis.

4.3 Analyze effects of the body's attempts to maintain homeostasis.

4.3.1 Identify some major disorders of the body.

4.4 Identify some technologies used to maintain homeostasis.

Notes for Teaching and Learning

If working with a group of students, instructors could introduce the concept of homeostasis by having them complete the Starting Point Activity on page 215. BLM 1-10 can be used for drawing a line graph and BLM 11-1 can be used to record data.

Students could complete Investigation 11-A to find out how heart rate responds to temperature change. Consult the Teacher's Resource for information about this investigation.

A health professional could be invited to discuss with students the risk factors for certain diseases, the effects of these diseases on the body, and the lifestyle choices that can affect homeostasis. Students should be directed to plan questions in advance of the visit

A fitness expert could be invited to discuss the benefits of exercise and appropriate types of fitness activities with students.

Students could be directed to complete the **Internet Connect** (ICT) on page 224 to calculate their life expectancy based on lifestyle factors. Point out to them that the quiz provided there uses average statistics and is therefore only an estimate.

Unit 4 - Maintaining Homeostasis

Suggestions for Assessment

The work outlined in the Study Guide for this unit could be given as an assignment. This would mean that the final exam for the course would cover the material in the first three units only. The mark given for the assignment would be used to help determine the final mark for the course. Evaluating in this way allows weaker students to have a more manageable amount of material to study for testing purposes.

If students will be tested on Unit 4, some questions in BLM 11-8 can be included in the test.

Instructors should review all student answers to the questions in the *Study Guide* for this unit. Their written work should be assigned a mark to be used as part of the final evaluation for the course. (Note: An overall mark of 10% is the recommended for the written work from the Study Guide, excluding lab reports and assignments.)

Students should continue to add to their vocabulary list for the course.

If students are working through the Life Expectancy ICT, they could be asked to answer the questions in the ICT Master provided in the Teacher's Resource.

BLM 11-6 can be used to review some of the terms presented in this unit.

BLM 11-7, *Technology Challenge*, needs to be copied and given to students for question 4.8 in the Study Guide.

Resources

science.connect1,
Chapter 11, pages 214 - 233.

science.connect1
Teacher's Resource, Unit C.

science.connect1 web site:
<http://www.mcgrawhill.ca/school/booksites/science.connect+1/>

BLM 11-6, Word Scramble.

BLM 11-7, Technology Challenge.

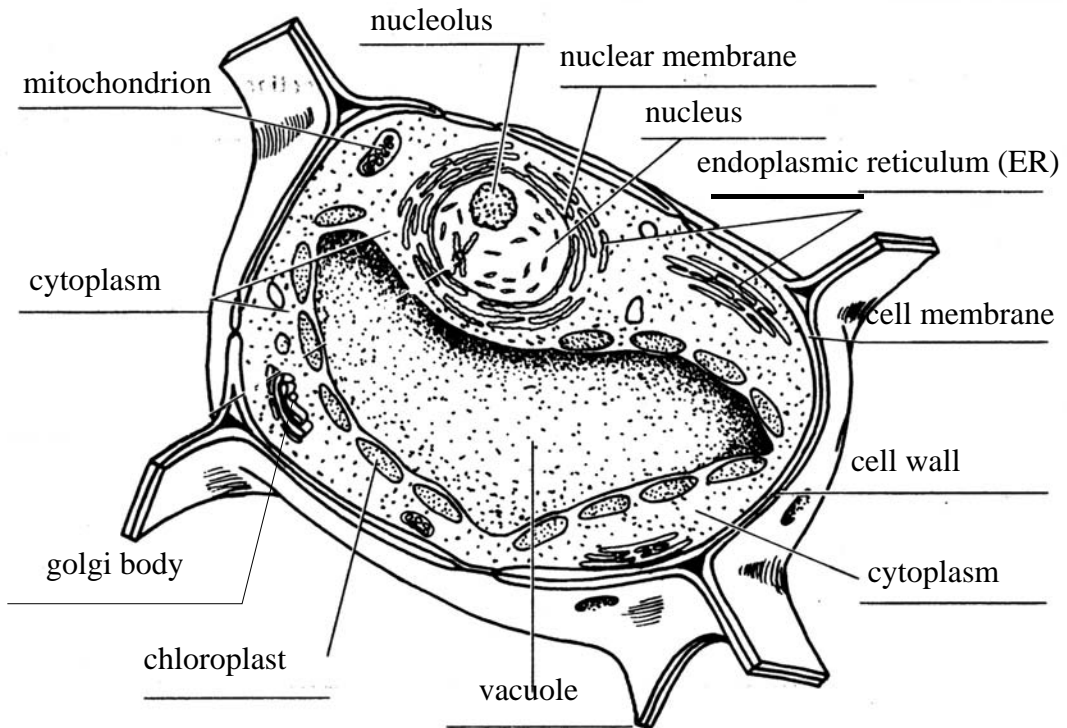
BLM 11-8, Chapter 11 Chapter Test.

Appendix A

Plant Cell

Name: _____

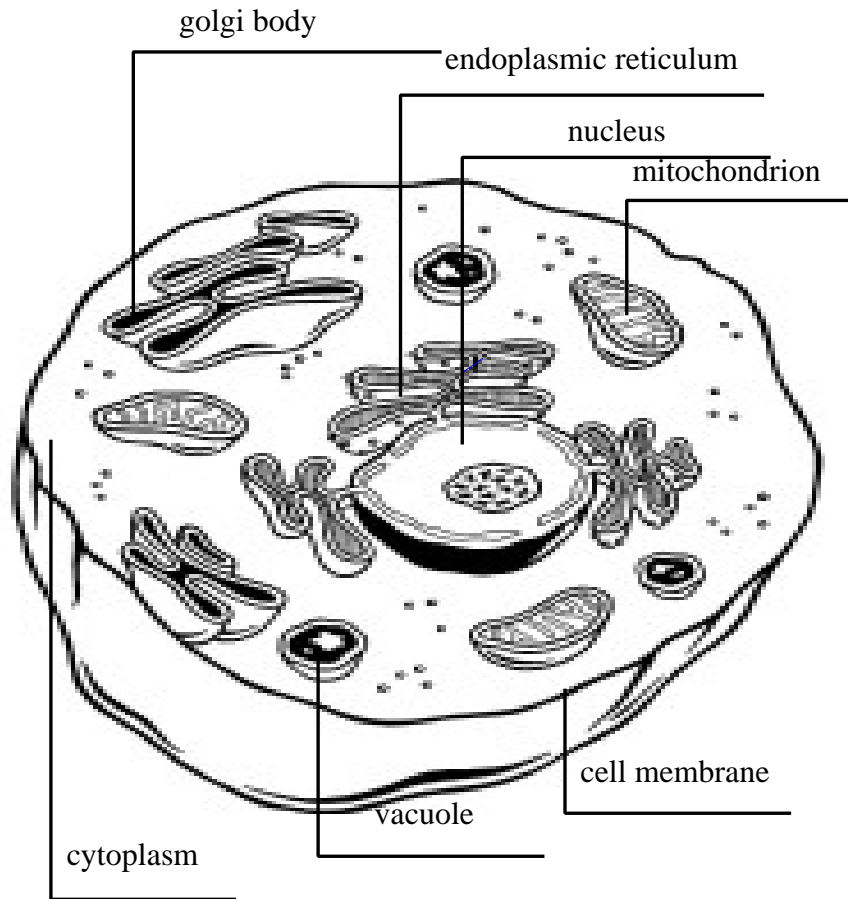
Date: _____



Animal Cell

Name: _____

Date: _____



Digestive Processes

Name: _____

Date: _____

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

