Adult Basic Education
Science

Biology 2101C

Maintaining Dynamic Equilibrium I

Curriculum Guide

Prerequisites: Biology 2101A

Credit Value: 1

Biology Concentration

Biology 1101
Biology 2101A
Biology 2101B
Biology 2101C
Biology 3101A
Biology 3101B
Biology 3101C

Table of Contents

To the Instructor

I. Introduction to Biology 2101C

Cells, tissues, organs organ systems and ultimately organisms, must maintain a biological balance despite changing external conditions. Homeostasis is the state of internal balance so critical to existence. It represents a dynamic equilibrium displaying constant interactions and checks and balances both within organisms and between organisms and their environment. There are a variety of systems within living things responsible for the maintenance of this delicate balance. This course will identify and introduce the role of the circulatory, respiratory, digestive, excretory, and immune systems.

Biology 2101C is the third of 3 courses (the others are Biology 2101A and Biology 2101B) that are equivalent to Biology 2201 in the current high school program.

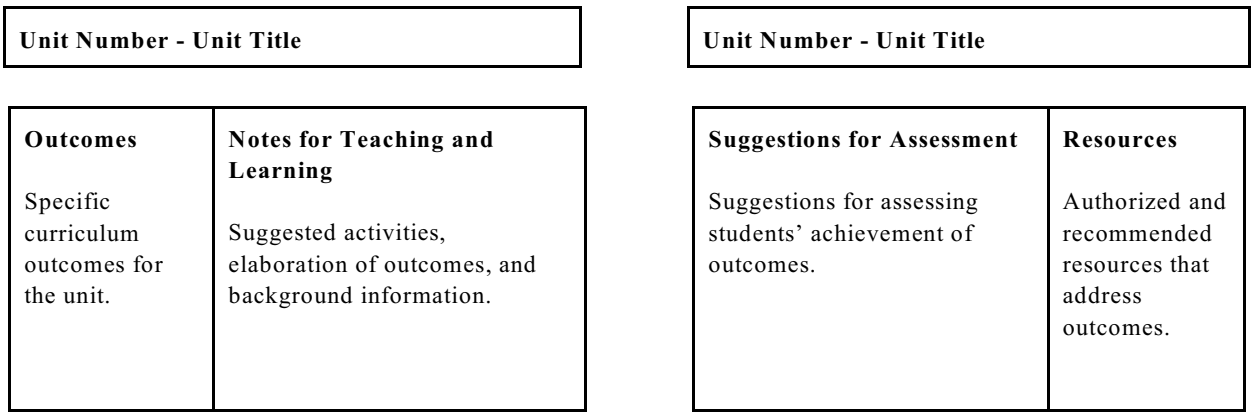
Biology 2101A is a pre-requisite for this course.

Biology 2101C is a pre-requisite for all remaining Biology courses in the Biology concentration.

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



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.

IV. Resources

Essential Resources

Text: Biology; Bullard, Chetty, et al; McGraw-Hill Ryerson, 2003.

McGraw-Hill Ryerson Biology, Teacher's Resource.

Recommended Resources

McGraw-Hill Ryerson Biology, Teacher's Resource CD-ROM.

Biology 11/12 #D Science Animations.

Department of Education web site:
www.gov.nl.ca/edu/science_ref/main.htm

Other Resources

Textbook web site:
http://www.mcgrawhill.ca/school/booksites/biology/

Center for Distance Learning and Innovation:
http://www.cdli.ca/

V. Recommended Evaluation

Written Notes	10%
Labs/Assignments	20%
Test(s)	20%
Final Exam *(entire course)*	50%
	100%

The overall pass mark for the course is 50%.

Maintaining Dynamic Equilibrium I

Unit 1 - Homeostasis

Outcomes

1.1 Explain the concept of homeostasis and its critical nature to living things.

1.1.1 Define homeostasis.

1.1.2 Explain the concept of dynamic equilibrium.

1.2 Explain the importance of maintaining equilibrium.

1.2.1 Describe the role of one body system in maintaining equilibrium.

Notes for Teaching and Learning

Unit 1 is intended to be an introduction to this course. The course will identify and introduce the role of several systems (circulatory, respiratory, digestive, excretory, and immune) in maintaining a biological balance (homeostasis). Homeostasis represents a dynamic equilibrium. It is important for students to understand this concept and to be able to apply it as they work through the course.

During this course, students will be given the opportunity to study a variety of factors that affect the homeostasis of an organism. Through this, they will begin to appreciate the complexity of mechanisms involved in the maintenance of homeostasis. For an illustration of how human systems interact to maintain homeostasis refer to page 301 of the text.

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 course.

Unit 1 - Homeostasis

Suggestions for Assessment

Questions 1.1 - 1.3 in the Study Guide should be assigned to cover Outcomes 1.1 - 1.2. Students will find the answers to these questions in Chapter 9 Introduction and Section 9.1 of the text.

Instructors should assess the student's level of understanding by reading their answers to questions from the Study Guide and providing feedback.

Resources

McGraw-Hill Ryerson Biology, pages 298 - 303.

McGraw-Hill Ryerson Biology, Teacher's Resource.

McGraw-Hill Ryerson Biology, Teacher's Resource CD-ROM.

Biology 11/12 Computerized Assessment Banks.

Biology 11/12 3D Science Animations.

www.gov.nl.ca/edu/science_ref/main.htm

http://www.mcgrawhill.ca/school/booksites/biology/

Unit 2 - The Circulatory System

Outcomes

2.1 Explain how the human circulatory system helps maintain homeostasis.

2.1.1 Explain the need for a transport system.

2.1.2 Describe the organization of blood vessels into 3 primary cycles (cardiac, pulmonary, and systemic).

2.1.3 Describe the structure of an artery, vein, and capillary; and relate these structures to their function in blood circulation.

2.1.4 Identify the main components of the human heart and explain the role of each. Include:

(i) atria
(ii) ventricles
(iii) valves (bicuspid, tricuspid, semilunar)
(iv) aorta
(v) pulmonary vein
(vi) pulmonary artery
(vii) septum

Notes for Teaching and Learning

Instructors should point out to students that while it is generally accepted that arteries carry oxygenated blood and veins carry deoxygenated blood, the opposite is true in the case of the pulmonary artery and vein.

Students could observe, within a laboratory situation, differences in the physical structure of an artery, vein and capillary by studying prepared microscope slides. They could use models, dissections or computer simulations. They should also identify these structures through the use of drawings or photographs.

Students could be provided with blank copies of the diagram of the human heart to use for practice in labelling. Instructors should make sure, either by providing an answer key or by checking directly, that students are labelling the diagram correctly.

Unit 2 - The Circulatory System

Suggestions for Assessment

Questions 2.1 - 2.7 in the Study Guide should be assigned to cover Outcome 2.1. Students will find the answers to these questions in Sections 9.2, 9.3 and 9.4 of the text.

Instructors should assess the student's level of understanding by reading student answers to questions from the Study Guide and providing feedback.

Instructors should ensure that students are able to label the diagram, The Human Heart , properly without referring to the text.

The Teacher's Resource CD-ROM includes Blackline Masters that instructors may find useful. These Blackline Masters may be edited before use.

Instructors should photocopy Blackline Master 9-1, "Know the Pathway of Circulation", and use it to assess the student's understanding of the structure of the human heart and the pathway of blood flow in the body. Questions 1 and 4 in the Section Review, page 321, could be added to the BLM.

Resources

McGraw-Hill Ryerson Biology, pages 304 - 328.

Diagram, "The Human Heart", in Appendix A.

Blackline Master 9-1, "Know the Pathway of Circulation".

Unit 2 - The Circulatory System

Outcomes

2.1.5 Trace the flow of blood through the heart and describe the pulmonary and systemic pathways.

2.1.6 Identify the main components of blood and explain the role of each. Include:

(i) erythrocytes
(ii) leukocytes
(iii) platelets
(iv) plasma

2.1.7 Explain how the lymphatic circulatory system contributes to the maintenance of dynamic equilibrium.

Notes for Teaching and Learning

While studying this section, students should have the opportunity to observe and appreciate how structures control the direction of blood flow through a heart. Observation of a heart using preserved specimens, models or computer simulations will help students clarify how the structure of the heart allows it to function as a mechanical pump.

Within the laboratory, students could use the microscope to examine prepared slides of human blood and to observe the contrasting morphologies and relative abundance of the cellular components (red and white blood cells).

Unit 2 - The Circulatory System

Suggestions for Assessment

Instructors should ensure that all necessary terms are being added to the student's vocabulary list and provide students with ideas about how to successfully remember definitions.

Resources

McGraw-Hill Ryerson Biology, pages 304 - 328.

Unit 2 - The Circulatory System

Outcomes

2.2 Identify the impact of circulatory diseases on the homeostasis of an organism.

2.2.1 Describe disorders linked to the circulatory system and their effect on the homeostasis of the system and the organism as a whole. Include:

(i) hypertension
(ii) atherosclerosis
(iii) arteriosclerosis

2.3 Analyze why and how technology related to the treatment of circulatory disorders was developed and improved over time.

2.3.1 Describe the progress from bypass surgery to modern techniques. Include:

(i) coronary bypass
(ii) angioplasty
(iii) clot-busting drugs
(iv) coronary shunt

Notes for Teaching and Learning

This is a very lengthy course with many new terms and diagrams that students will be required to become familiar with and study for evaluation purposes. For this reason, the outcomes that are related to disorders of the various systems are covered in the form of assignments.

Students will **not** be expected to study the material covered in Outcomes 2.2 and 2.3 for testing purposes. These outcomes will be covered by completing the assignment found in Appendix A.

In addition to the material covered in the assignment, students may be interested in investigating additional disorders related to the circulatory system—varicose veins, heart murmur, aneurysm, blood clots, leukemia, pulmonary edema (congestive heart failure). These could be researched along with the capability of technology to diagnose, treat or cure the problem (angioplasty, clot-busting drugs). Students may research, assess and debate the effect that lifestyle choices play in the development of these disorders and the importance of promoting continued physical fitness. This would provide a good opportunity to link with the Language Arts program.

If a stethoscope is available, students could be given the opportunity to listen to their own heartbeat.

Unit 2 - The Circulatory System

Suggestions for Assessment	Resources
Assignment 1, Part 1, *"Disorders of the Circulatory System"*, should be evaluated and assigned a mark which will be used as part of the overall mark for the course. Students will find the information to complete the assignment in Section 9.4 of the text.	*McGraw-Hill Ryerson Biology, pages 323 - 326.* *Assignment 1, Part 1, "Disorders of the Circulatory System", in Appendix B.*
Blackline Master 9-2, "How Much Blood Does Your Heart Pump Per Minute?", could be used to help stimulate students' interest about their own heart rate and blood flow under different conditions.	*Blackline Master 9-2, "How Much Blood Does Your Heart Pump Per Minute?".*
Instructors could assign additional questions from the "Section Review" and/or "Chapter Review" sections of the text.	

Unit 3 - The Respiratory System

Outcomes	Notes for Teaching and Learning
3.1 Explain how the human respiratory system helps maintain homeostasis.	Students should be reminded that humans require a respiratory surface for gas exchange and ultimately to provide O_2 for respiration at the cellular level.
3.1.1 Explain the need for a respiratory surface in humans.	The respiratory surface must be moist and large enough for efficient gas exchange. Students should realize that moisture is required to allow gases to dissolve and to allow cross-membrane transport. A large surface area aids in efficiency and accounts for the advantage of the mammalian lung.
3.1.2 Identify and state the function of: (i) nasal cavity (ii) trachea (iii) bronchi (iv) bronchioles (v) alveoli (vi) diaphragm	Students may construct a model to illustrate the functioning of the diaphragm in respiration. A popular design involves the use of a bell jar, balloons to represent lungs and a membrane for the diaphragm.
3.2 Identify how respiratory diseases affect the homeostasis of an organism.	Students will not be expected to study the material covered in Outcomes 3.2 and 3.3 for testing purposes. These outcomes will be covered by completing the assignment found in Appendix A.
3.2.1 Investigate the disorders: (i) lung cancer (ii) asthma (iii) pneumonia	Students may choose to investigate additional respiratory disorders such as bronchitis or emphysema. Students may choose to research treatments of these disorders. Students may discuss other environmental concerns related to respiratory difficulties and clean air, including the 'scent free' policy that exists within many public buildings, 'sick' building syndrome and smog. This would provide a good opportunity to link with the Language Arts program.
3.3 Predict the impact of environmental factors, such as allergens, on homeostasis within an organism.	
3.3.1 Identify the impact of environmental factors on the respiratory system of an asthmatic.	

Unit 3 - The Respiratory System

Suggestions for Assessment

Questions 3.1 - 3.7 in the Study Guide should be assigned to cover Outcome 3.1. Students will find the answers to these questions in Section 10.1 of the text.

Instructors should assess the student's level of understanding by reading student answers to questions from the Study Guide and providing feedback.

Assignment 1, Part 2 *"Disorders of the Respiratory System"*, should be evaluated and assigned a mark which will be used as part of the overall mark for the course. Students will find the information to complete the assignment in Section 10.3 of the text.

Instructors should ensure that students are able to label the diagram, Human Respiratory System, properly without referring to the text.

Instructors could assign additional questions from the "Section Review" and/or "Chapter Review" sections of the text.

Students have now completed the first 3 units (about half) of the course. A test may be given at this point and used as part of the evaluation for the course.

Resources

McGraw-Hill Ryerson Biology, pages 332 - 351.

Diagram, "Human Respiratory System", Appendix A.

Assignment 1, Part 2, "Disorders of the Respiratory System", in Appendix B.

Biology 11/12 Computerized Assessment Banks.

Unit 4 - The Digestive System

Outcomes

4.1 Explain how the human digestive system helps maintain homeostasis.

4.1.1 Describe the purpose and functioning of the digestive system.

4.1.2 Define mechanical and chemical digestion and explain the relationship between them.

4.1.3 Identify the major organs and glands of digestion and investigate their role in the digestive process Include:
(i) salivary glands
(ii) stomach
(iii) liver
(iv) pancreas
(v) gall bladder
(vi) small intestine
(vii) large intestine

4.1.4 Trace the pathway of food through the human digestive tract and explain the efficiency of its structure:
(i) teeth
(ii) taste buds
(iii) tongue
(iv) mucous lining
(v) sphincters
(vi) villi
(vii) peristalsis

Notes for Teaching and Learning

Students should be aware that the purpose of digestion is to convert large molecules into smaller ones capable of being utilized by the cell.

Students should be provided with the opportunity to observe the principal features of the digestive system, utilizing models, computer simulations or dissection, and to identify those structures through the use of drawings or photographs. A diagram of the human digestive system is provided in Appendix A and students should be able to label it properly.

Instructors could relate the function of intestinal villi to active transport. In active transport, materials are carried across the cell membrane. Intestinal villi increase surface area for absorption of amino acids, sugars, and peptides from the intestines into the blood vessels. Fats are transported to the liver.

Unit 4 - The Digestive System

Suggestions for Assessment

Questions 4.1 - 4.6 in the Study Guide should be assigned to cover Outcomes 4.1 - 4.3. Students will find the answers to these questions in Sections 11.1 and 11.2 of the text.

Instructors should assess the student's level of understanding by reading student answers to questions from the Study Guide and providing feedback.

The "Digestion Worksheet", in Appendix C is a good review of the process of digestion.

Students should be able to label the diagram, Human Digestive System, properly, without referring to the text.

Resources

"Digestion Worksheet", Appendix C.

Diagram, "Human Digestive System", Appendix A.

Unit 4 - The Digestive System

Outcomes

4.2 Identify chemical elements and compounds that are commonly found in living systems.

> 4.2.1 Identify the six basic nutrients: carbohydrates, lipids, proteins, vitamins, minerals and water and determine the sources of each of these nutrients.

4.3 Identify the role of some compounds involved in digestion.

> 4.3.1 Discuss the role of the six basic nutrients.
>
> 4.3.2 Discuss the general role of enzymes and secretions, and the role of these substances pertaining to the digestive system.

4.4 Describe disorders and the treatment of disorders linked to organs of the digestive system and their effect on the homeostasis of the system and the organism as a whole. Include:

> (i) ulcers
> (ii) gall stones
> (iii) ileitis/colitis

4.5 Explain the importance of fitness and nutrition in maintaining homeostasis.

Notes for Teaching and Learning

Students will not be expected to study the material covered in Outcomes 4.4 - 4.7 for testing purposes. These outcomes will be covered by completing the assignment found in Appendix A.

The specific pathologies of the digestive system created by digestive disorders could be researched along with the capability of technology to diagnose, treat or cure the problem. Students may discuss other conditions related to digestive function, such as cancer, Crohn's disease, or celiac disease. Students can be asked to assess and debate or discuss the effects of legal and over the counter drugs on the functioning of the digestive system including but not exclusive to alcohol, codeine and prescription medicines. Students could be asked to debate or discuss the question of whether society can, or should, play a more proactive role in promoting the improvement of diets and the prevention of diseases versus a more reactive role in the treatment of these diseases. This would provide a good opportunity to link with the Language Arts program.

Unit 4 - The Digestive System

Suggestions for Assessment

Assignment 1, Part 3, *"Disorders of the Digestive System"*, should be evaluated and assigned a mark which will be used as part of the overall mark for the course. Students will find the information to complete the assignment in Section 11.2 of the text.

Resources

McGraw-Hill Ryerson Biology, pages 368 - 373.

Assignment 1, Part 3, "Disorders of the Digestive System", in Appendix B.

Unit 4 - The Digestive System

Outcomes

4.6 Investigate the value of vitamins, minerals and herbal supplements in support of a healthy lifestyle.

4.7 Evaluate how nutritional deficiency and starvation diets such as bulimia and anorexia nervosa can adversely affect the dynamic equilibrium

Notes for Teaching and Learning

Unit 4 - The Digestive System

Suggestions for Assessment

Instructors could assign additional questions from the "Section Review" and/or "Chapter Review" sections of the text.

Resources

Assignment 1, Part 3, "Disorders of the Digestive System".

Unit 5 - The Excretory System

Outcomes

5.1 Explain how the excretory system helps maintain homeostasis.

5.1.1 Explain how the following act as organs of excretion
(i) lungs
(ii) skin
(iii) liver
(iv) kidney

5.1.2 Explain the role of the kidney as an excretory organ in removing metabolic wastes from the body.

5.1.3 Identify and describe the main structures of the human urinary system including kidney, ureter, bladder, and urethra.

5.1.4 Identify and describe the internal structure of the kidney, including the cortex, medulla and pelvis.

5.1.5 Identify and describe the function of the glomerulus.

Notes for Teaching and Learning

The excretory systems maintain homeostasis with respect to water, salt and metabolite concentrations within the blood.

Students often oversimplify the excretory system by thinking it is all about the kidney (which removes metabolic wastes). Several other organs involved in the excretory system are often overlooked. The lungs (which remove CO_2), the skin (which removes heat), and the liver (which removes metabolic wastes) are vital organs that play a major role in the excretory system. Students should be aware of their role in maintaining homeostasis.

Students should be provided with the opportunity to observe the principal features of the human excretory system, utilizing models, dissection or computer simulations, and to identify those structures through the use of drawings or photographs. Diagrams or charts could be used to illustrate the structure of the nephron and to emphasize its role as the working unit of the kidney. Microscopic analysis of a kidney cortex section could provide some visual confirmation of the structural components of the kidney.

Students will recognize the kidney's structure as including the cortex, medulla and pelvis, and the filtration and reabsorption functions of the nephron.

Students should be able to label diagrams of the human urinary system and the internal structure of the human kidney (found in Appendix A).

Unit 5 - The Excretory System

Suggestions for Assessment	Resources
Questions 5.1 - 5.5 in the Study Guide should be assigned to cover Outcome 5.1. Students will find the answers to these questions in Section 11.3 of the text.	*McGraw-Hill Ryerson Biology, pages 374 - 386.*
Instructors should assess the student's level of understanding by reading student answers to questions from the Study Guide and providing feedback.	*Diagrams, "The Human Urinary System", "The Internal Structure of the Human Kidney", and "The Glomerulus and Nephron", in Appendix A.*
Students should be able to label the diagrams of the human urinary system, the internal structure of the human kidney, and the diagram of the glomerulus and nephron properly without referring to the text.	
Students should complete Blackline Master 11-6, "Nephron Structure and Function", to assess their understanding of the working of the nephron.	*Blackline Master 11-6, "Nephron Structure and Function"*

Unit 5 - The Excretory System

Outcomes

5.1.6 Identify and explain the function of the parts of a nephron. Include:

(i) Bowman's capsule
(ii) loop of Henle
(iii) tubules-proximal and distal
(iv) collecting duct

5.2 Describe disorders linked to the excretory system and their effect on the homeostasis of the system and the organism as a whole. Include:

(i) kidney stones
(ii) kidney infections
(iii) bladder infections

5.3 Analyze and describe examples where technologies were developed, based on scientific understanding, to treat renal failure.

5.3.1 Briefly explain how the technology of dialysis works.

Notes for Teaching and Learning

Students will not be expected to study the material covered in Outcomes 5.2 and 5.3 for testing purposes. These outcomes will be covered by completing the assignment found in Appendix A.

Kidney shutdown or renal failure may result from a variety of conditions and can lead to many deleterious effects including abnormal concentrations of salt and water, altered pH and general deterioration of homeostasis. Ideally, dialysis is a temporary measure used to replace normal kidney functioning until the kidneys begin to function again on their own, or in more serious cases, until a transplant becomes available. The discussion of dialysis should be limited to the fundamental aspects of how kidney dialysis functions. Kidney dialysis is the process whereby blood is removed from the body, harmful metabolic waste products are removed from the blood by the processes of osmosis and diffusion and the processed blood is returned to the body. This process has limitations.

Students could consider the implications of the utilization of other species as potential kidney donors. Students could propose guidelines for selecting the most appropriate expenditures. They could then debate and defend their choices. This would provide a good opportunity for a link with the Language Arts program.

Unit 5 - The Excretory System

Suggestions for Assessment

Assignment 1, Part , *"Disorders of the Excretory System"*, should be evaluated and assigned a mark which will be used as part of the overall mark for the course. Students will find the information to complete the assignment in Section 11.3 of the text.

Instructors could assign additional questions from the "Section Review" and/or "Chapter Review" sections of the text.

Resources

Assignment 1, Part , "Disorders of the Excretory System", in Appendix B.

Outcomes

6.1 Predict the impact of environmental factors on homeostasis within an organism.

6.1.1 Explain the meaning of antigen (allergen) and antibody.

6.2 Explain how the immune system helps to maintain homeostasis.

6.2.1 Explain the complete immune response.

(i) 1st line of defense (physical and chemical barriers)
(ii) 2nd line of defense (inflammatory response)
(iii) 3rd line of defense (immune response)

6.2.2 Compare the role of white blood cells in the defense process including phagocytes and lymphocytes.

6.2.3 Compare the mechanism of acquired immunity including passive (breast milk) and active (actual exposure, vaccines).

6.3 Identify how autoimmune disorders cause diseases such as rheumatoid arthritis.

Notes for Teaching and Learning

Students should be aware that a properly functioning immune system is essential for health and well being, and recognize the consequences that result when the immune system does not function properly.

A study of the non-specific first line defenses would include both physical and chemical barriers such as skin, sweat and stomach acids. The inflammatory response and phagocytes as second line defenders and the immune response involving T cells, B cells and antibody production should be summarized.

Students can expand their study by investigating how vaccines make use of the workings of the immune system in order to be effective and by studying the requirements, interest and financial resources that society has to support the prevention of the spread of disease-causing organisms such as HIV, Staphylococcus, and smallpox. Some herbal supplements (Echinacea) claim that they boost the immune system. Students may investigate these claims and investigate the antioxidant (chemical altering of free radicals) nature of Vitamins E, C and beta-carotene, and the relevance of these to the health of the human population (e.g., link with cancer and cardiovascular disease). Their research provides another opportunity for a link with the Language Arts program.

Unit 6 - The Immune System

Suggestions for Assessment

This unit is covered by completing Assignment 2, "The Immune System". Instructors should mark the assignment and use this mark as part of the evaluation for the course.

Students should be aware that the material covered in this unit will not be tested on the final exam for the course.

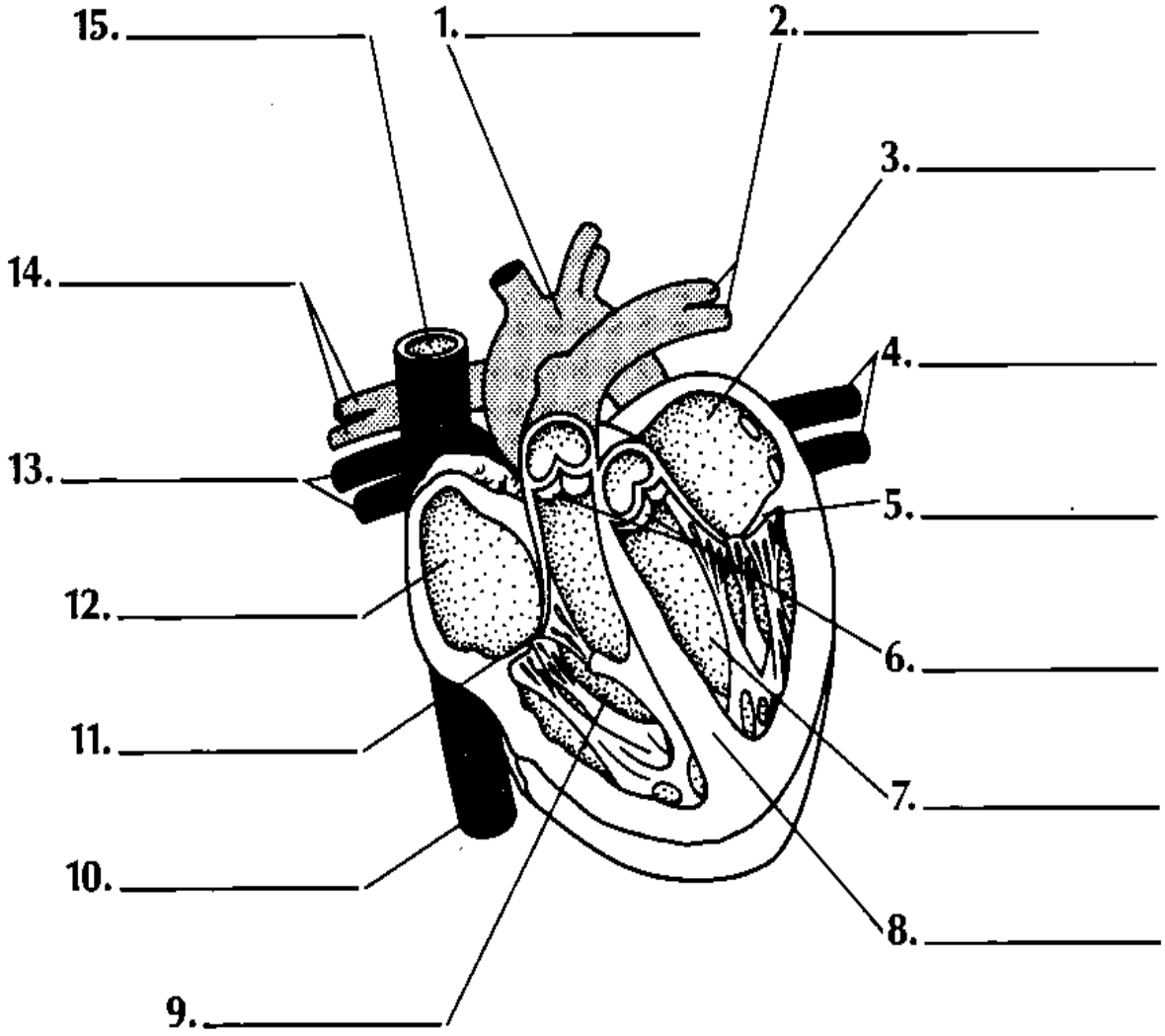
Resources

McGraw-Hill Ryerson Biology, pages 382 - 386.

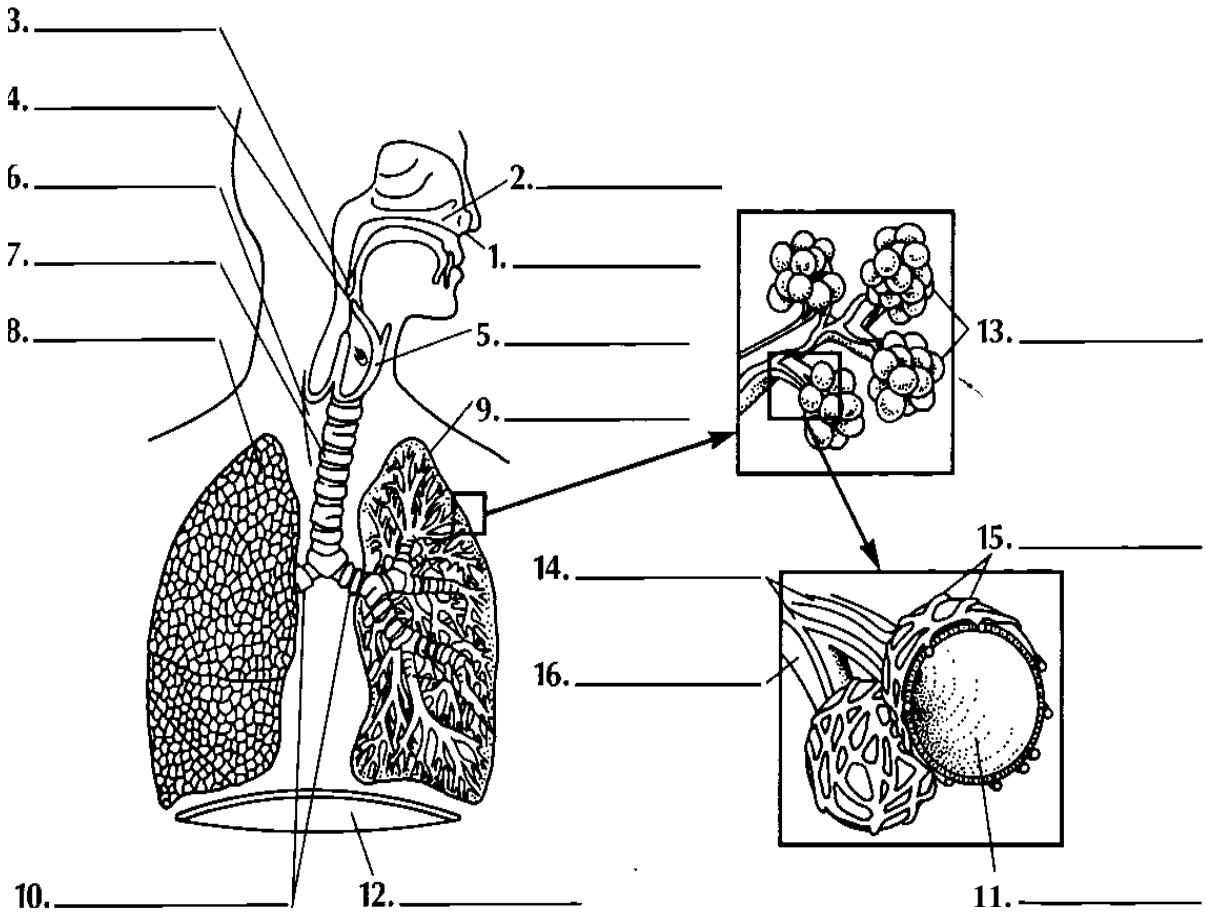
Assignment 2, "The Immune System", in Appendix B.

Appendix A

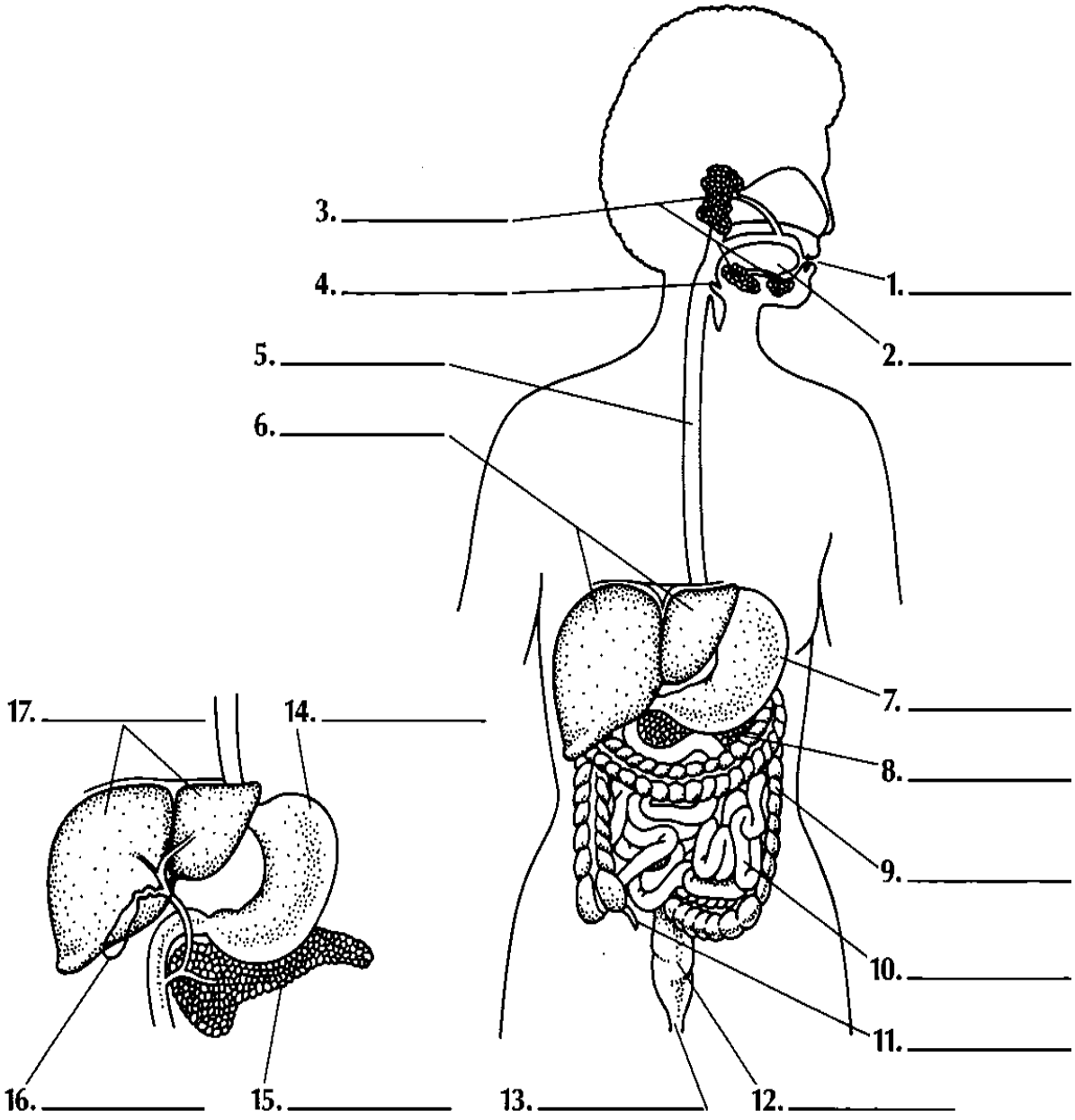
Diagrams



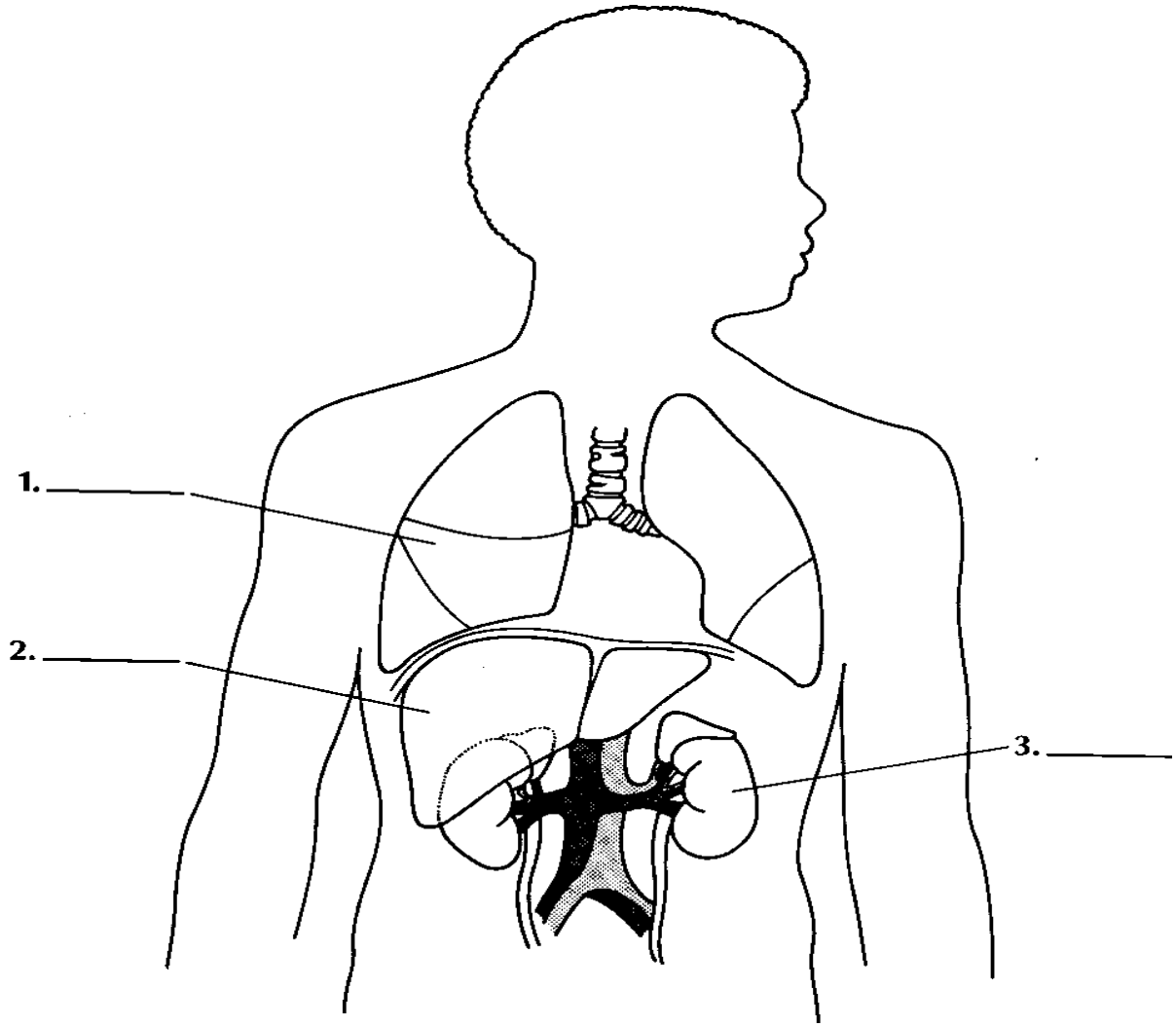
Structure of the Human Heart



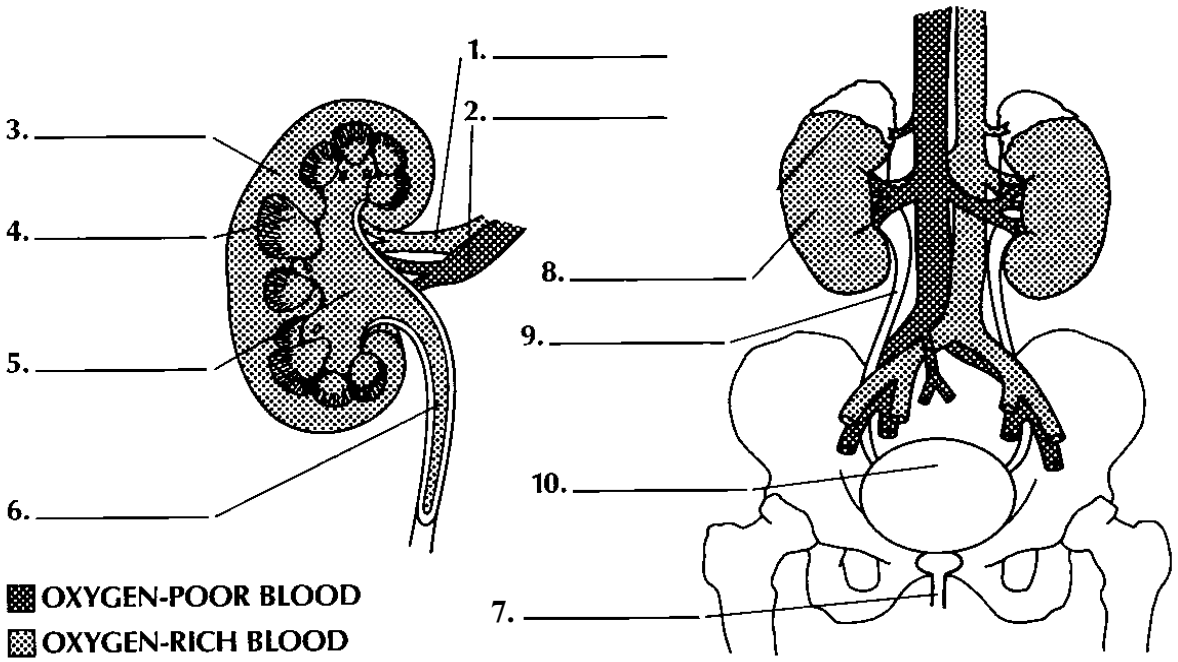
The Human Respiratory System



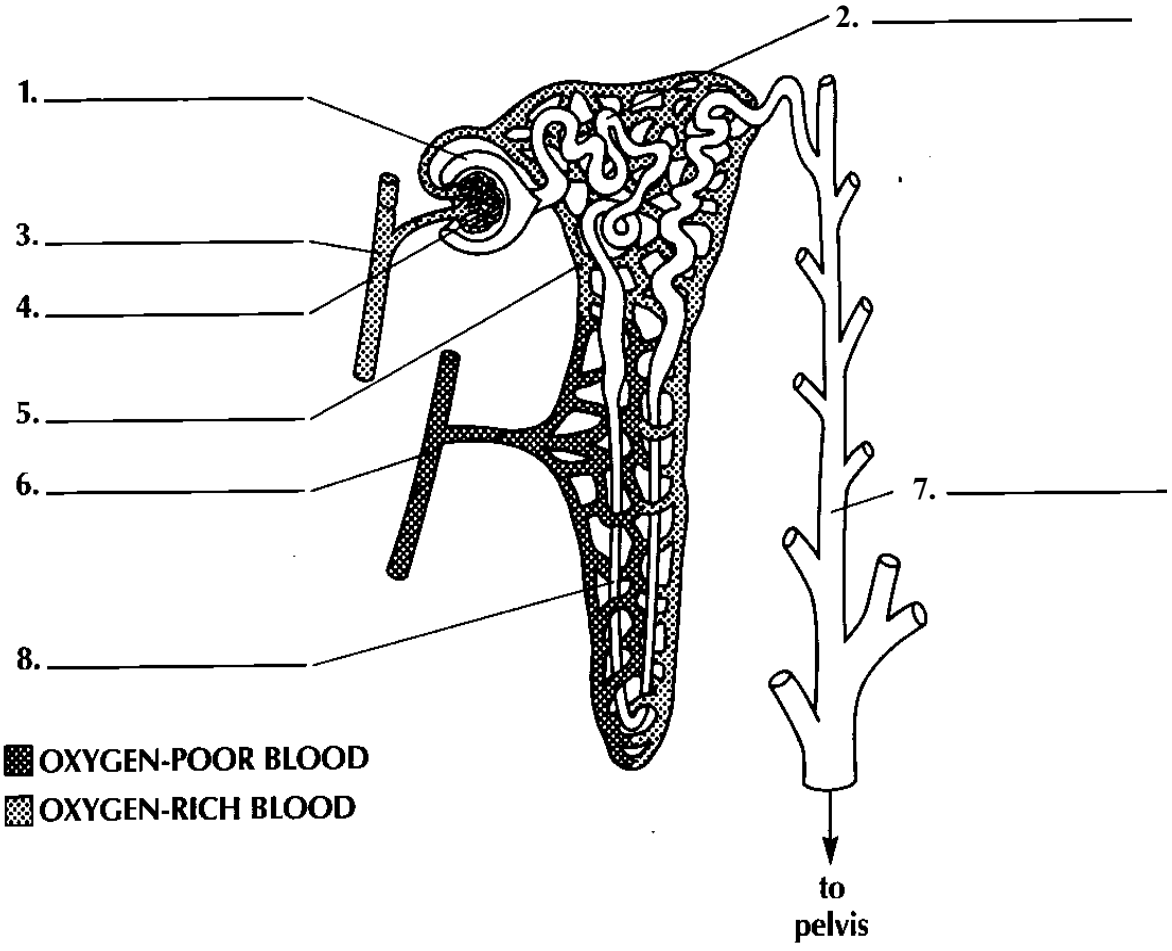
Human Digestive System



Organs of the Human Excretory System

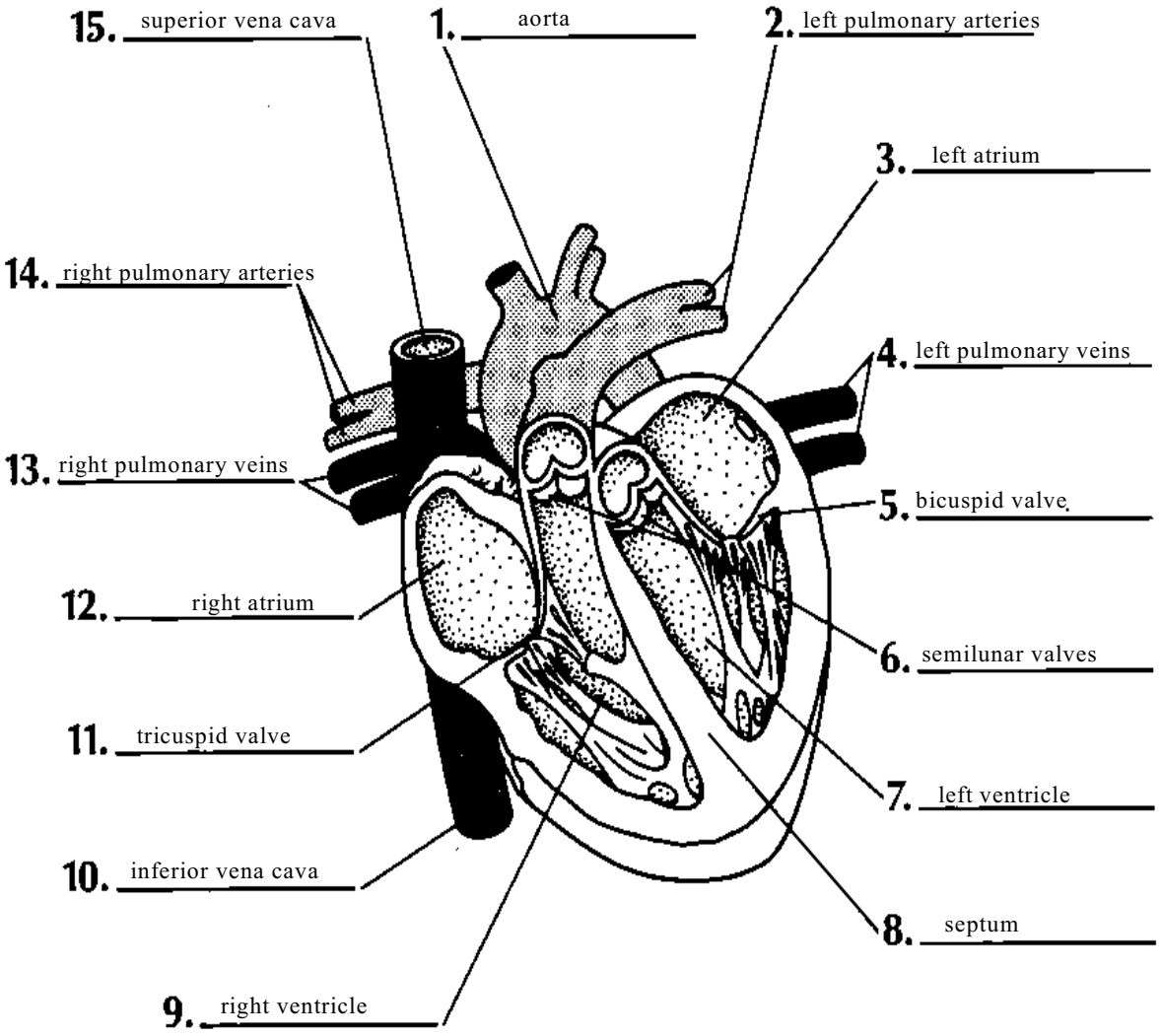


The Human Urinary System

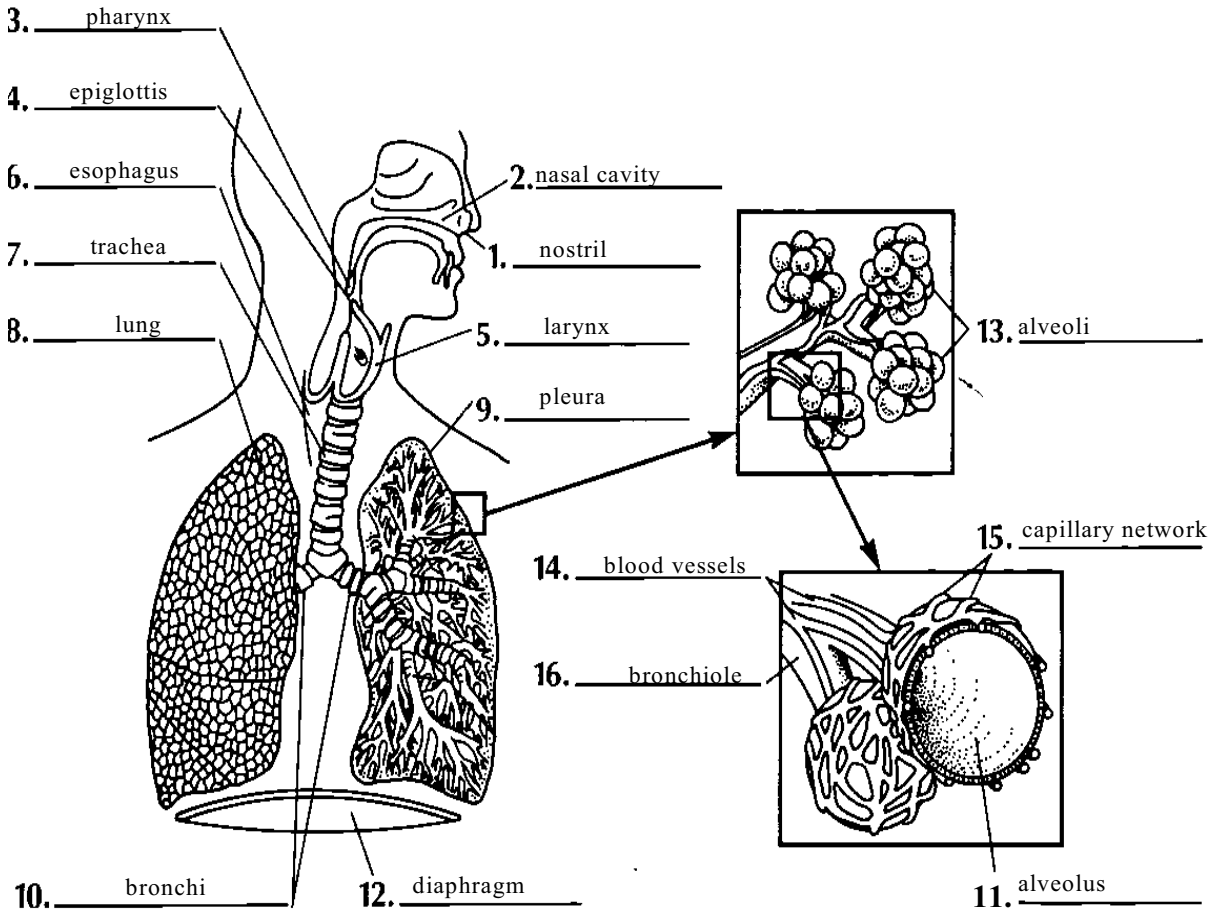


The Nephron

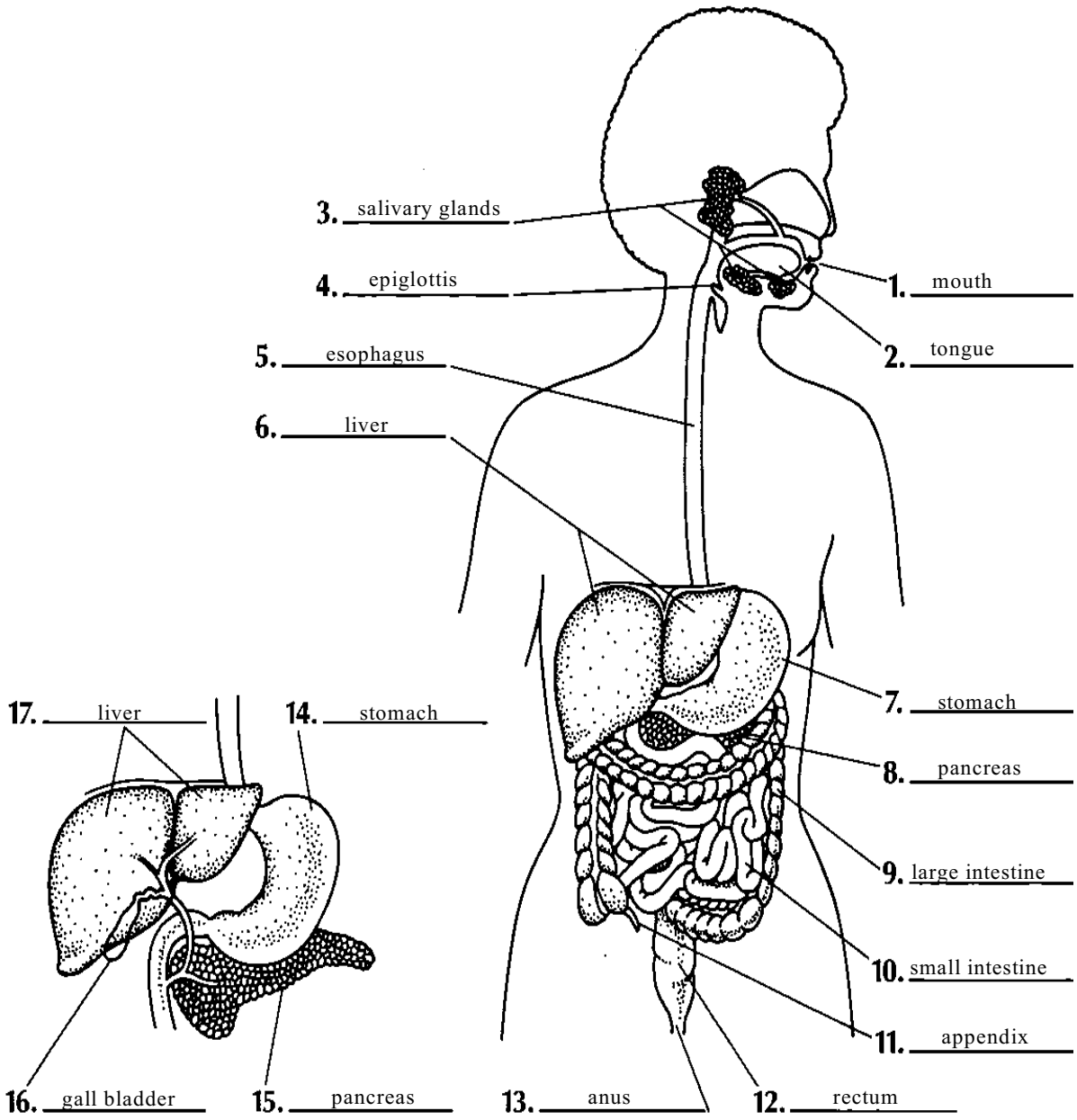
ANSWER SHEETS



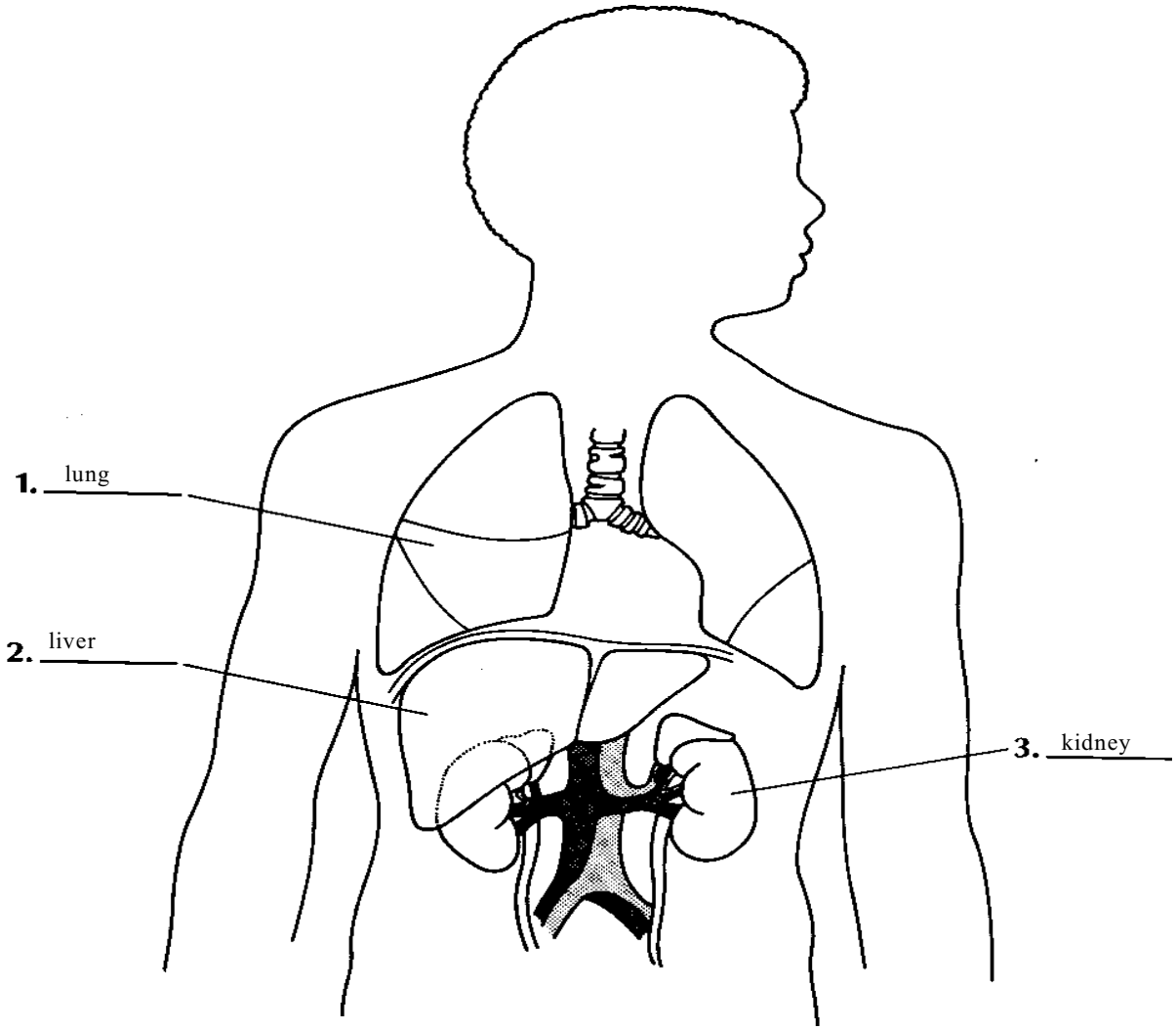
Structure of the Human Heart - ANSWER SHEET



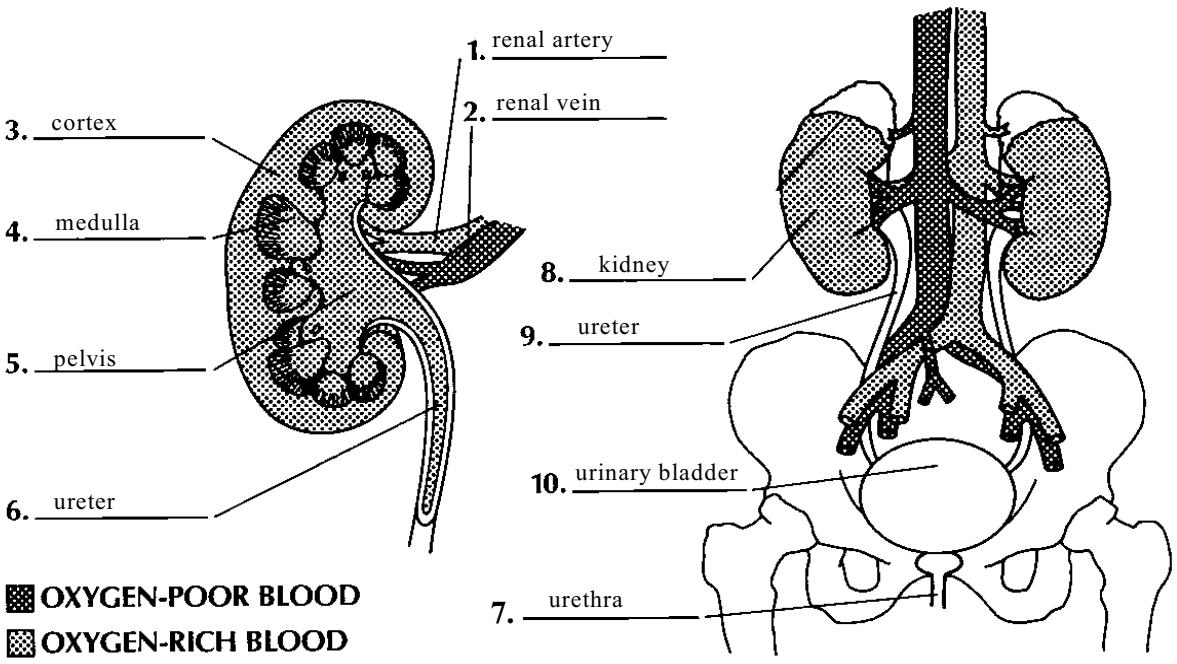
The Human Respiratory System - ANSWER SHEET



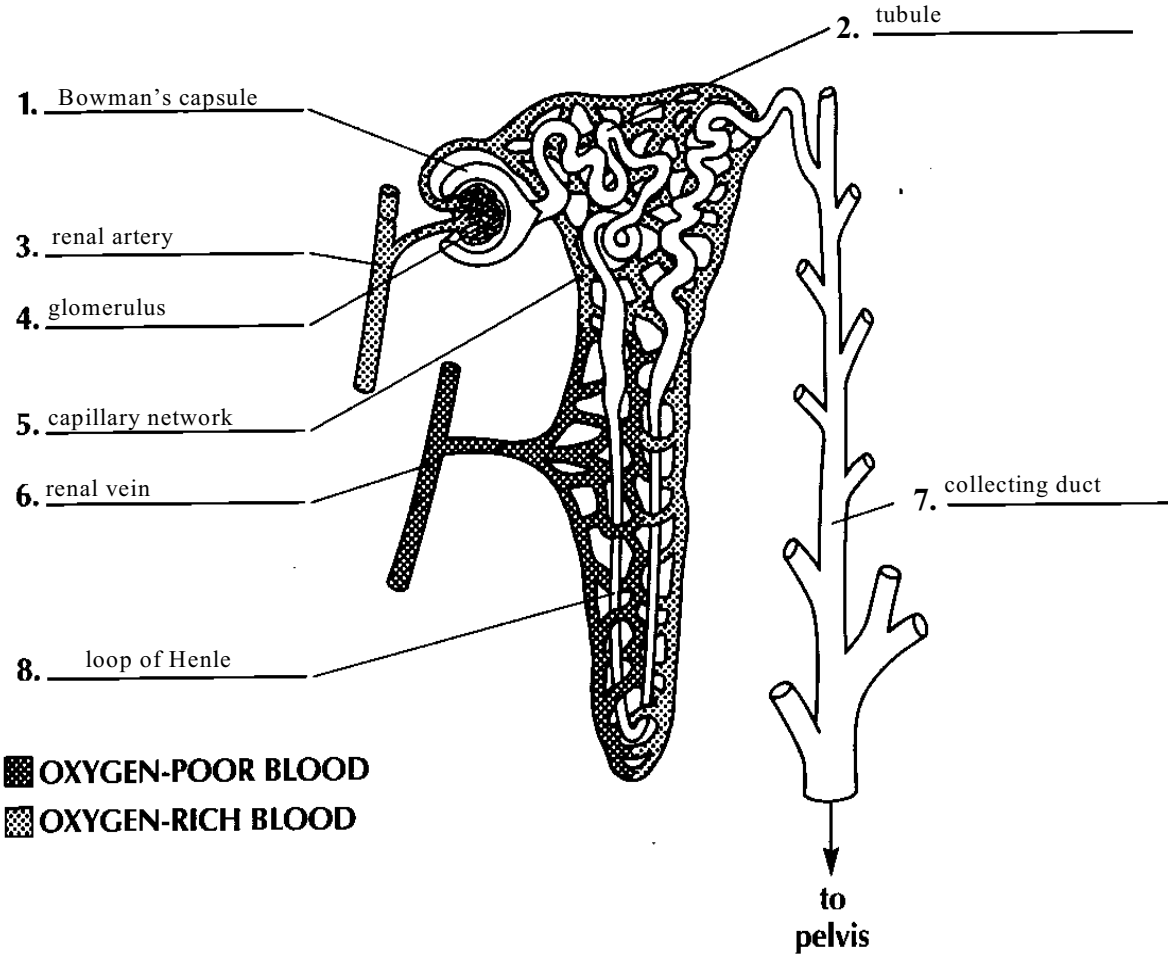
Human Digestive System - ANSWER SHEET



Organs of the Human Excretory System - ANSWER SHEET



The Human Urinary System - ANSWER SHEET



The Nephron - ANSWER SHEET

Appendix B

Assignments

Assignment 1

Part 1

Disorders of the Circulatory System

1. Explain what is meant by each of the following disorders that are linked to the circulatory system and describe their effects on the organism as a whole.

   (i) hypertension

   (ii) atherosclerosis

   (iii) arteriosclerosis

2. Describe each of the following treatments for circulatory problems.

   (i) angioplasty

   (ii) coronary bypass

   (iii) clot-busting drugs

3. What is a coronary shunt and how is it used?

Assignment 1

Part 2

Disorders of the Respiratory System

1. (a) Explain what lung cancer is.

   (b) Describe how a carcinoma forms and how it causes death.

2. Describe 2 common causes of cancer.

3. (a) Describe 3 different forms of pneumonia.

   (b) What are the treatment options for each of the different forms?

4. (a) What is asthma?

   (b) What are the symptoms of asthma?

5. Explain how asthma can be managed.

Assignment 1

Part 3

Disorders of the Digestive System

1. Describe each of the following disorders of the digestive system.

   Include the cause, how the digestive system is affected, and the treatment that is available.

   - ulcers
   - gall stones
   - ileitis
   - colitis

2. Describe two reasons why good nutrition is important.

3. (a) Explain why some people use diet supplements and herbal remedies.

   (b) Give 3 examples of common herbal remedies and what they are used for.

4. Briefly describe the eating disorders anorexia nervosa and bulimia nervosa.

Assignment 1

Part 4

Disorders of the Excretory System

1. Describe each of the following disorders of the excretory system.

   Include the cause, how the excretory system is affected, and the treatment that is available.

   - kidney stones
   - kidney infection (pyelonephritis)
   - bladder infection (cystitis)

2. Explain what is meant by hemodialysis (kidney dialysis) and explain how it works.

Assignment 2

The Immune System

1. Define immunity and pathogen.

2. Name 3 ways that pathogens are prevented from entering the blood stream (the body's first line of defense).

3. Describe the body's second line of defense.

4. Describe the body's third line of defense.

5. Explain how antibodies and antigens are related.

6. Explain the difference between active immunity and passive immunity and describe how a person obtains each.

7. (a) Define autoimmune disease.

   (b) Give an example of an autoimmune disease.

Appendix C

Worksheet

Digestion Worksheet

Organ	Associated Glands	Chemical Digestion (Enzyme Action)	Mechanical Digestion	Other Secretions
Mouth				
Stomach				
Small Intestine				
Large Intestine				

Digestion Answer Sheet

Organ	Associated Glands	Chemical Digestion (Enzyme Action)	Mechanical Digestion	Other Secretions
Mouth	*salivary glands*	*salivary amylase breaks starch into maltose*	*teeth and tongue*	*sodium bicarbonate, mucin and water*
Stomach	*gastric glands and pyloric glands*	*pepsin breaks proteins into shorter polypeptides*	*peristalsis 3 times a minute*	*HCl kills bacteria, breaks down cellulose, lowers pH for pepsin* *water* *mucus protects stomach* *gastrin is a hormone that controls the release of gastric juice*
Small Intestine	*liver and gall bladder*	*none*	*peristalsis occurs regularly to mix food and enzymes and so push food against the intestinal wall for absorption*	*bile emulsifes lipids and neutralizes chyme* *sodium bicarbonate neutralizes chyme* *mucus lubricates food mass and protects the digestive tube from enzymes*
	pancreas	*proteases (trypsin and chymotrypsin) further break down polypeptides from the stomach into shorter polypeptides* *erepsins break down simple polypeptides into amino acids* *lipase breaks down fats into fatty acid and glycerol* *pancreatic amylase breaks down starch into maltose*		
	intestinal glands	*peptidases break simpler polypeptides into amino acids* *lipase breaks down fats into fatty acids and glycerol* *maltase breaks maltose into simple sugars, sucrase breaks* *sucrose into simple sugars and lactase breaks lactose into simple sugars*		
Large Intestine	*mucus glands*	*none*	*none, any muscular action is for the movement of food* *water is reabsorbed*	*mucus to lubricate passageway*