# INTRODUCTORY LESSON
# THE ORGANIZATION OF THE HUMAN BODY

**Overview**:

By reading, answering questions and researching for an activity, students will learn how the human body is organized to fulfill its functions.

**Suggested Timeline:** 4 hours

**Materials**:

- Human Body Systems – Unit Organizer
- The Organization of the Human Body (Student Handout)
- Body Bag (Student Handout – Individual)
- Body Bag (Student Handout – Group)
- The Organization of the Human Body Quiz (Student Handout)
- large garbage bags
- different colors of construction paper
- tape
- student access to computers with the internet
- biology textbooks or other human body system resources for student use

**Method**:

**INDIVIDUAL FORMAT:**

1. Have students preview the unit via an examination of their unit overview sheet.
2. Have students complete their vocabulary list on 'The Organization of the Human Body' (Student Handout) by using their student handout notes, a computer with internet access and/or other textbooks and resources available. Students can then move on to complete the reading and answer questions after each section. Review student answers to questions with them.
3. Introduce the body bag activity by providing an example of a completed body bag. Provide students with internet access and other biology resources to prepare their body bag and put it on display in the classroom.
4. Announce a date for the quiz on material learned in this lesson.

**GROUP FORMAT:**

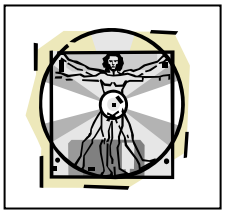
1. Preview the unit by having students fill in the unit organizer as you go thorough it with them.
2. Have students complete their vocabulary list on 'The Organization of the Human Body' (Student Handout) by using their student handout notes and/or other textbooks and resources available.
3. Instruct students to read thorough their handout and answer the questions after each section. Review the answers to questions with students.
4. Introduce the body bag activity by providing an example of a completed body bag. In groups of two, have students research their system, prepare their body bag and present their information to the rest of the class.
5. Announce a date for the quiz on material learned in this lesson.

**Assessment and Evaluation:**

- Assessment of students' understanding of body systems thorough body bag activity
- Affective assessment of students' ability to work in a group
- Student grade on quiz

Name: _____ Date: _____ Period: ____

# The Organization of the Human Body



## VOCABULARY

cell –

tissue –

organ –

epithelial tissue –

nerve tissue –

connective tissue –

muscle tissue –

**Instructions:** Read the following passage. Use the information from your reading to answer the questions.

### Part 1 – Cells, Tissues and Organs

Have you ever had car trouble? If you have had a chance to look under the hood of a car, you will know that there are many parts that must all be working together for the car to function well. In some ways, your body is like a car. It has many parts. All of those parts must be working together well for your body to function.

Your body is made up of trillions of **cells** – the smallest units that can be said to be alive that serve as building blocks for the body. The cells of the body are alike in many ways, but not all cells are the same. They have different shapes and sizes. Different kinds of cells have different jobs. They are specialized. Specialized cells are similar in size and shape. The shapes of most cells help them to do their jobs.

The job of a specialized cell can be done only by that kind of cell. For example, only nerve cells can send and receive messages. Only muscle cells can make your bones move.

In multicellular, or many-celled, organisms, cells work as teams, just like players on a baseball team. They form specialized groups called **tissues**. A tissue is a group of similar cells that work together to perform a specific function.

Humans are made of four main kinds of tissues. They include **epithelial tissue**, **nerve tissue**, **connective tissue**, and **muscle tissue**.

Groups of cells that work together form tissues. Different tissues also 'team up'. Groups of tissues that join together to do a specific job are called **organs**.

Your body has many organs. Your heart is an organ of circulation. It pumps blood throughout the body. You have sense organs. Your eyes, ears and nose are sense organs that give you information about your surroundings. Your lungs and windpipe are organs of respiration. They are used to exchange gases between you and your environment.

Part 1 Questions:

1. What combine to form tissues? _____

2. Name four kinds of tissues found in the human body. _____,

   _____, _____, _____

3. What combine to form organs? _____

## Part 2 – A Closer Look at Tissues

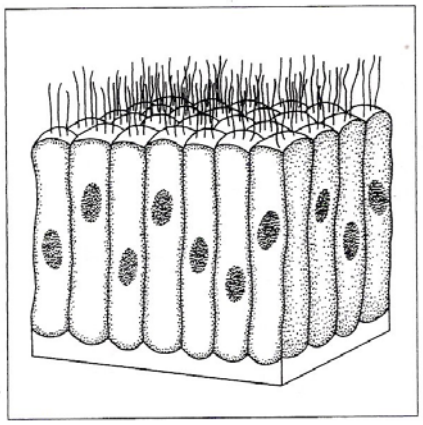


Figure A

**Epithelial tissue** is covering tissue. It is made up of cells that are joined tightly together. Skin is made up of epithelial tissue. Epithelial tissue covers organs both inside and outside your body. It helps keep out germs and protects you from injury.

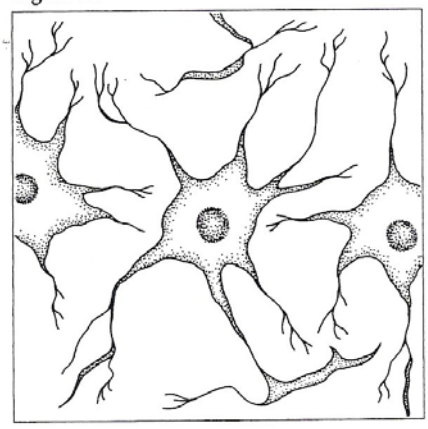


Figure B

**Nerve tissue** is made up of nerve cells. It sends and receives messages. Nerve tissue allows us to respond to stimuli, or changes, in our surroundings. Nerve tissue responds to changes both inside and outside the body.

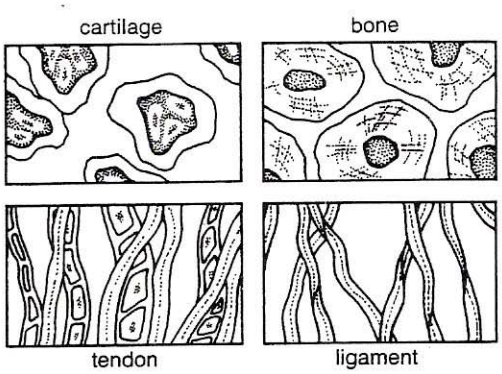



Figure C

**Connective tissue** supports the body and holds it together. Connective tissue also helps to protect the body.

Bone, cartilage, tendons and ligaments are all examples of connective tissue. Look at the picture of these tissues in figure C.

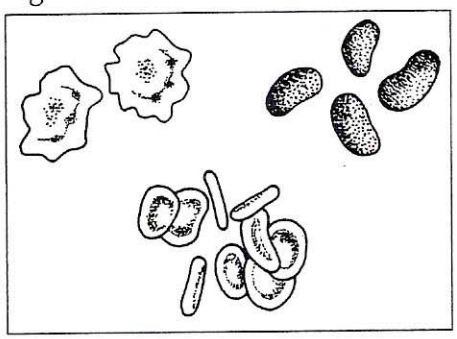


**Figure D**

Blood is also a connective tissue. Note the picture of different blood cells in figure D. Blood carries oxygen, digested food, and important chemicals to all parts of the body. Blood tissue also carries away waste.

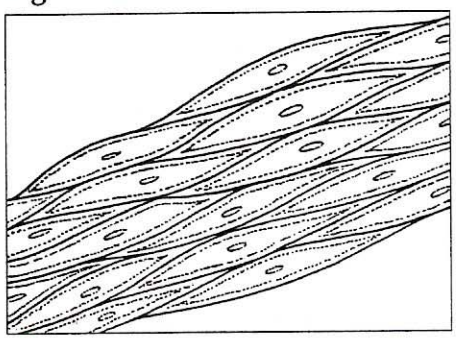


**Figure E**

**Muscle tissue** makes movement possible. Muscle tissue is made up of cells that can become shorter. Notice the long and tapered muscle cells forming muscle tissue in figure E. There are different kinds of muscle tissue. One kind is attached to bones. When these muscles shorten, they pull on bones for movement.

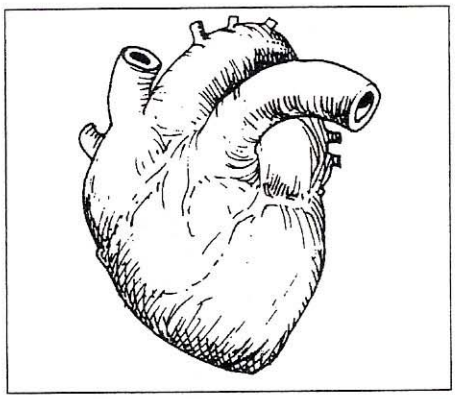


**Figure F**

**Organs are made up of many tissues -** Your body has many organs. An organ is made mostly of just one kind of tissue. But an organ has other tissues, also. For example, your heart is an organ. Figure F shows what the human heart looks like. It pumps blood throughout your body. The heart is made mostly of muscle tissue. But it is also made of blood tissue, nerve tissue and epithelial tissue.

The chart below lists several organs and their jobs. It also lists some of the tissues that make up each organ.

| ORGANS | JOB | TISSUES |
|---|---|---|
| HEART | pumps blood throughout the body | mostly muscle; also blood, nerve, and epithelial |
| STOMACH | digests food | muscle, nerve, blood, and other tissues |
| SKIN | covers and protects the body; helps get rid of salts, water, heat, and a small amount of urea | mostly epithelial; also blood, nerve, and other tissues |
| BRAIN and SPINAL CORD | the brain is the organ of thinking; the brain and spinal cord send and receive messages | mostly nerve; also blood, connective, and other tissues |
| EARS, EYES, NOSE, TONGUE, and SKIN | sense organs; tell what is happening around you | nerve, muscle, blood, and other tissues |

Part 2 – Questions:

1. Use the information from the chart above to answer the questions about the picture below. The two organs shown in the picture are made mostly of nerve tissue.

   a) What is the name of organ A? _____

   What does it do? _____

   b) What is the name of organ B? _____

   What does it do? _____

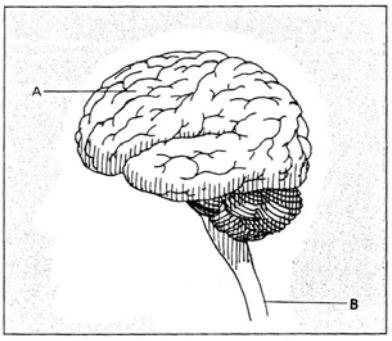



Figure G

2. Match each term in column A with its description in column B. Write the correct letter in the space provided.

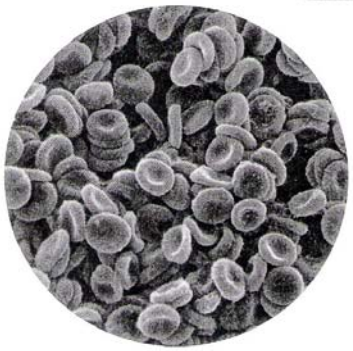
| | Column A | Column B |
|---|---|---|
| _____ | 1. blood | a) pumps blood |
| _____ | 2. connective tissue | b) covering tissue |
| _____ | 3. epithelial tissue | c) made mostly of nerve tissue |
| _____ | 4. stimuli | d) carries oxygen and food to cells |
| _____ | 5. sense organs | e) produces movement |
| _____ | 6. muscle tissue | f) bone, tendons, ligaments and cartilage |
| _____ | 7. brain and spinal cord | g) organ of digestion |
| _____ | 8. stomach | h) ears, eyes, nose, skin and tongue |
| _____ | 9. lungs | i) organs of respiration |
| _____ | 10. heart | j) changes in our surroundings |

Adapted from Lesson 1 – What are Tissues and Organs?, pp.2-6 *Biology Science Workshop Series*

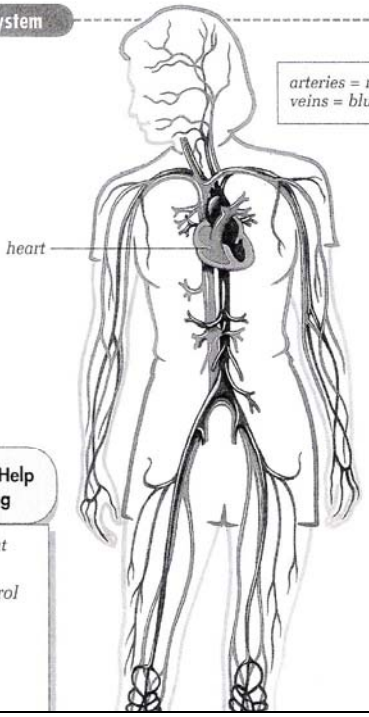
**Part 3 – Organ Systems**

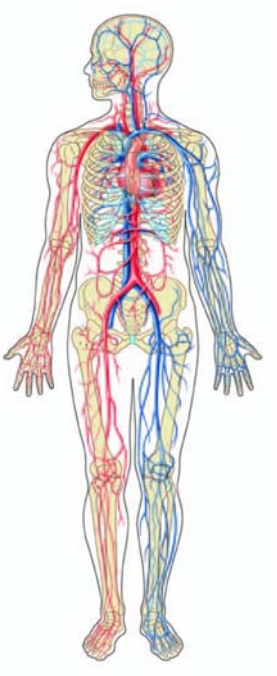
This morning on your walk to class, many parts of your body were involved in the exercise that you did. These include your skin, your bones, your heart, your lungs, your mouth and your stomach. None of these body parts functions on its own. Each part is an **organ** which forms part of a body system. The organs that make up each **organ system** work together to perform a certain task or function. For example, the organs of your digestive system work together to break down food to supply your body cells with the energy and nutrients they need to survive. The following charts describe some of your body's organ systems. Read thorough the information and use it to answer the questions that follow.

## Circulatory System



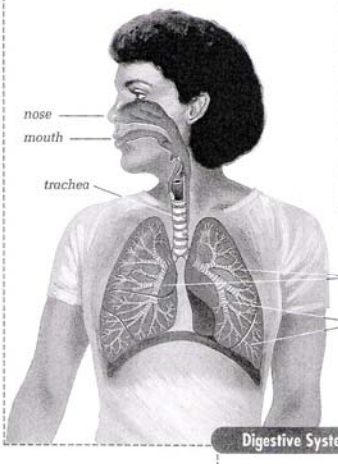
Red blood cells



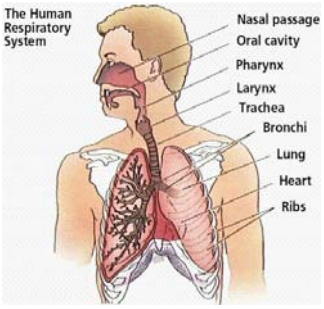



| Structures | Function | Factors That Help Functioning |
|---|---|---|
| heart, blood, arteries, veins | • transport oxygen, food, and other substances throughout the body<br>• transport some wastes to other organs for elimination<br>• defend the body against diseases<br>• connect all other organ systems | • arteries that are clear of cholesterol<br>• exercise |

## Respiratory System

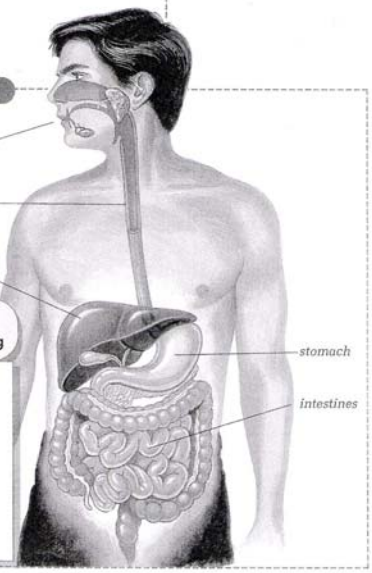



| Structures | Function | Factors That Help Functioning |
|---|---|---|
| nose, mouth, trachea, bronchi, lungs | • transport oxygen from outside air to the blood<br>• transport carbon dioxide from the blood to the outside air | • keep structures clear of harmful pollutants (such as tar from cigarette smoke)<br>• free from colds and allergies |

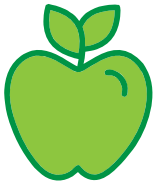



## Digestive System

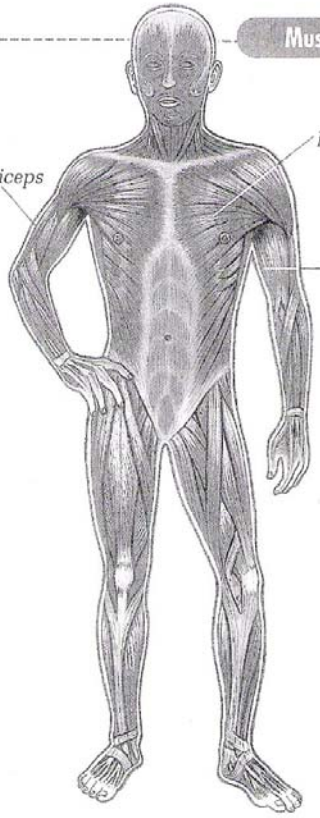
The digestion of food begins in your mouth.




| Structures | Function | Factors That Help Functioning |
|---|---|---|
| mouth, esophagus, stomach, liver, intestines | • break down food pieces into much smaller pieces (particles) so they can be absorbed and transported throughout the body | • balanced diet<br>• water |



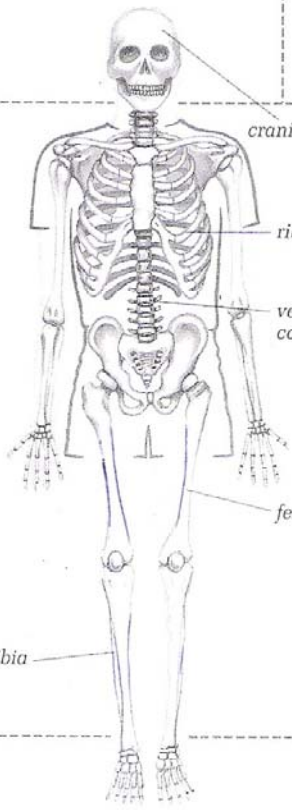
## Muscular System



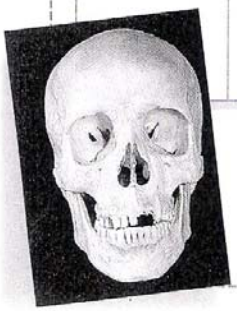

| Structures | Function | Factors That Help Functioning |
|---|---|---|
| *muscles, tendons* | • *move bones*<br>• *move organs that contain muscle tissue (such as the heart and stomach)* | • *exercise* |

Athletes learn how to control their muscles.

## Skeletal System

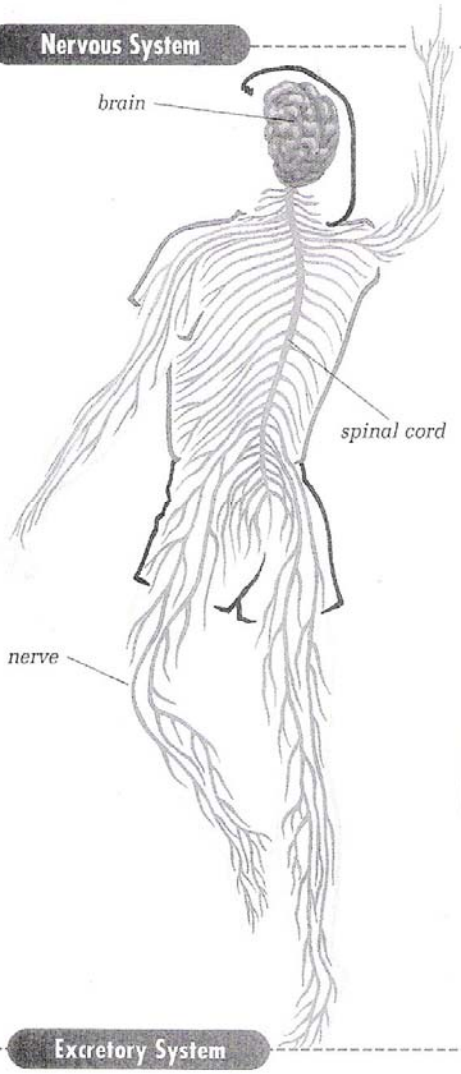



| Structures | Function | Factors That Help Functioning |
|---|---|---|
| *bones, cartilage* | • *provide a moveable support frame for the body*<br>• *protect soft-tissue organs such as the heart and lungs* | • *exercise*<br>• *calcium* |



You have 206 bones in your body.

## Nervous System

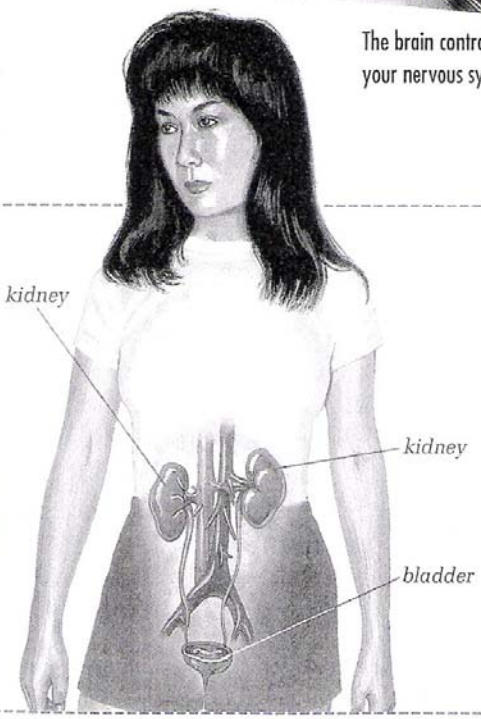


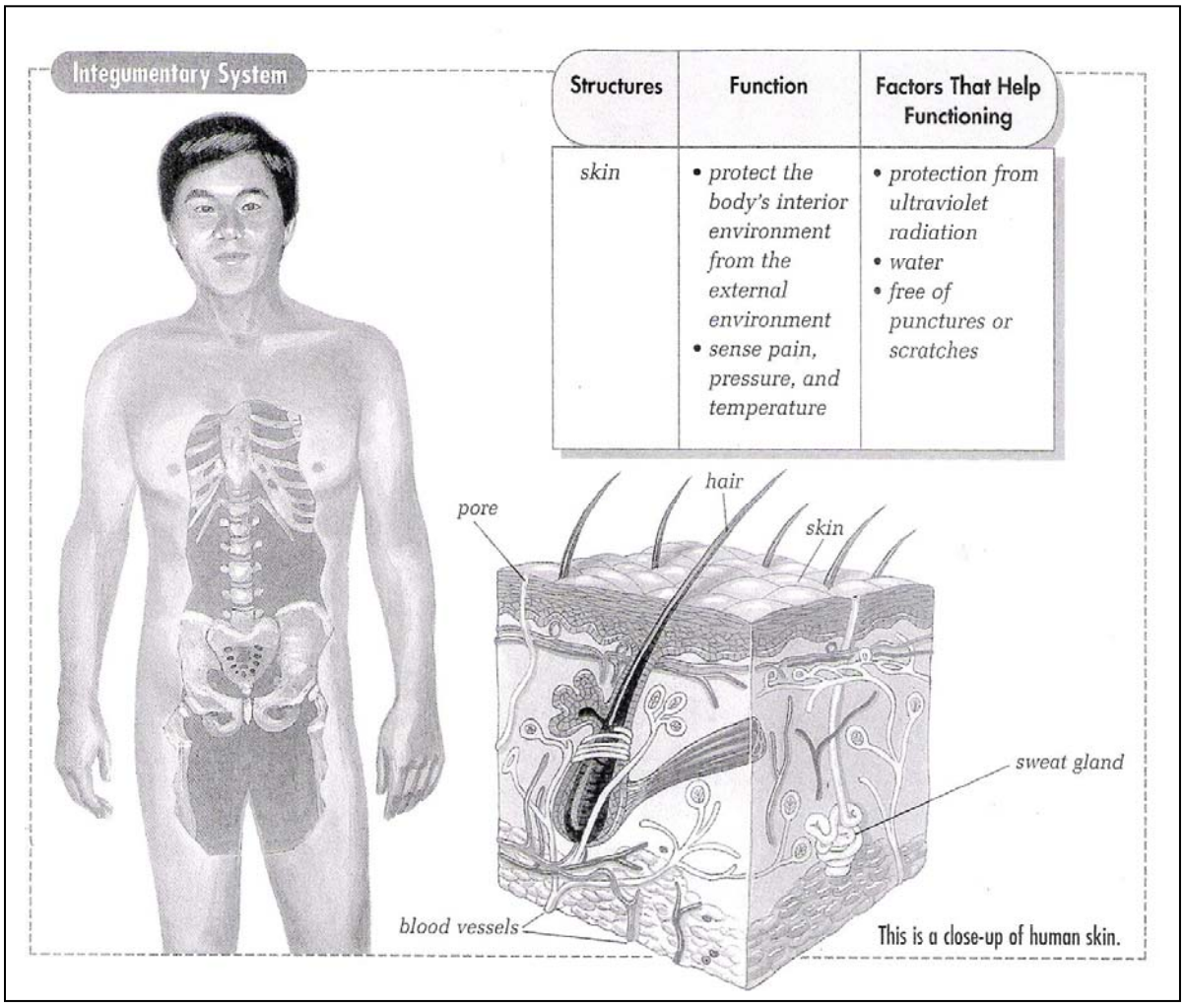

| Structures | Function | Factors That Help Functioning |
|---|---|---|
| *brain, spinal cord, eyes, ears, and other sensing organs (hand, nose, etc.)* | • *coordinate and control the actions of all organs and organ systems*<br>• *detect, process, and respond to changes in external and internal environment* | • *enough rest*<br>• *no stimulants or depressants* |

The brain controls your nervous system.

## Excretory System

| Structures | Function | Factors That Help Functioning |
|---|---|---|
| *kidneys, bladder, lungs, skin* | • *remove chemical and gaseous wastes from the blood* | • *water*<br>• *balanced diet* |






Part 3 – Questions:

1. What is the name of the body system that is the master controller of the rest of the systems of the body?

   _____

2. The body system that filters wastes from the blood is the _____ system.

3. Calcium is an important element to include in one's diet, especially for the health of the _____ system.

4. The system that moves the body is the _____ system.

5. List the five main structures of the digestive system. _____

   _____

6. The tube of the respiratory system that carries air into the lungs is called the _____.

7. The system that carries blood throughout the body is the _____ system.

8. Your sensory structures, such as your nose, eyes and ears, are part of the _____ system.

9. The skin is part of the integumentary system, but since it is also involved in removing excess heat and some wastes from the blood, it is also part of the _____ system.

10. The skeletal system is a support frame for the body and is made up of _____ and _____.

11. Digestion of food begins in your _____.

12. The system that contains cells to fight disease is the _____ system.

Adapted from How Your Body is Organized, pp.8-12 *Addison Wesley Science and Technology 8*

Student Handout INDIVIDUAL


**Overview:**
In this project, students will discover the organs that are part of one body system and assemble a life-size model of the distribution and size of the organs.

**Materials**:
- large garbage bag
- different colors of construction paper
- tape
- internet access
- biology textbooks or other human body system resources
- display area for posting the project

**Method:**
1. Choose one of the following body systems:
   a) circulatory system
   b) respiratory system
   c) digestive system
   d) nervous system
   e) excretory system
   f) another system approved by your teacher

2. Using a computer with internet access and other biology resources, research the following:
   a) what organs are found in the system
   b) the location of the organs in the system
   c) the approximate size of the organs in the system
   d) the function of the organ system and the function of each organ within that system (on a piece of loose leaf)

3. Cut a neck hole and two arm holes in the garbage bag.

4. Trace the shape of the organ (with its approximate size) onto construction paper.

5. Tape the organs to the garbage bag in their correct position.

6. Type out the function of each organ and paste the information either on the organ or on a sheet that will have an arrow connecting it to the organ.

7. Make a title of your body system to put above your body bag. Make it large, neat and clear.

8. Post your body bag and the title of your body system in the area designated by your teacher.

**Extensions:**

- Using cut-outs and your bag, show a disorder related to your body system
- Using cut-outs, objects and your bag, show a medical procedure related to your system
- Using cut-outs, show how your system is connected to another organ system in the body

# BODY BAG

**Overview:**
In this project, students will discover the organs that are part of one body system and assemble a life-size model of the distribution and size of the organs.

**Materials** (per group):
- large garbage bag
- different colors of construction paper
- tape
- internet access
- biology textbooks or other human body system resources

**Method:**
1. Choose one of the following body systems:
   a) circulatory system
   b) respiratory system
   c) digestive system
   d) nervous system
   e) excretory system
   f) another system approved by your teacher

2. Using a computer with internet access and other biology resources, research the following:
   - what organs are found in the system
   - the location of the organs in the system
   - the approximate size of the organs in the system
   - the function of the organ system and the function of each organ within that system (on a piece of looseleaf)

3. Cut a neck hole and two arm holes in the garbage bag.

4. Trace the shape of the organ (with its approximate size) onto construction paper.

5. Have your partner put on the garbage bag.

6. Using your discretion and the assistance of the person wearing the bag, tape the organs to the garbage bag in their correct position.

7. Present your body bag on your partner to the rest of the class. Make sure that you explain the different organs and what they do.

**Extensions:**

- Using cut-outs and your bag, show a disorder related to your body system
- Using cut-outs, objects and your bag, show a medical procedure related to your system
- Using cut-outs, show how your system is connected to another organ system in the body

Student Handout

_____
**12**

Name: _____ Date: _____ Period: _____

## The Organization of the Human Body – Quiz

**INSTRUCTIONS –** Place the correct letter beside each term.

_____ circulatory system

_____ integumentary system

_____ nervous systeem

_____ muscular system

_____ skeletal system

_____ excretory system

_____ digestive system

_____ connective tissue

_____ epithelial tissue

_____ cell

_____ organ

_____ muscle tissue

a) consists of the kidneys, bladder, lungs and skin

b) provides a support framework for the body

c) breaks down food into a nutrients that can be absorbed by the body

d) consists of the brain, spinal cord and nerves

e) protective system consisting of the skin

f) moves blood throughout the body

g) moves bones and organs that have muscle

h) covers organs inside and outside of the body, keeps out germs and protects

i) bone, cartilage, tendons and ligaments are all examples of this type of tissue

j) tissue that is made up of cells that can become shorter and that pull on bones for movement

k) the basic building block of life

l) made up of tissues working together for a certain function e.g., the heart