

## BONES, MUSCLES AND SKIN

### Human Body Is Organized into Systems

The human body works very smoothly carrying out its daily functions because it is organized. The human body has different levels of organization that consist of **cells** (the smallest), **tissues**, **organs**, and **organ systems** (the largest).

The cell is the basic building block of all living organisms. The adult human body contains trillions of cells. Tissues are the second level of organization.

### Four Types of Tissue

Tissues are made of similar cells that serve a specific function. The human body contains four types of tissues: muscle tissue, nervous tissue, connective tissue, and epithelial tissue.

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Muscle tissue



Nervous tissue

**Connective tissue:** This type of tissue connects the different parts of the body together. Bone is an example of this tissue type. It supports the body and protects the internal structures.

**Nerve tissue:** This type of tissue brings information from all parts of the body to the brain. The brain then sends a message back out to the body.

**Muscle tissue:** This type of tissue controls all of the movement of the body. Muscle tissue contracts, stretches, and shortens, which allows the body to move.

**Epithelial tissue:** This tissue covers all of the surfaces of the body, both inside and outside.

## Organs

As we learned in Topic 14, an organ is a group of tissues that come together to perform a specific job that is more complex than each individual tissue's specific job. An organ system is many organs that work together.

## What is homeostasis?

The body's tendency to maintain a balance internally is called

homeostasis. The body maintains homeostasis by using feedback loops.

If you eat a meal, your blood sugar increases. Your body responds by releasing insulin, which lowers your blood sugar.

When you are stressed, your body releases adrenaline, which increases your heart rate and blood pressure. This helps you react quickly to the situation.



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**Adrenaline** is a chemical that gives the body a sudden burst of energy and causes many other changes within the body. All of these changes combine to allow for quick action to the situation. The changes that are caused by adrenaline are called the “fight-or-flight” response. The name is given because your body will make the decision to either fight the stressor or take flight or run from the stressor.

Let's review several of your body's organ systems.

## The Skeletal System

There are five major functions of the skeletal system:

- to enable you to move around you environment,
- to protect internal organs,
- to support and provide shape,
- to store materials, and
- to produce blood cells.



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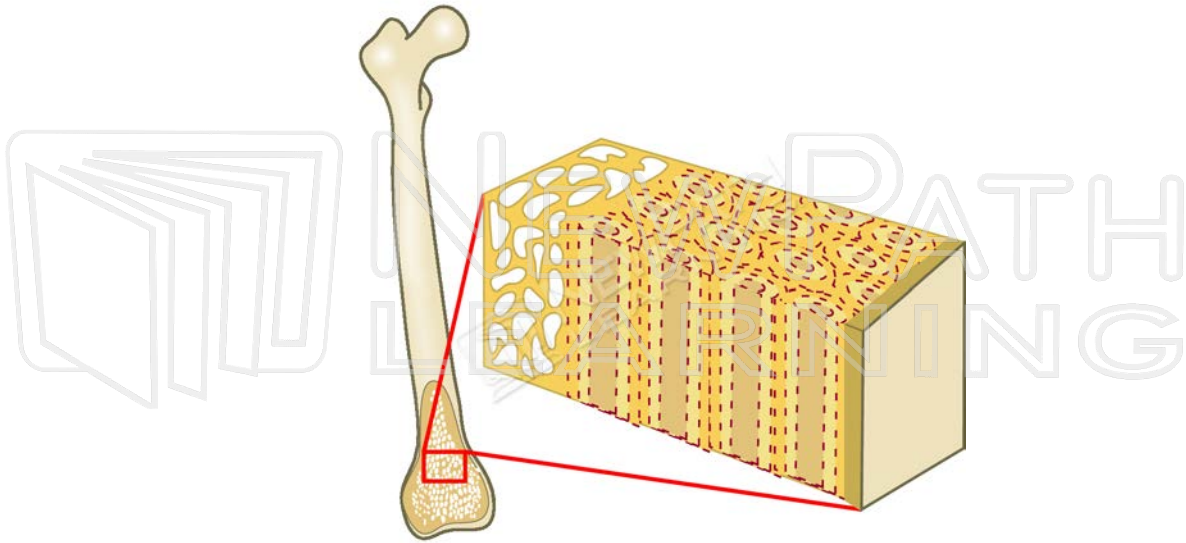
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## The structure of bone

The structure of a bone consists of an outer layer of hard connective tissue. Inside the outer layer is the compact bone, then the spongy bone. The spongy bone gives the bone its lightness and keeps the bone strong. The spaces within the bone are filled with **marrow**, a soft connective tissue within bones. The two types of marrow are yellow and red. The yellow marrow stores fat and other materials to use for energy when necessary. The red marrow produces blood cells for the body.



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**Mov**

for a wide range of movements.

### The types of movable joints

The body has four kinds of movable joints -- **ball and socket, hinge, pivot, and gliding joints**. Connective tissues called **ligaments** hold together the bones in movable joints.

### Immovable joints

**Immovable joints** are joints between bones that do not allow movement. Examples of immovable joints are the joints between the bones of the skull, which protect a part of the body that doesn't have movable parts.



**Smooth muscle:** These involuntary muscles are on the insides of internal organs. These muscles work automatically to control many functions of the body. Smooth muscles are not striated like skeletal muscles.

**Cardiac muscle:** This type of muscle has characteristics in common with both skeletal and smooth muscles. Cardiac muscles are striated like skeletal muscles and are involuntary like smooth muscles. The heart muscle beats for the entire life of an organism.

An illustration showing a profile of a human head on the left and a cross-section of a heart on the right, both in a simple, cartoonish style.A large rectangular banner with a light blue background and an orange border. At the top, there are four thought bubbles containing various educational icons: a cube, a microscope, a globe, a chemistry flask, a globe, a DNA helix, a pie chart, a bar graph, and mathematical symbols. Below the bubbles is a row of ten diverse cartoon children standing on a green patch of grass. In the center of the banner, the word 'PREVIEW' is written in large, bold, blue and orange letters. Below that, the text 'Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet' is displayed in a dark blue font.

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A simple illustration of a human bicep muscle, showing its characteristic shape and color.

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If you have ever flexed your bicep muscle, then you have noticed that the muscle will bulge or contract.

A skeletal muscle will contract when it receives information from the brain. Muscles will contract, but they will not extend. This means that for every muscle there is a muscle that does the opposite. Muscles work in pairs so that when one muscle contracts, the other in the pair will go back to its original length.

## The Skin

The skin completes many important functions for the body and is the largest organ of the body.

The skin provides these functions to your body:

- covers the body,
- prevents water loss,
- gathers information from the environment,
- eliminates waste,
- protects the body from injury and infection,
- produces vitamin d, and
- regulates the body's temperature.

There are two main layers of the skin. They are the **dermis** and the **epidermis**.

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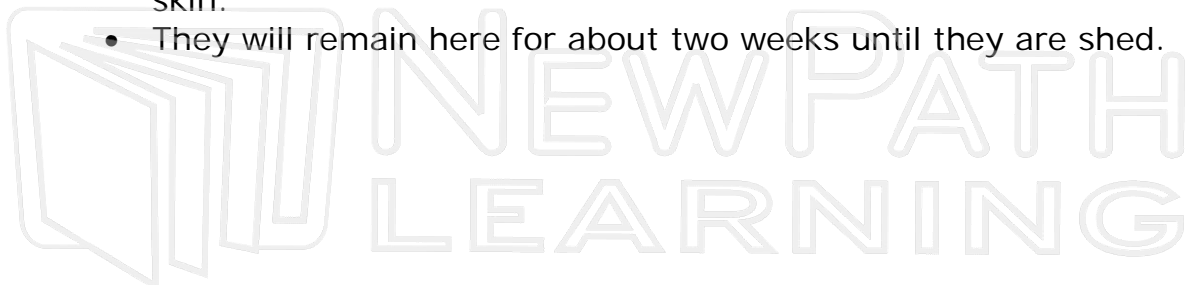


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The epidermis cells have this life cycle:

- They divide from other epidermis cells and mature for about two weeks.
- They will then die and become part of the surface layer of the skin.
- They will remain here for about two weeks until they are shed.



## Keeping your skin healthy

The skin is a very important organ, so keeping it as healthy is very important. This can be done by:

- Keeping the skin clean and dry – **acne** is a bacterial infection of the skin that is very difficult to control.
- Wearing protection in the sun – without consistent protection from the sun's rays, it is possible to develop skin cancer. Cancer is a disease that causes cells to divide uncontrollably.
- Drinking plenty of water – replacing the liquid in your body while completing a demanding activity is important for sweating.
- Eating properly – a healthy diet is important for keeping the cells supplied without energy.

An illustration showing a row of diverse children standing on a green patch of grass. Above them are four thought bubbles containing various educational icons: a 3D cube, a microscope, a protractor, a globe, a chemistry flask, a globe, a pencil, a bar chart, a pie chart, a bar chart, a bar chart, and a calculator. The word 'PREVIEW' is written in large, bold, blue and orange letters below the children. Below the preview text, it says 'Please Sign In or Sign Up to download the printable version of this worksheet'.