

## Week 3

### How Your Body Works: The Skeletal and External Systems

*“A sound heart is the life of the flesh: but envy the rottenness of the bones” (Proverbs 14:30).*

*“Pleasant words are as an honeycomb, sweet to the soul, and health to the bones” (Proverbs 16:24).*

*“A virtuous woman is a crown to her husband: but she that maketh ashamed is as rottenness in his bones” (Proverbs 12:4).*

*“The light of the eyes rejoiceth the heart: and a good report maketh the bones fat” (Proverbs 15:30).*

#### Lesson 1

Write the definitions from the glossary for the following vocabulary terms.

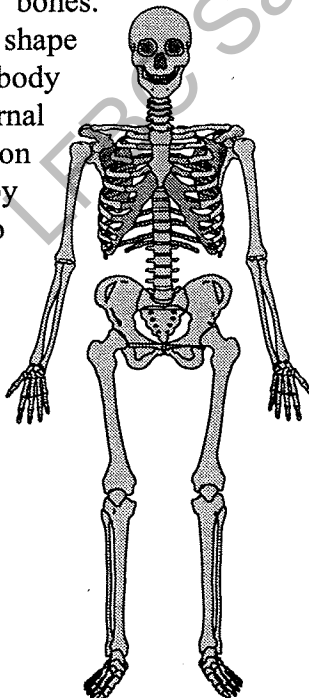
1. axial \_\_\_\_\_  
\_\_\_\_\_
2. vertebrae \_\_\_\_\_  
\_\_\_\_\_
3. appendicular \_\_\_\_\_  
\_\_\_\_\_
4. ligaments \_\_\_\_\_  
\_\_\_\_\_
5. cartilage \_\_\_\_\_  
\_\_\_\_\_
6. tendons \_\_\_\_\_  
\_\_\_\_\_

- 7. epidermis \_\_\_\_\_  
\_\_\_\_\_
- 8. dermis \_\_\_\_\_  
\_\_\_\_\_
- 9. follicle \_\_\_\_\_  
\_\_\_\_\_
- 10. acne \_\_\_\_\_  
\_\_\_\_\_
- 11. bacteria \_\_\_\_\_  
\_\_\_\_\_
- 12. melanin \_\_\_\_\_  
\_\_\_\_\_

Read the following text for good understanding.

**THE SKELETON**

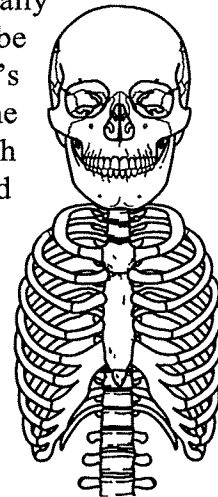
The skeleton of the average adult consists of 206 distinct bones. These bones give shape and support to the body and protect internal organs. Body motion is made possible by muscles attached to the skeleton. The bones also store calcium and help maintain the correct level of this chemical for the body. The bone marrow also has the important task of making blood cells.



**The Axial Skeleton**

The **axial** skeleton refers to the bones of the head and trunk (80 bones). This includes the skull, the spine, the ribs, and the breastbone. The spine consists of 26 separate bones. The 24 **vertebrae** have holes through them which line up vertically forming a hollow tube (again see God's miraculous design). The spinal cord runs through this tube and is protected by the vertebrae.

The seven top spinal bones are the neck bones. They support the skull. The skull surrounds and protects the brain. It also provides protection for the eyes, the ears, and the nasal passages. Of



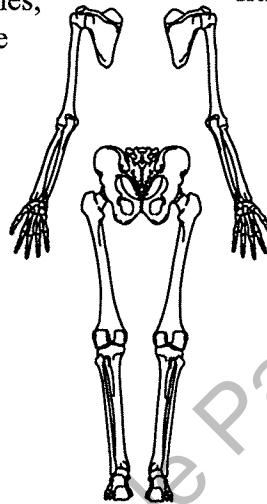
**Axial Skeleton**

the skull's 28 bones (including the cranium, facial bones, etc.) only one — the lower jaw bone — is movable.

The chest is protected by 12 pairs of ribs. Each pair is attached to a vertebrae. These ribs form a cage which protects the body's most vital organs, the lungs and the heart.

### Appendicular Skeleton

This **appendicular** skeletal system includes the shoulder bones, arm bones, hip bones, and leg bones. This bone system is one of the many differences between man and all the animals. The human skeletal system allows man to walk uprightly, grasp things (using his fingers and thumb), and carry out a wide range of motions unknown to most animals. The human skeletal system, the ability to reason, and man's immortal soul demonstrate that he is not just another animal, but a unique being created in the image of God.



**Appendicular Skeleton**

### Joints

Any place where two or more bones come together is referred to as a joint. The type of joint determines what kind of movement can take place. A hinge joint (the elbow for example) allows bending in only one direction. Ball and socket joints (for example, the hip) allow both bending and rotary movements. Many joints do not allow any movement.

Bones are bound together at joints by tough fibers called **ligaments**. These ligaments limit movements and help to prevent joints from being dislocated. Where the ends of bones meet at joints, they are protected by rubbery tissue known as **cartilage**.

Muscles, which provide the strength needed to move bones, are attached to the bones by **tendons**. Normally a muscle is

attached by tendons to one bone at one end and to another bone at the other end.

### SKIN

The outside of the human body is covered by an organ referred to as skin. This tissue shields the tissues and organs underneath from injury, protects from germs, insulates against heat and cold, and helps to eliminate body fluids through perspiration. Skin also helps to produce the body's supply of vitamin D. Its sense receptors enable the body to feel pain, cold, heat, touch, and pressure.

The skin consists of two main parts: the outer layer (**epidermis**) and the inner layer (**dermis**).

The outer layer is made up of several layers of cells. The cells from the outer layer are constantly being shed and replaced by cells from the lower layer. The cells of the top layer of the epidermis are non-living and need no blood supply. A cut in the skin can open the way for germs to infect the inner areas of the body. The inner layer is made up of connective tissues including blood vessels and nerves. The various skin sensations are made possible by these nerves.

### Sweat Glands

The sweat glands are located deep in the inner layer. They collect body fluids containing salt, water, and waste products from the blood. It is carried away in little canals and exit through pores on the skin's surface.

### Oil Glands

The oil (sebaceous) glands are also in the inner layer. They secrete the oil which keeps the skin surface well lubricated. Many of the oil glands are connected with hair **follicles**.

### Care of the Skin

Proper diet, rest, and exercise are all important to the care of the skin. Cleanliness is also necessary (see Week 8). Facial skin is very delicate and is also normally exposed to wind, sun, and cold. The face should be washed at least twice a day. Men are usually satisfied to wash with water and soap. The skin of females is often more delicate and they may prefer to use special facial soaps or cleansing creams.

The amount of oil and perspiration secreted by the glands varies greatly from person to person. It can also be influenced by general health and personal skin care. Skin tends to become drier in middle- and old-age thus encouraging wrinkles.

Dry skin should not be washed too often with soap and water. A cleansing cream may be needed. Sometimes skin is unusually dried by the weather. Chapped skin should be treated with specially designed products.

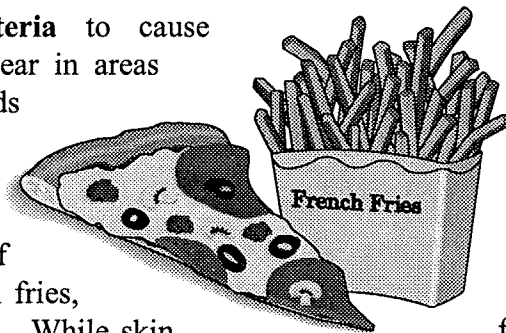
Oily skin should be washed more often but not with oily creams or lotions. It is important not to allow skin pores to become clogged with oil and dirt.

### Acne

**Acne** occurs in about 90% of teenagers. About 5% of teenagers have acne with severe enough inflammation to create permanent scarring.

Acne is related to the hormones of puberty (see Week 6). These hormones stimulate the oil glands causing them to produce a fatty substance called sebum which interacts with certain **bacteria** to cause pimples. Acne tends to appear in areas where there are many oil glands like the face, back, and chest.

Most scientists discount the other suggested causes of acne (chocolate, pizza, french fries, sexual activity, etc.) as myths. While skin



cleanliness is important, excessive, harsh scrubbing of the skin can aggravate the glands and actually make acne worse.

Mild acne can be managed by cleansing twice a day with a mild soap followed by over-the-counter medications applied to pimples daily. No medication works instantly or completely. A certain amount of acne may have to be endured.

### Sunburn

A very common teen problem is sunburn. Sunburn can dry the skin to the point that blistering and peeling takes place and painful inflammation of the skin tissues can cause extreme discomfort.

Sunscreen lotion decreases the chance of skin burning. Gradual exposure to the sun in small doses over a period of several days is much less likely to do damage than prolonged exposure at once. Lotions should be reapplied frequently during exposure with water.

### Hair

Hair is a tissue that develops from the skin. The average person may have as many as 125,000 hairs on their scalp. Hair texture differs from one part of the body to another. It also differs between individuals. The color of the hair depends on a pigment called **melanin**. The less melanin the lighter the hair.

Hair develops out of a pocket in the skin called a follicle. The part of the hair beneath the skin is called the root; above the skin it is called the shaft. The follicles are connected to the oil glands which supply oil to the scalp and to the hair.

A hair grows from the roots. As the hair grows more and more it is pushed above the skin making the shaft longer. Sometimes individual follicles go through

dormant stages.

When the melanin in the hair is depleted, the hair turns gray. Baldness occurs when the follicles in a certain area no longer develop hair. Baldness is a very common occurrence among men; in fact, it is often called “male pattern baldness.” The rate and amount of baldness differs greatly from person to person.

Another type of baldness is called symptomatic baldness or temporary hair loss. It should be noticed that preparations applied externally to the hair cannot “feed” the hair or change the nature of follicle development.

The Scriptures make it clear that the difference in development in men and women’s hair is designed by God.

**Lesson 2**

**Match the following.**

- |                                  |   |
|----------------------------------|---|
| ___ 1. axial skeleton            | a. 26 separate bones                            |
| ___ 2. spine                     | b. carry salt, water, and waste out of the body |
| ___ 3. vertebrae                 | c. chocolate, pizza, french fries, etc.         |
| ___ 4. joint                     | d. bones of head and trunk                      |
| ___ 5. sweat glands              | e. very common among men                        |
| ___ 6. acne                      | f. five percent of teenagers                    |
| ___ 7. severe acne with scarring | g. in a column of 24                            |
| ___ 8. mythical acne causes      | h. distinctions in men’s and women’s hair       |
| ___ 9. follicle                  | i. 90% of teenagers                             |
| ___ 10. baldness                 | j. pocket out of which grows a hair             |
| ___ 11. I Corinthians 11         | k. where two or more bones come together        |

**Fill in the blanks.**

1. Body motion is made possible by \_\_\_\_\_ attached to the \_\_\_\_\_.
2. The seven top spinal bones are the \_\_\_\_\_ bones which support the \_\_\_\_\_.
3. The ribs form a \_\_\_\_\_ which protects the most vital organs, the \_\_\_\_\_ and the \_\_\_\_\_.