

## Chapter Twenty-two: Body Organization and Structure

### Teacher Notes

#### Lesson One: Body Organization

- Cells, Tissues, and Organs
  - Homeostasis-the maintenance of a constant internal state in a changing environment.
    - maintaining isn't easy
      - internal environment is always changing
      - nutrients are needed, cells need to remove waste
  - Tissue-a group of similar cells that perform a common function
  - Tissues Form Organs
    - Organ-a collection of tissues that carry out a specialized function of the body.
  - Organs Form Systems
    - groups of organs that work together
- Working Together
  - Your body has 12 major organ systems
    - Integumentary System-your skin, hair, and nails protect the tissue that lies beneath them.
    - Muscular System-muscles that work with skeletal system to help you move.
    - Skeletal System-bones that provide a frame to support and protect your body parts.
    - Cardiovascular System-heart that pumps blood
    - Circulatory System-blood vessels that carry blood through the body.
    - Respiratory System-lungs absorb oxygen and release carbon dioxide
    - Urinary System-removes waste from the blood and regulates your body fluids.
    - Male Reproductive System-produces and delivers sperm.
    - Female Reproductive System-produces eggs and nourishes and protects the fetus.
    - Nervous System-receives and sends electrical messages throughout your body.
    - Digestive System-breaks down the food you eat into nutrients that your body can absorb.
    - Lymphatic System-returns leaked fluids to blood vessels and helps get rid of bacteria and viruses.
    - Endocrine System-glands send out chemical messages. Ovaries and testes are part of this system.

#### Lesson Two: The Skeletal System

- Bones
  - Skeletal System-the organ system whose primary function is to support and protect the body and to allow the body to move.
  - Average adult human has 206 bones

- support and protect parts of your body
- work with muscles so you can move
- help body maintain homeostasis by storing minerals and making blood cells

#### -Bone Structure

- a living organ made of several different tissues
  - made of connective tissue and minerals
  - minerals are deposited by living cells called osteoblasts
  - compact bone-bone that doesn't have visible open spaces
    - is rigid and dense
    - tiny canals within compact bones contain small blood vessels
  - spongy bone-bone provides most of the strength and support for a bone
  - marrow-soft tissue contained in bones
    - red marrow-produces both red and white blood cells
    - yellow marrow-found in the central cavity of long bones and stores fat

#### -Bone Growth

- bones start out as a flexible tissue called cartilage
  - as an infant you have mostly cartilage but as you grow it is replaced by cartilage

#### -Joints-a place where two or more bones meet.

- allow your body to move when your muscles contract
  - fixed muscles allow little or no movement
  - gliding joint-allow bones in the hand and wrist to glide over one another and give some flexibility to the area
  - ball-and-socket joint-moves freely in all directions (hip)
  - hinge joint-allows a door to open and close (knee)
- ligaments-strong elastic bands of connective tissue that hold joints together
  - cartilage cushions the area where joints and bones meet

#### -Skeletal System Injuries and Diseases

- bones can be fractured or broken
- joints can be injured
  - dislocated joint is a joint in which one or more bones have been moved out of place
  - sprain-happens when ligaments are stretched too far or torn
- skeletal diseases
  - osteoporosis-causes bones to become less dense and break
  - arthritis-disease of joints that make them swell or stiffen

### **Lesson Three: The Muscular System**

#### -Kinds of Muscle

- Muscular System-the organ system whose primary function is movement and flexibility.

- Smooth Muscle-found in the digestive tract and in the walls of blood vessels
- Cardiac Muscle-found only in your heart
- Skeletal Muscle-attached to your bones for movement; help protect inner organs
- Muscle Action
  - voluntary-muscle action controlled by you
  - involuntary-muscle action that is not controlled by you
    - smooth and cardiac muscle
- Movement
  - Muscles Attach to Bones
    - tendons-tough strands of tissue that connect your skeletal muscles to your bones
  - Muscles Work in Pairs
    - usually one muscle in the pair bends part of the body and the other muscle straightens part of the body
    - flexor-a muscle that bends part of your body
    - extensor-a muscle that straightens part of your body
- Use It or Lose It
  - Resistance Exercise-people work against the resistance or weight of an object
    - example-curl-ups
  - Aerobic Exercise-steady, moderate intense activity
    - examples-jogging, cycling, skating, swimming, and walking
- Muscle Injury
  - strain-an injury in which a muscle or tendon is overstretched or torn
    - often happen because a muscle has not been warmed up
    - may happen when muscles are worked too hard
  - tendinitis-injured tendons that become inflamed by too much exercise
    - only way to repair is a long rest
  - anabolic steroids-drugs people take to make their muscles stronger
    - can cause long-term health problems like heart, liver, and kidney damage
    - can cause high blood pressure and can cause bones to stop growing

#### **Lesson Four: The Integumentary System**

- Integumentary System-the organ system that forms a protective covering on the outside of the body.
- Functions of Skin
  - skin protects you by keeping water in your body and foreign particles out of your body.
  - skin keeps you in touch with the outside world by allowing nerve endings in skin to feel things around you.
  - skin helps regular your body temperature by allowing you to sweat.
  - skin helps you get rid of wastes.
- Layers of Skin
  - Epidermis-the surface layer of cells on a plant or animal.
    - made of epithelial tissue
    - there are many layers of cells but the skin on most of your body is only as thick as two sheets of paper. It is thicker on your hands and feet.

- Dermis-the layer of skin below the epidermis.
  - made of fibers called collagen which provide strength
  - they allow skin to bend without tearing

#### -Hair and Nails

- hair
  - forms at the bottom of a tiny sac called a hair follicle
  - hair grows as new cells are added to the follicle
  - only living cells of hair are in the hair follicle
  - protects skin from ultraviolet light
  - keeps particles out of eyes and nose
  - helps to regulate body temperature
- nail
  - grows from living cells in the nail root at the base of the nail
  - protect the tips of fingers and toes

#### -Skin Injuries

- skin repairs itself
- damage to the genetic material in skin can cause cancer
- skin may be affected by hormones that cause oil glands in the skin to make too much oil.