BODIES HUMAN

Instructions: As you tour the Bodies Human exhibition, answer the following questions. Some can be answered by reading the exhibit text and observing the specimens, while others will require you to draw conclusions based on your observations and knowledge. If you're unsure about an answer, mark it for later classroom discussion.

SKELETAL SYSTEM

1. The human skeleton provides several important functions. Which of the following is NOT a primary function of the skeletal system?

    - a) Protection of internal organs
    - b) Production of blood cells
    - c) Filtration of toxins from the bloodstream
    - d) Storage of minerals like calcium and phosphorus
2. Identify the three types of joints found in the human body based on their movement capabilities:

    - a) Fibrous, cartilaginous, and synovial
    - b) Ball-and-socket, hinge, and gliding
    - c) Movable, semi-movable, and immovable
    - d) Rotational, pivotal, and saddle
3. What makes up approximately 30-40% of bone tissue weight?

    - a) Calcium
    - b) Collagen
    - c) Marrow
    - d) Phosphate
4. The human vertebral column typically contains how many individual vertebrae?

    - a) 12
    - b) 24
    - c) 33 at birth, 26 in adults
    - d) 33 throughout life
5. What is the remodeling process by which bone tissue is continuously replaced throughout life?

    - a) Ossification

- b) Calcification
- c) Osteogenesis
- d) Bone turnover

💫 ADVANCED FACT:

Bone is constantly being remodeled through the coordinated actions of osteoblasts (bone-forming cells) and osteoclasts (bone-resorbing cells). The entire adult skeleton is completely regenerated every 10 years!

MUSCULAR SYSTEM

1. The three types of muscle tissue in the human body are:
    - a) Voluntary, involuntary, and cardiac
    - b) Skeletal, smooth, and cardiac
    - c) Striated, non-striated, and semi-striated
    - d) Fast-twitch, slow-twitch, and medium-twitch
2. Muscle tissue converts biochemical energy into mechanical energy through a process involving:
    - a) Oxygen diffusion
    - b) Glucose metabolism
    - c) Sliding filament mechanism
    - d) Nerve impulse transmission
3. What substance is responsible for the "burn" sensation during intense exercise?
    - a) Lactic acid
    - b) Pyruvic acid
    - c) Carbonic acid
    - d) Uric acid
4. The principle that states a muscle will develop to meet the demands placed on it is known as:
    - a) Muscular adaptation
    - b) Progressive overload
    - c) Specificity principle
    - d) Reversibility principle
5. Which muscle in the human body is considered the strongest relative to its size?
    - a) Quadriceps
    - b) Gluteus maximus

- c) Masseter (jaw muscle)
- d) Heart

💫 ADVANCED FACT:

The force generated by the masseter muscle during a bite can reach up to 200 pounds (90 kg) on the molars. This incredible force is sufficient to crack a walnut!

NERVOUS SYSTEM

1. The action potential that travels along a neuron is a result of:
    - a) Blood flow changes
    - b) Changes in ion concentrations across the cell membrane
    - c) Structural changes in the myelin sheath
    - d) Alterations in neurotransmitter production
2. The region between two neurons where signals are transmitted is called:
    - a) Axon terminal
    - b) Node of Ranvier
    - c) Synapse
    - d) Dendrite junction
3. Which part of the brain is primarily responsible for maintaining balance and coordinating movement?
    - a) Frontal lobe
    - b) Hypothalamus
    - c) Cerebellum
    - d) Medulla oblongata
4. Neuroplasticity refers to the brain's ability to:
    - a) Generate new neurons throughout life
    - b) Modify its connections and reorganize itself
    - c) Protect itself from physical trauma
    - d) Regulate hormone production
5. The autonomic nervous system consists of two main divisions:
    - a) Central and peripheral
    - b) Somatic and visceral
    - c) Sympathetic and parasympathetic
    - d) Voluntary and involuntary

💫 ADVANCED FACT:

Information in your brain travels at speeds of up to 268 mph (432 km/h), but different types of nerve fibers conduct signals at different rates, with myelinated fibers transmitting signals much faster than unmyelinated ones.

RESPIRATORY SYSTEM

1. During inhalation, the diaphragm:
    - a) Relaxes and moves upward
    - b) Contracts and moves downward
    - c) Remains stationary while the chest muscles do all the work
    - d) Expands outward to increase chest volume
2. The process by which oxygen and carbon dioxide move between the alveoli and blood capillaries is:
    - a) Active transport
    - b) Facilitated diffusion
    - c) Simple diffusion
    - d) Osmosis
3. Approximately what percentage of the air we breathe consists of oxygen?
    - a) 21%
    - b) 40%
    - c) 60%
    - d) 78%
4. The respiratory system's defense mechanisms against pathogens and irritants include:
    - a) Mucus, cilia, and coughing reflex
    - b) T-cells, B-cells, and macrophages
    - c) Alveolar surfactant production
    - d) Bronchodilation and bronchoconstriction
5. Long-term smoking most commonly leads to:
    - a) Pulmonary fibrosis
    - b) Chronic obstructive pulmonary disease (COPD)
    - c) Pulmonary hypertension
    - d) Cystic fibrosis

💫 ADVANCED FACT:

The total surface area of the alveoli in your lungs is approximately 75 square meters (807 square feet) – about the size of a tennis court – providing an enormous area for gas exchange!

CARDIOVASCULAR SYSTEM

1. The cardiac cycle is regulated by electrical impulses that originate in the:
    - a) Apex of the heart
    - b) Sinoatrial (SA) node
    - c) Ventricular walls
    - d) Coronary arteries
2. What is the function of the bicuspid (mitral) valve in the heart?
    - a) Prevents backflow from the aorta to the left ventricle
    - b) Controls blood flow from the left atrium to the left ventricle
    - c) Regulates blood flow from the right atrium to the right ventricle
    - d) Allows blood to flow from the lungs into the left atrium
3. The normal resting heart rate for adolescents typically ranges from:
    - a) 40-60 beats per minute
    - b) 60-100 beats per minute
    - c) 100-120 beats per minute
    - d) 120-140 beats per minute
4. Atherosclerosis is characterized by:
    - a) Enlargement of the heart chambers
    - b) Buildup of plaque in artery walls
    - c) Inflammation of heart muscle tissue
    - d) Irregularities in heart rhythm
5. What's the approximate amount of blood in an adult human body?
    - a) 2-3 liters
    - b) 5-6 liters
    - c) 8-10 liters
    - d) 12-15 liters

💫 ADVANCED FACT:

Your blood vessels form a network that, if laid end to end, would stretch approximately 60,000 miles (97,000 kilometers) – long enough to circle the Earth more than twice!

DIGESTIVE SYSTEM

1. Which digestive enzyme begins the breakdown of carbohydrates in the mouth?

    - a) Pepsin
    - b) Amylase
    - c) Lipase
    - d) Trypsin
2. The majority of nutrient absorption occurs in the:

    - a) Stomach
    - b) Small intestine
    - c) Large intestine
    - d) Esophagus
3. Which of these is NOT a function of the liver?

    - a) Production of bile
    - b) Detoxification of harmful substances
    - c) Production of digestive enzymes
    - d) Storage of glycogen
4. The muscular contractions that move food through the digestive tract are called:

    - a) Peristalsis
    - b) Digestion
    - c) Absorption
    - d) Secretion
5. Approximately how long does it take for food to complete its journey through the digestive system?

    - a) 2-4 hours
    - b) 6-8 hours
    - c) 24-72 hours
    - d) 4-7 days

💫 ADVANCED FACT:

Your digestive system contains about 100 trillion bacteria of over 500 different species, collectively known as the gut microbiome. These microbes play crucial roles in digestion, immunity, and even mood regulation!

REFLECTION QUESTIONS

1. Which system of the human body did you find most interesting at the Bodies Human exhibition, and why?

2. Describe one specimen from the exhibition that helped you better understand human anatomy:

3. How has the Bodies Human exhibition changed your understanding of how your body works?

4. After seeing the exhibition, what lifestyle choices might you make to keep your body healthy?