Body Systems

Human Body Systems

- Circulatory System
- Nervous System
- Respiratory System
- Digestive System
- Skeletal System
- Muscular System
Body Systems Introduction

• The levels of organization in multicellular organisms:
  Cell $\rightarrow$ ___________ $\rightarrow$ Organs $\rightarrow$ _______________ $\rightarrow$ Organism

• Organ Systems: Are a group of organs that help perform ___________________________ in the body.

• Many organs play a role in multiple organ systems.
Body Systems Introduction

- Main Function of some body systems:

**Digestive:** Break down ________ and absorb ___________ into the blood and eliminate some waste.

**Circulatory:** Transport ________, ___________, ____________, and other material throughout the body (to and from cells).

**Respiratory:** Bring ________________ into the blood for ________________ and eliminate ________ and ________ waste.

**Endocrine:** Produce ________________ to regulate growth, development, metabolism, and homeostasis.

**Immune:** Protect the body from ________ using ________ blood cells.
Circulatory System

- It is the “_______________” system of the body which carries substances throughout the body both to cells and away from cells.

- Necessary substances for cells (O$_2$, nutrients, etc.) are brought to cells and _________ and other products (such as hormones) are carried away from cells.

- The blood also helps regulate ______________________ by transporting heat that can be exchanged through the ____________________________.
RED BLOOD CELL LIFESPAN

- Produced in the _______________
- Only type of body cell without a ____________
- Old RBC destroyed in liver, spleen
- Average lifespan 120 days
BLOOD VESSELS

arterioles (thinner arteries) → venules (thinner veins)

Arteries
• Carry blood __________ from the heart
• Most arteries contain _________________ blood
• Blood is under greater ________________ (most arteries protected deeper within body)
• Thick walled vessels
• Muscular walls __________________________ to help move blood
CAPILLARIES: SITE OF GAS/NUTRIENT EXCHANGE

• _______________ blood vessels
• Lining is 1 cell thick
• Allows __________ and __________ to diffuse into body cells
• _______________ from cells diffuses into blood
VEINS

• Carry blood back to the heart
• Most veins carry deoxygenated blood
• Since many veins travel against gravity, equipped with one-way valves to prevent back-ups

Artery: Thicker layer of smooth muscle
Vein: One way valves
Heart

- Mainly cardiac muscle
- Cells have numerous mitochondria
- Mammalian hearts have _____ chambers
  - 2 Upper Chambers: Atria
    » Receiving chambers
  - 2 Lower Chambers: Ventricles
    » Pump blood out of heart
- Left and right sides separated by solid wall to create two pumps
Pathway of Blood

Oxygen poor blood returning from body enters right atrium

Right atrium → right ventricle → pulmonary artery → lungs → pulmonary vein → left atrium → left ventricle → aorta → arteries → capillaries → veins → vena cavae
Respiratory System

Respiration is the process of bringing ______________ to the cells and removing waste ________________

Cellular respiration

- Occurs in aerobic cells
- Uses _____ and food molecules (esp. ____________) to make ATP, the cell’s energy currency
- _____________ and ________________ are by-products

Overall: \[ C_6H_{12}O_6 + 6 \text{ O}_2 \rightarrow 6 \text{ CO}_2 + 6 \text{ H}_2\text{O} \]
**EXCHANGE OF GASES**

___________ have thin walls and are surrounded by a network of _______________ (thin blood vessels).

_____ from the alveoli diffuses into the blood stream and _______ in the returning blood enters the alveoli.
KEEPING THE LUNGS CLEAN

Nose hairs filter dirt particles.

The trachea is lined with cilia (tiny hairs) and mucus.
- The sticky mucus traps dirt particles.
- The cilia wave upwards to expel dirt.
- **Smoking tobacco products _________________ CILIA!**
THE MECHANICS OF BREATHING

- The diaphragm (a muscle located at the base of the rib cage) and muscles in the rib cage ______________ to increase the volume around the lungs to inhale, and ______ to exhale.
These actions increase the volume of the chest cavity, decreasing the air pressure.

This difference in ________ causes inhalation, as higher pressure air outside moves into the lungs.
CONTROL OF RESPIRATION

Brain region called the medulla oblongata regulates breathing to maintain homeostasis.

If _____________ levels in blood stream are high, the medulla oblongata signals an increase in the breathing rate. This is because the ________ creates lower pH (more basic) blood.
Healthy Bodies - What are 4 things that you can do that will help your bones, digestive system, nervous, endocrine, respiratory and circulatory systems healthy?

• Exercising regularly – promotes strong bones and muscles, helps remove waste and increases circulation. It also promotes brain health.

• Eating nutritious food – provides the nutrients (enzyme cofactors a.k.a. vitamins) and minerals (like iron that carries oxygen in hemoglobin or calcium that helps build bone tissue) you need for good health.

• Getting adequate sleep – promotes a healthy immune and nervous system, and maintenance of healthy weight.

• Avoiding tobacco and smoking – smoking tobacco paralyzes lung cilia, and tobacco products are linked with increased rates of cancer, heart disease, birth defects, and premature death.
Review of Concepts:

- The best description of the function of your circulatory system is:
  A. To produce red blood cells
  B. To move substances throughout the body, to and from cells.
  C. To bring O2 into the blood and get rid of CO2
  D. To break down nutrients from your food.
Review of Concepts

• The best choice for the purpose of your respiratory system is:
  A. To breath
  B. To break down biomolecules
  C. For gas exchange (O2 and CO2) between the blood and air.
  D. To move nutrients to and from your cells.
Review of Concepts

• Explain how oxygen gets into your blood and is carried to your body cells. Use the terms: diffusion, lungs, alveoli, capillaries, blood.

• Also explain how carbon dioxide waste leaves your cells and is exhaled out using the same terms.
Review of Concepts

• How is your involuntary breathing controlled?

A. By the level of Oxygen in your blood.
B. By the level of Carbon Dioxide in your blood.
C. By the pH of your blood.
D. All the above
E. Choice “B” and “C” only