

# Physiology Class 1: Introduction, Organization of the Body, Homeostasis

## Activities

These activities are designed to be done at home. There is no grade given for these and they do not have to be turned in. The answer key has been emailed to your grown up.

### Write a story!

Write or draw a short story from the point of view of one organ or system.

Here are a few prompts to get you started, but feel free to choose your own:

- **A Day in the Life of the Heart**

Correct ideas might include:

- “I pump blood all day long — I never take a break!”
- “I work together with the lungs to get oxygen into the blood.”
- “Blood carries oxygen and nutrients to every cell in the body.”
- Tissues involved: *cardiac muscle, connective, epithelial, nervous* (optional)

- **Diary of a Red Blood Cell**

Correct ideas might include:

- “I carry oxygen from the lungs to the body.”
- “On my way back, I pick up carbon dioxide to drop off at the lungs.”
- “I travel through arteries, veins, and capillaries.”
- “I don’t have a nucleus — more room for oxygen!”

- **The Brain’s Big Day**

Correct ideas might include:

- “I send and receive electrical messages through the nerves.”
- “I tell the heart to beat and the lungs to breathe.”
- “The spinal cord helps carry messages to the rest of the body.”
- Tissues involved: *nervous (neurons, glial cells), connective, epithelial* (optional)

Include how your organ works and helps the rest of the body. Read your story to your grownup when you are done!

In the event that kids choose another topic, here are the remaining body systems and what to look for. If they don't get all the key points, that is OK, just ask them questions to guide them to thinking of things they might have missed.

### **Stomach**

Important points students should include:

- The stomach is part of the digestive system.
- Works with mouth (chewing, saliva), esophagus (transport), small intestine (absorption).
- Involves tissues: smooth muscle (movement), epithelial (lining), and glandular cells (enzymes, acid).
- Mentions mechanical and chemical digestion.
- May include complaints about poor diet (fatty, acidic, sugary foods).

### **Skin**

Important points students should include:

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- The skin is part of the integumentary system.
- Functions: protection, temperature regulation, sensation.
- Includes sweat glands, hair follicles, nerves, blood vessels.
- Layers: epidermis, dermis, subcutaneous tissue.
- Works with circulatory (heat) and nervous systems (touch, pain).

### **Muscles**

Important points students should include:

- The muscular system enables movement, posture, and heat production.
- Works with skeletal system (bones as levers) and nervous system (control).
- Types of muscle: skeletal (voluntary), smooth (involuntary), cardiac (heart).
- Describes coordination between muscles and nerves during motion.
- Could include examples of muscle fatigue or recovery.

### **Nervous System**

Important points students should include:

- The nervous system controls communication throughout the body.
- Includes brain, spinal cord, and peripheral nerves.
- Uses electrical impulses and neurotransmitters.

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- Works with muscular, endocrine, and sensory systems to respond to stimuli.
- Could include examples of reflexes or fight-or-flight response.

### Lungs

Important points students should include:

- The lungs are part of the respiratory system.
- Function: exchange oxygen (O<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) with the blood.
- Works closely with heart and diaphragm.
- Describes breathing mechanics — diaphragm movement, inhalation/exhalation.
- May mention alveoli and capillaries where gas exchange occurs.

### Endocrine

Important points students should include:

- The endocrine system uses glands to produce hormones.
- Hormones travel through the bloodstream to target organs.
- Major glands: pituitary, thyroid, adrenal, pancreas, gonads.
- Works with nervous system to maintain homeostasis.
- May describe feedback loops (e.g., insulin regulating blood sugar).

### Skeletal

Important points students should include:

- The skeletal system provides structure, protection, and mineral storage.
- Works with muscular system for movement and circulatory system via bone marrow (makes blood cells).
- Mentions osteocytes, osteoblasts, and osteoclasts (bone cells).
- Could include fun elements like “building strength” or “supporting others.”
- Should mention connective tissue (cartilage, ligaments) involvement.

### Homeostasis Detective

Keep track for one day:

- When you felt hot or cold
- When you got hungry or thirsty
- When your heart beat faster (exercise, excitement, etc.)

Then explain how you think your body fixed each one.

## Pre-Assessment Quiz: Physiology Introduction, Organization of the Body and Homeostasis

1. What is physiology?

A. The study of what the body looks like

**B. The study of how body parts work and stay alive**

C. The study of plants

D. The study of bones

2. Which list shows the correct order of body organization?

A. Systems → Organs → Cells → Tissues

B. Organism → Organs → Tissues → Cells

**C. Cells → Tissues → Organs → Organ Systems → Organism**

D. Tissues → Cells → Systems → Organs

3. What is the smallest living unit of the body?

A. Organ

B. Tissue

**C. Cell**

D. System

4. Which structure acts like the control center of the cell?

A. Cytoplasm

B. Cell membrane

**C. Nucleus**

D. Mitochondria

5. Which human cells do NOT have a nucleus?

A. Muscle cells

B. Skin cells

C. Neurons

**D. Red blood cells**

6. What are tissues?

A. Groups of organs working together

**B. Groups of similar cells working together**

- C. Layers of skin
- D. Liquids in the body

7. Which organ system includes the heart and blood vessels?

- A. Nervous system
- B. Respiratory system

**C. Circulatory system**

- D. Digestive system

8. Homeostasis means...

- A. Growth of new cells
- B. Digestion of food

**C. Keeping the body's internal environment stable**

- D. Breaking down nutrients

9. What happens when your body gets too hot?

- A. Blood vessels narrow and you shiver

**B. Blood vessels widen and you sweat**

- C. Your stomach releases enzymes
- D. Cells stop working

10. Which system acts as the body's control center?

- A. Circulatory system
- B. Digestive system

**C. Nervous system**

- D. Immune system