

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. Have your student read you their short story. While all children will clearly write their own story, make sure they hit at least some of the important points. If they don't, ask them questions to see if they can arrive at some of these points.

1. Organization of the Body

Write a short creative story told from the point of view of an organ or a body system. Include characters from each of the tissues or organs that cooperate for that organ or body system. Read and discuss this with one of your grown-ups!

Examples/Prompts: Feel free to use one of these or come up with your own!

1. "A Day in the Life of the Brain"

You're the command center of the whole body — neurons are your messengers, and you're trying to keep everyone organized. But the heart and stomach keep interrupting with their own demands!

Important points students should include:

- The brain is the control center of the body.
- It sends and receives signals through the nervous system (neurons, spinal cord, sensory organs).
- Works with muscles (movement), heart (heartbeat regulation), endocrine system (hormones).
- Should mention how different brain parts (cerebrum, cerebellum, brain stem) coordinate body functions.
- May include how the brain maintains homeostasis (temperature, hunger, emotions, etc.).

2. "The Heart Diaries"

Write from the perspective of the heart as it races, rests, and responds to emotions, caffeine, or exercise — with the blood cells and lungs as your closest co-workers.

Important points students should include:

- The heart pumps blood through the circulatory system.

- Works closely with the lungs (oxygen exchange) and blood vessels (arteries, veins, capillaries).
- Red blood cells carry oxygen and carbon dioxide.
- The heart has four chambers and valves that control flow.
- Possible connection to homeostasis (keeping oxygen and nutrient supply constant).

3. “The Stomach’s Complaint Letter”

The stomach writes to the mouth and intestines about all the junk food it’s forced to handle. How do enzymes, muscles, and acids help (or get overwhelmed)?

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).

4. “Mission: Oxygen Delivery”

You’re a red blood cell on a cross-country journey through the circulatory system. Describe what happens as you visit the lungs, heart, and body tissues on your daily route.

Important points students should include:

- The story follows a red blood cell in the circulatory system.
- Describes journey: lungs (oxygen pick-up) → heart → body tissues → back to lungs.
- Mentions hemoglobin carrying oxygen and CO₂ exchange.
- Involves cooperation between respiratory and circulatory systems.
- Could include details on arteries, veins, and capillaries.

5. “Whispers of the Skin”

The skin tells its story about protecting the body, sensing danger, and working with sweat glands, blood vessels, and nerves to keep things balanced.

Important points students should include:

- 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).

6. “The Muscles’ Big Performance”

Muscles, nerves, and bones work together to put on the greatest show — walking, running, or dancing. Tell the story from the perspective of the skeletal muscles preparing for action.

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.

7. “The Nervous System Hotline”

You’re the nervous system, running a 24-hour call center. Every cell has an urgent message — the hand touched something hot, the eyes saw something scary, the heart is panicking! How do you handle the chaos?

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

8. “Lungs Under Pressure”

Tell the story of the lungs during exercise — working overtime with the diaphragm, heart, and blood vessels to deliver oxygen. What happens when the body finally rests?

Important points students should include:

- The lungs are part of the respiratory system.
- Function: exchange oxygen (O₂) and carbon dioxide (CO₂) 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.

9. “Endocrine Express: Hormones on the Move”

You’re a hormone traveling through the bloodstream from a gland to your target organ. Who do you meet along the way, and what message are you delivering?

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).

10. “A Bone’s Secret Life”

Write as a bone cell deep in the skeleton, talking about teamwork with muscle cells, marrow, and nerves — and what it’s like being both strong and alive.

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.

2. Homeostasis Activity

For one day, write down examples of your body adjusting — shivering, sweating, feeling hungry, yawning, etc.

Goal: Recognize that homeostasis happens constantly, even without noticing it.

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

1. What is *physiology* the study of?
 - A. The structure and shape of the body
 - B. How living things reproduce
 - C. How the parts of the body work and function**
 - D. The diseases that affect the body
2. Which of the following lists the levels of organization in the correct order?
 - A. Organ → tissue → cell → system → organism
 - B. System → organism → organ → tissue → cell
 - C. Cell → tissue → organ → system → organism**
 - D. Cell → organ → tissue → organism → system
3. What is the smallest living unit that can carry out all life functions?
 - A. Organ
 - B. Cell**
 - C. Tissue
 - D. System
4. Which statement about red blood cells is true?
 - A. They contain a nucleus and many organelles.
 - B. They have no nucleus or organelles and carry oxygen.**
 - C. They transmit electrical signals.
 - D. They build bone tissue.
5. What do all organs have in common?
 - A. They are made of only one type of tissue.
 - B. They all control movement.
 - C. They are made of two or more types of tissue working together.**
 - D. They are part of the nervous system.
6. Which of the following is *not* one of the four main types of tissue?
 - A. Epithelial
 - B. Muscle
 - C. Connective
 - D. Circulatory**
7. What is the main goal of *homeostasis*?
 - A. To make the body grow faster
 - B. To keep the body's internal environment stable and balanced**
 - C. To stop the body from changing
 - D. To make the body's temperature drop

8. When blood sugar rises after eating, which hormone helps bring it back to normal?
- A. Adrenaline
 - B. Insulin**
 - C. Melatonin
 - D. Estrogen
9. What happens when the body gets too hot?
- A. Blood vessels narrow and you shiver.
 - B. The pancreas releases insulin.
 - C. Blood vessels widen and you sweat.**
 - D. The kidneys release more water in urine.
10. If one kidney is damaged and the other works harder to maintain balance, what is this called?
- A. Organ failure
 - B. Compensated balance (temporary homeostasis)**
 - C. Tissue breakdown
 - D. Endocrine regulation