

Physiology Unit Test and Review

Review

Physiology Unit Test Review (Ages 10–13)

This study guide reviews all major concepts taught across the five physiology units. It is designed to help students prepare for the 10–13 Physiology Unit Test by summarizing key ideas in clear, student-friendly language.

1. Foundations of Physiology & Homeostasis

Physiology is the study of how the parts of the body work and stay alive.

Anatomy tells what body parts look like. Physiology tells how they work.

Levels of organization in the body:

- Cells → Tissues → Organs → Organ Systems → Organism

Cells are the smallest living units. Most cells have a cell membrane, cytoplasm, and a nucleus. Red blood cells do NOT have a nucleus.

Tissues are groups of similar cells working together.

The four main tissue types are:

- Epithelial – covers and protects
- Connective – supports and holds together
- Muscle – moves the body
- Nervous – sends electrical signals

Organs are made of two or more tissues working together (examples: heart, lungs, stomach, skin).

Organ systems are groups of organs that work together, such as the circulatory, respiratory, digestive, urinary, nervous, muscular, skeletal, endocrine, immune, and integumentary systems.

Homeostasis means keeping the body's internal environment stable, even when the outside world changes.

Examples of homeostasis:

- Sweating when hot and shivering when cold
- Thirst when water is low

- Faster breathing during exercise

2. Cardiovascular & Respiratory Systems

The heart and lungs work together to deliver oxygen to the body and remove carbon dioxide.

Blood is a liquid tissue made of:

- Plasma – liquid that carries nutrients and waste
- Red blood cells (RBCs) – carry oxygen using hemoglobin
- White blood cells (WBCs) – fight germs
- Platelets – help blood clot

Red blood cells are shaped like a donut with the center pushed in. This gives more surface area for oxygen and allows them to fit through tiny capillaries.

Hemoglobin contains iron. Iron allows oxygen to stick to RBCs.

Blood clotting happens in three steps:

- Blood vessel tightens
- Platelets plug the wound
- Fibrin forms a net and creates a scab

Basic path of blood:

Heart → Lungs → Heart → Body → Heart

The heart beats using its own electrical pacemaker (SA node).

Oxygen and carbon dioxide move by diffusion, which means moving from high concentration to low concentration.

Gas exchange happens in the alveoli of the lungs and in body tissues.

3. Digestive & Excretory Systems

The main job of the digestive system is to break food into nutrients the body can use.

Path of food:

Mouth → Esophagus → Stomach → Small Intestine → Large Intestine → Rectum → Anus

Enzymes are proteins that speed up chemical reactions.

- Amylase – breaks carbohydrates into sugar
- Protease – breaks proteins into amino acids
- Lipase – breaks fats into fatty acids

Most nutrients are absorbed in the small intestine. The jejunum is the main site of absorption.

The liver makes bile to help break down fats. The gallbladder stores bile. The pancreas makes digestive enzymes and bicarbonate.

The kidneys filter blood and make urine to remove waste.

When dehydrated, urine becomes darker. When hydrated, urine becomes lighter.

The large intestine absorbs water and forms stool.

4. Muscular, Nervous & Skeletal Systems

Muscles move the body by contracting. Muscles work in pairs (one contracts, one relaxes).

Muscle contraction uses the sliding filament mechanism: myosin pulls on actin.

Muscle contraction requires ATP (energy) and calcium.

A motor unit is one motor neuron and all the muscle fibers it controls.

The nervous system sends fast electrical signals. It is divided into the CNS (brain & spinal cord) and PNS (all other nerves).

The autonomic nervous system has two parts:

- Sympathetic – fight or flight
- Parasympathetic – rest and digest

A reflex is a fast, automatic response that happens through the spinal cord without waiting for the brain.

The skeletal system supports the body, protects organs, makes blood cells, and stores calcium.

Osteoblasts build bone. Osteoclasts break down bone.

Calcium is needed for muscle contraction, nerve signals, and blood clotting.

5. Endocrine & Immune Systems

The endocrine system uses hormones to send messages through the blood.

Major glands and their jobs:

- Pituitary – master gland
- Pineal – makes melatonin for sleep
- Thyroid – controls how fast the body uses energy
- Adrenal – makes adrenaline and cortisol
- Pancreas – makes insulin and glucagon

Insulin lowers blood sugar by helping glucose enter cells.

Negative feedback loops help the body stay in balance.

The immune system protects the body from germs.

White blood cells destroy germs and infected cells.

Inflammation is part of healing. Signs include redness, heat, swelling, and pain.

Healthy habits that support both systems: good sleep, healthy food, water, exercise, and managing stress.

Final Study Tips

Students should be able to explain how each system works, trace basic pathways like blood and food, and describe how the body stays in balance through homeostasis.

Test

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

11. What is blood considered?

A. A liquid tissue

B. A muscle

C. A type of bone

D. A gas

12. Which blood part carries oxygen using hemoglobin?

A. Plasma

B. White blood cells

C. Red blood cells

D. Platelets

13. What mineral allows hemoglobin to carry oxygen?

A. Calcium

B. Iron

C. Sodium

D. Potassium

14. Why are red blood cells shaped like a donut with the center pushed in?

A. To help them fight germs

B. To store food

C. To squeeze through capillaries and carry more oxygen

D. To hold a nucleus

15. Which part of blood helps stop bleeding when you get a cut?

A. White blood cells

B. Plasma

C. Red blood cells

D. Platelets

16. What is the correct basic path of blood?

A. Heart → body → lungs → heart

B. Heart → lungs → heart → body

C. Lungs → heart → body → heart

D. Body → lungs → heart → body

17. What causes the heart to beat?

A. Your brain sends a signal for every beat

B. The heart has its own electrical pacemaker

C. Blood pressure pushes it

D. You have to think about it

18. Where does gas exchange happen in the lungs?

A. In the trachea

B. In the alveoli

- C. In the diaphragm
- D. In the ribs

19. What is diffusion?

- A. Movement of particles from high concentration to low concentration**
- B. A type of breathing exercise
- C. The body storing carbon dioxide
- D. The heart pumping blood faster

20. What do the diaphragm and rib muscles do during breathing?

- A. They digest food
- B. They squeeze blood vessels
- C. They help air move in and out of the lungs**
- D. They store oxygen for later

21. What is the main job of the digestive system?

- A. To pump blood
- B. To remove waste
- C. To break food into nutrients**
- D. To control breathing

22. What is ATP?

- A. The energy of a cell**
- B. Special rocket fuel
- C. An enzyme
- D. Part of the integumentary system

23. Which enzyme starts breaking down carbohydrates in the mouth?

- A. Protease
- B. Lipase
- C. Amylase**
- D. Pepsin

24. Where are MOST nutrients absorbed?

- A. Stomach
- B. Small intestine**
- C. Large intestine
- D. Rectum

25. Which organ makes bile to help digest fats?

- A. Pancreas
- B. Gallbladder
- C. Liver**
- D. Kidney

26. What do the kidneys produce to remove waste?

- A. Sweat
- B. Blood
- C. Urine**
- D. Stool

27. When the body is dehydrated, what happens to urine?

- A. It becomes pale
- B. It becomes darker**
- C. It stops forming
- D. It turns blue

28. The large intestine mainly:

A. Absorbs water and forms stool

B. Digests proteins

C. Makes enzymes

D. Breaks down oxygen

29. Which nutrient gives quick energy?

A. Protein

B. Fat

C. Vitamins

D. Carbohydrates

30. What do enzymes do?

A. Slow down digestion

B. Speed up chemical reactions

C. Carry oxygen in the blood

D. Make urine