

The page is decorated with various botanical and natural elements. In the top corners, there are stylized flowers with long, narrow petals. On the left side, a butterfly with white wings and dark markings is shown in flight. The background is a light green color with darker green accents, including a large leaf on the right side and another flower at the bottom right.

**Class: 9th**

**Subject: Biology**

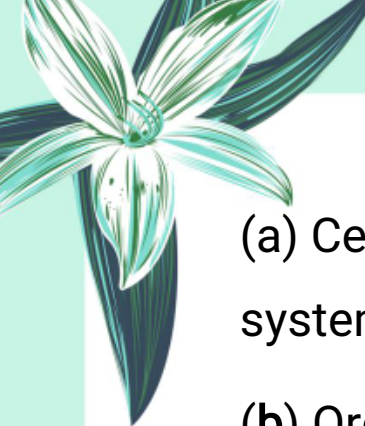
**Chapter 5: Tissue , Organs, And Organ  
System**

**Exercise MCQs:**

1. A higher level of organization exhibits emergent properties when:


- (a) Its parts function independently
- (b) The sum of its parts is greater than the whole
- (c) The individual parts are more important than the whole
- (d) Its parts interact to perform more functions

2. Which of the following demonstrates the levels of organization of the body, from simplest to most complex?



(a) Cell  $\Rightarrow$  Organ  $\Rightarrow$  Tissue  $\Rightarrow$  Organelle  $\Rightarrow$  Organ system

(b) Organelle  $\Rightarrow$  Cell  $\Rightarrow$  Tissue  $\Rightarrow$  Organ  $\Rightarrow$  Organ system



(c) Tissue  $\Rightarrow$  Cell  $\Rightarrow$  Organelle  $\Rightarrow$  Organ  $\Rightarrow$  Organ system

(d) Organ system  $\Rightarrow$  Tissue  $\Rightarrow$  Cell  $\Rightarrow$  Organelle  $\Rightarrow$  Organ

**3. At which level of organization gas exchange occurs between body and environment?**

(a) Organelle level in mitochondria

(b) Cellular level in alveolar cells

(c) Tissue level in epithelial tissues

(d) Organ system level in the respiratory system

**4. The epithelial tissue in the stomach wall is responsible for producing:**

(a) Mucus

(b) Enzymes for digestion

(c) Bile juice





(d) Hormones

**5. In the wall of stomach, which tissue also contains nerves and blood vessels?**

(a) Epithelial tissue

(b) Muscle tissue

(c) Inner connective tissue

(d) Outer epidermal tissue

**6. In a leaf, which tissue is responsible for photosynthesis?**

(a) Xylem

(b) Mesophyll

(c) Epidermis

(d) Phloem

**7. What is the primary function of the xylem tissue in a leaf?**

(a) To transport sugars to other parts

(b) To transport water to parts of leaf

(c) To synthesize chlorophyll





(d) To control the opening and closing of stomata

**8. Which of these is a function of the human skeletal system?**

(a) Storing minerals and producing blood cells

(b) Removing carbon dioxide from blood

(c) Filtering blood to remove waste products

(d) Breaking down food for energy

**9. Which structures are responsible for the transport of food in plant body?**

(a) Xylem tissue

(c) Phloem tissue

(b) Palisade mesophyll

(d) Spongy mesophyll

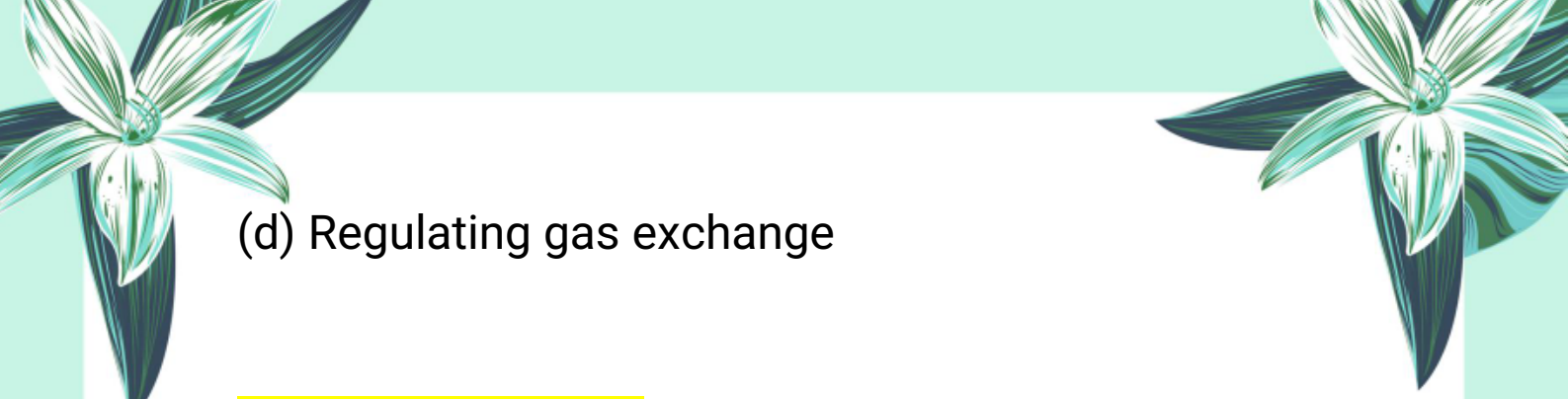
**10. In a plant, which of the following is the primary function of the flower?**

(a) Transporting water and minerals

(b) Supporting leaf growth

(c) Facilitating reproduction through pollination





(d) Regulating gas exchange

### Important MCQs:



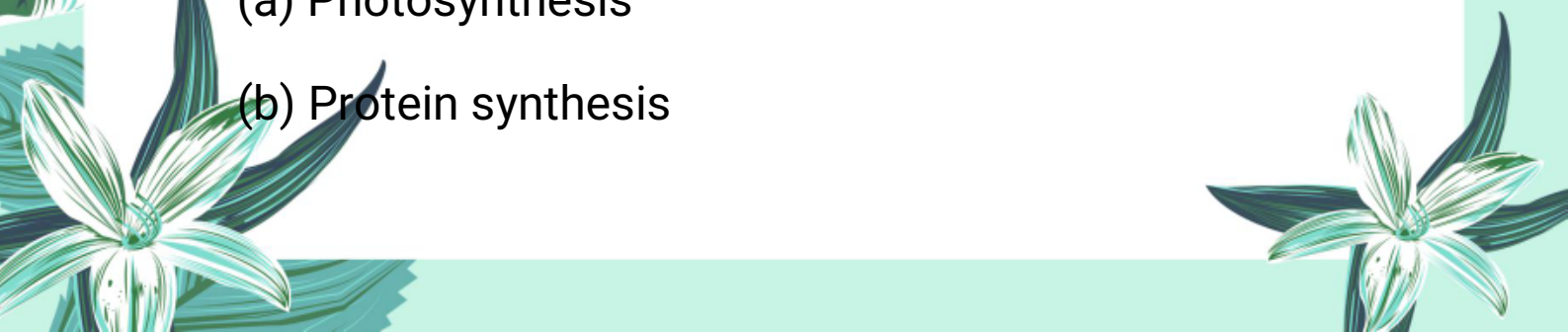
1. What is the smallest level of biological organization?

- (a) Cell
- (b) Atom
- (c) Molecule
- (d) Organelle

2. Which of the following is an example of a molecule?

- (a) Oxygen atom
- (b) Ribosome
- (c) Water
- (d) Mitochondria

3. What is the function of mitochondria?

- (a) Photosynthesis
  - (b) Protein synthesis
- 



(c) Cellular respiration

(d) Cell division

**4. Which organelle is responsible for protein synthesis?**



(a) Mitochondria

(b) Ribosome

(c) Nucleus

(d) Chloroplast

**5. What is the smallest unit of life?**

(a) Atom

(b) Organelle

(c) Cell

(d) Tissue

**6. Which tissue enables movement in animals?**

(a) Epithelial

(b) Connective

(c) Muscle

(d) Nervous





**7. Vascular tissue in plants is responsible for:**

- (a) Movement
- (b) Photosynthesis
- (c) Transport of water and nutrients
- (d) Protection



**8. Which of the following is an organ in animals?**

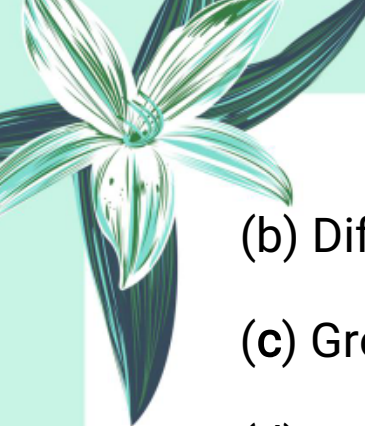

- (a) Skin tissue
- (b) Heart
- (c) Muscle
- (d) Blood


**9. Which plant organ is mainly responsible for photosynthesis?**

- (a) Root
- (b) Leaf
- (c) Stem
- (d) Flower

**10. What forms an organ system?**

- (a) Similar cells
- 

- 
- 
- (b) Different tissues
  - (c) Group of organs
  - (d) Group of molecules



**11. Which organ system is responsible for breaking down food?**

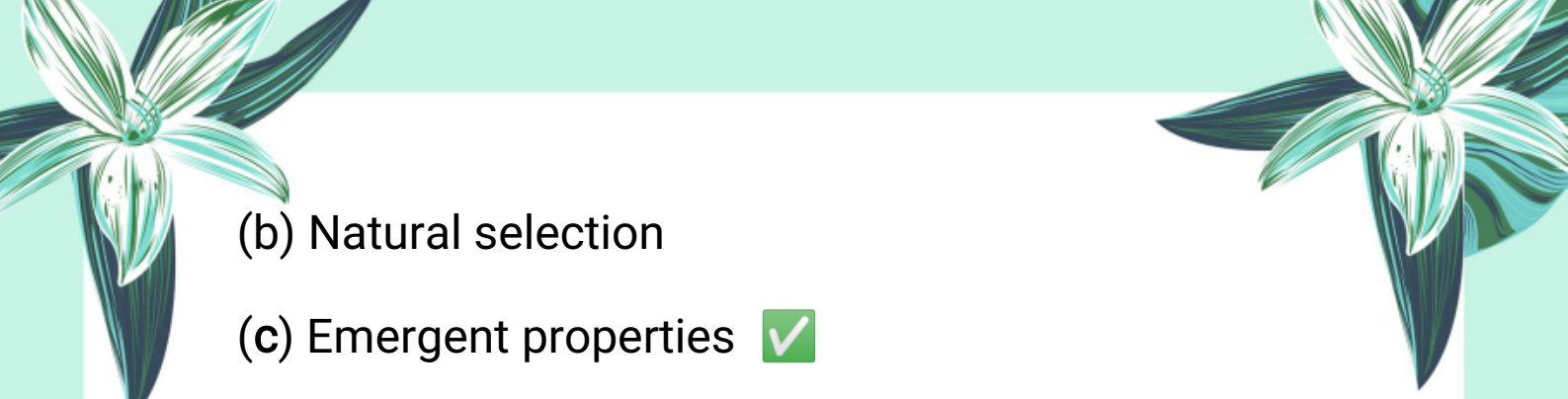
- (a) Respiratory system
- (b) Circulatory system
- (c) Digestive system
- (d) Nervous system

**12. What is the highest level of organization in living things?**


- (a) Organ
- (b) Organ system
- (c) Organism
- (d) Tissue

**13. The phrase "The whole is greater than the sum of its parts" refers to:**


- (a) Genetic coding
- 
- 

- 
- (b) Natural selection
  - (c) Emergent properties
  - (d) Energy flow

**14. Which of the following is an emergent property at the tissue level?**

- 
- (a) Breathing
  - (b) Protein synthesis
  - (c) Contraction and force generation
  - (d) Circulation of blood

**15. Which combination results in the emergence of consciousness and adaptability in humans?**

- 
- (a) Molecules and cells
  - (b) Cells and tissues
  - (c) Organs and organ systems
  - (d) Coordinated organ systems

**16. Which part of the plant anchors it in the soil and absorbs water and minerals?**

- 
- (a) Stem



(b) Leaf

(c) Root

(d) Flower

**17. What is the main function of xylem tissue in leaves?**



(a) Transport of sugars

(b) Gas exchange

(c) Conducting water and minerals

(d) Photosynthesis

**18. Which part of the leaf contains guard cells and stomata?**

(a) Palisade mesophyll

(b) Lower epidermis

(c) Upper cuticle

(d) Spongy mesophyll

**19. Which tissue in the leaf performs photosynthesis?**

(a) Epidermis





(b) Mesophyll

(c) Xylem

(d) Phloem

20. Which of these is a reproductive organ of a plant?



(a) Leaf

(b) Flower

(c) Stem

(d) Root

21. What is the function of the liver in the human body?

(a) Pump blood

(b) Breathe

(c) Produce bile and store glucose

(d) Produce insulin

22. Which organ system includes the stomach and intestines?

(a) Respiratory system





(b) Skeletal system

(c) Digestive system

(d) Muscular system

**23. Which organ is responsible for exchanging oxygen and carbon dioxide?**



(a) Brain

(b) Heart

(c) Liver

(d) Lungs

**24. The muscular organ that breaks down food with digestive enzymes is the:**

(a) Kidney

(b) Pancreas

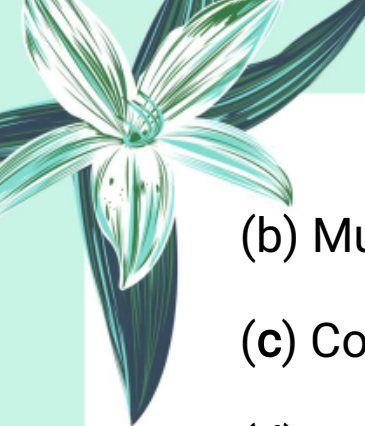

(c) Stomach


(d) Intestine

**25. Which layer of stomach contains blood vessels and provides structural support?**

(a) Epithelial tissue



- 
- 
- (b) Muscle tissue
  - (c) Connective tissue
  - (d) Outer connective tissue



**26. Which organ system controls and coordinates body functions through nerve impulses?**

- (a) Circulatory system
- (b) Endocrine system
- (c) Respiratory system
- (d) Nervous system

**27. Which of the following is a function of the blood circulatory system?**

- (a) Producing hormones
- (b) Coordinating muscles
- (c) Transporting oxygen and nutrients
- (d) Breaking down food

**28. The ability of an organism to maintain a stable internal environment is called:**

- (a) Circulation
- 
- 




(b) Metabolism

(c) Homeostasis

(d) Respiration

**29. Which organ system regulates temperature and helps in sweating?**



(a) Muscular system

(b) Integumentary system

(c) Nervous system

(d) Digestive system

**30. What happens when we do hard exercise?**

(a) Body temperature decreases

(b) Muscles need less oxygen

(c) Breathing and heartbeat increase

(d) Sweat glands stop working

**31. When we drink juice and blood glucose level rises, which hormone is released?**

(a) Glucagon

(b) Adrenaline





(c) Pepsin

(d) Insulin

**32. Which system eliminates waste and regulates salt and water balance?**



(a) Respiratory system

(b) Nervous system

(c) Urinary system

(d) Digestive system

**33. Which systems help maintain posture and support movement?**

(a) Nervous and endocrine

(b) Digestive and respiratory

(c) Muscular and skeletal

(d) Integumentary and urinary

**34. The respiratory system helps maintain homeostasis by:**

(a) Digesting food

(b) Producing blood cells



(c) Expelling carbon dioxide ✓

(d) Controlling urine

**35. Which two systems regulate heart rate, respiration, and metabolism?**

(a) Nervous and endocrine ✓

(b) Respiratory and circulatory

(c) Skeletal and muscular

(d) Digestive and integumentary

### Exercise Short Questions:

1. Enlist the levels of organization from cells to organ systems.

**Answer:**

The levels of organization in the body from simplest to most complex are:


Organelle ⇒ Cell ⇒ Tissue ⇒ Organ ⇒ Organ System ⇒ Organism

2. What are the major roles of the epithelial tissue





**present in the stomach?**

**Answer:**

- 
- Epithelial tissue in the stomach has several important roles:
  - It secretes mucus to protect the stomach lining.
  - It produces digestive enzymes and hydrochloric acid.
  - It absorbs some nutrients and water.
  - It provides a protective barrier against harmful substances.

**3. How do the smooth muscles contribute to the stomach's function?**


**Answer:**

- 
- Smooth muscles in the stomach wall help in:
  - Mixing food with digestive juices through muscular contractions.
  - Pushing the food forward into the small intestine (a process called peristalsis).
  - These actions help in the proper digestion of
- 



food.

#### **4. What is the function of the palisade mesophyll in the leaf?**



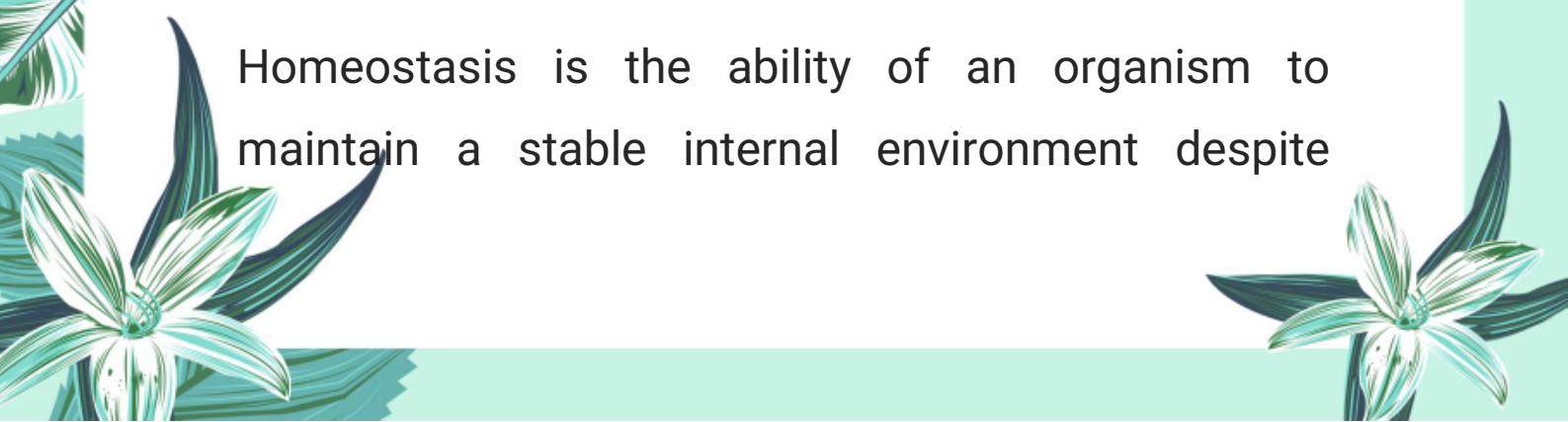
The palisade mesophyll is responsible for photosynthesis. It contains many chloroplasts, which capture sunlight and convert it into chemical energy (glucose).

#### **5. What is the role of the shoot system in plants?**

The shoot system includes stems, leaves, flowers, and fruits. Its roles are:

- Supporting the plant body.
- Carrying out photosynthesis (leaves).
- Transporting water and nutrients.
- Reproduction (flowers and fruits).
- Storing food in some cases.

#### **6. What is homeostasis, and why is it important for organisms?**



Homeostasis is the ability of an organism to maintain a stable internal environment despite



changes in the external environment.

**It is important because:**

- It ensures cells function properly.
- It maintains body temperature, pH, blood sugar, and water balance.
- It supports overall health and survival of the organism.



**7. How does the human body maintain a stable internal temperature?**

The body maintains internal temperature through the temperature-regulating center in the brain:

- When temperature rises, it sends signals to sweat glands to cool the body by sweating.
- When temperature drops, it signals muscles to produce heat by shivering.
- This regulation helps keep the body at a normal temperature.

**8. Differentiate between the following:**

**i. Tissue and Organ**

- 
- 
- **Tissue:** A group of similar cells performing a specific function (e.g., muscle tissue).
  - **Organ:** A structure made of different tissues working together (e.g., stomach).



## ii. Root system and Shoot system



**Root system:** Underground part of the plant that absorbs water and anchors the plant.

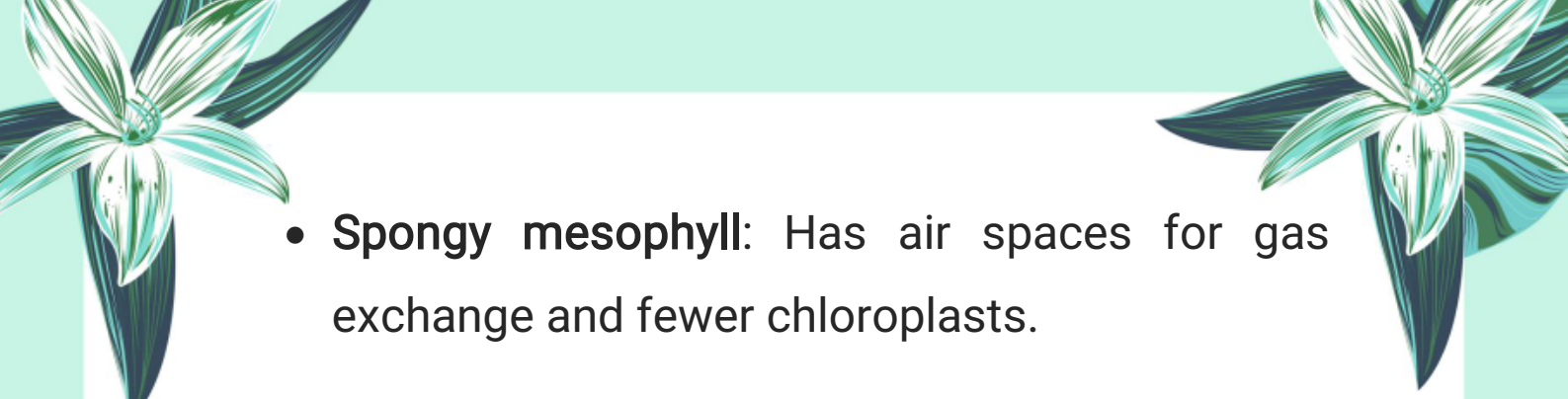
**Shoot system:** Above-ground part that includes stems, leaves, and flowers.

## iii. Epidermal and Mesophyll tissue

- **Epidermal tissue:** Outer protective layer of the leaf.
- **Mesophyll tissue:** Inner tissue where photosynthesis occurs, includes palisade and spongy cells.

## iv. Palisade and Spongy mesophyll

- **Palisade mesophyll:** Contains many chloroplasts and performs most photosynthesis.
- 
- 

- 
- **Spongy mesophyll:** Has air spaces for gas exchange and fewer chloroplasts.

### Important Short Questions:



1. What is the smallest unit of matter that maintains the properties of an element?

**Answer:** Atom.

2. Give two examples of molecules formed from atoms.

**Answer:** Water and protein.

3. What is the function of mitochondria in a cell?

**Answer:** Mitochondria perform cellular respiration to produce energy.

4. Define tissue with one example from animals.

**Answer:** A tissue is a group of similar cells that perform a specific function. Example: Cardiac muscle tissue.

5. Name two plant tissues and their functions.






**Answer:**

- Epidermal tissue: Protects the leaf.
- Vascular tissue: Transports water and nutrients.

**6. What is an organ? Give one example from plants.**



**Answer:** An organ is a structure made of different tissues performing specific functions. Example: Leaf (performs photosynthesis).

**7. Which organ system in animals is responsible for transporting nutrients and oxygen?**

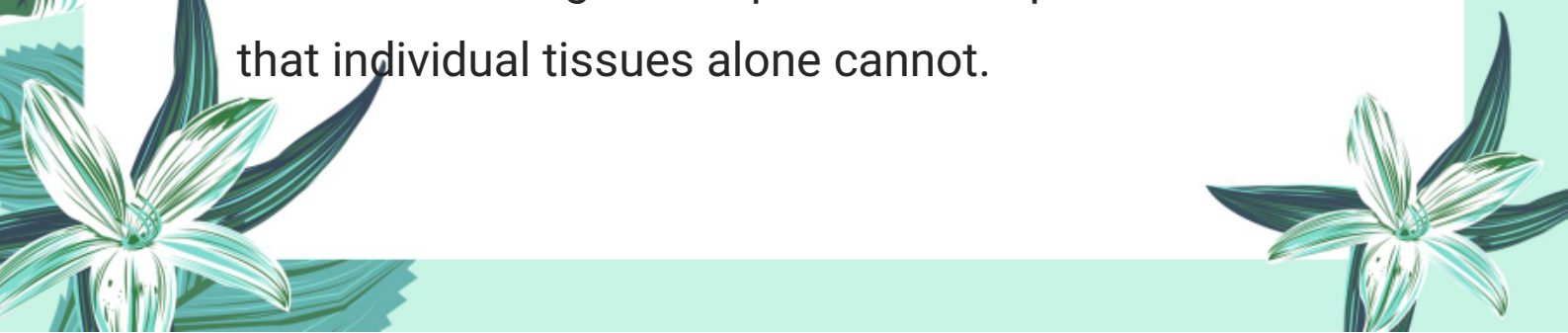
**Answer:** Circulatory system.

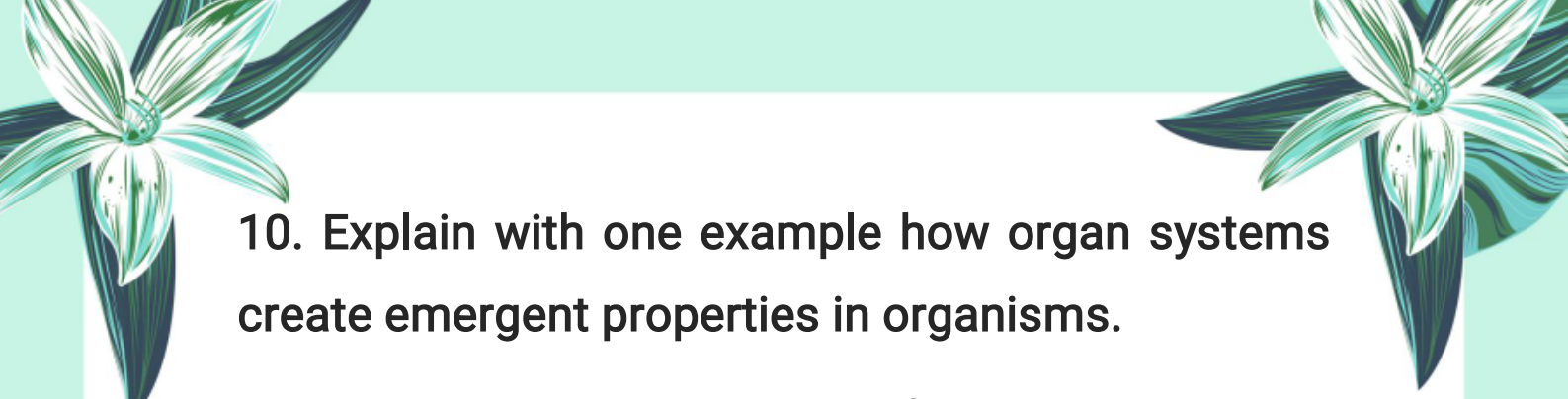
**8. What are emergent properties in biological organization?**

**Answer:** New functions that arise from interactions of components at higher levels of organization.

**9. How do tissues form emergent properties when they combine to make an organ?**

**Answer:** The organ can perform complex functions that individual tissues alone cannot.





**10. Explain with one example how organ systems create emergent properties in organisms.**

**Answer:** Coordinated action of organ systems in humans enables thinking and adaptation, which individual systems cannot do alone.



**11. What is the primary function of roots in plants?**

**Answer:** Roots anchor the plant in the soil and absorb water and essential minerals from the soil.

**12. How do stems contribute to a plant's growth?**

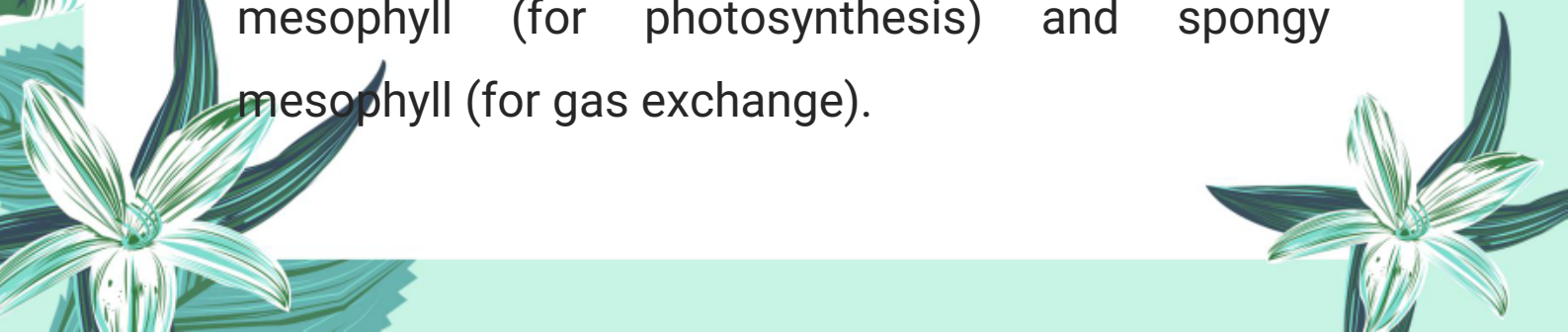
**Answer:** Stems support leaves, flowers, and fruits, and facilitate the movement of water, minerals, and nutrients between roots and leaves.

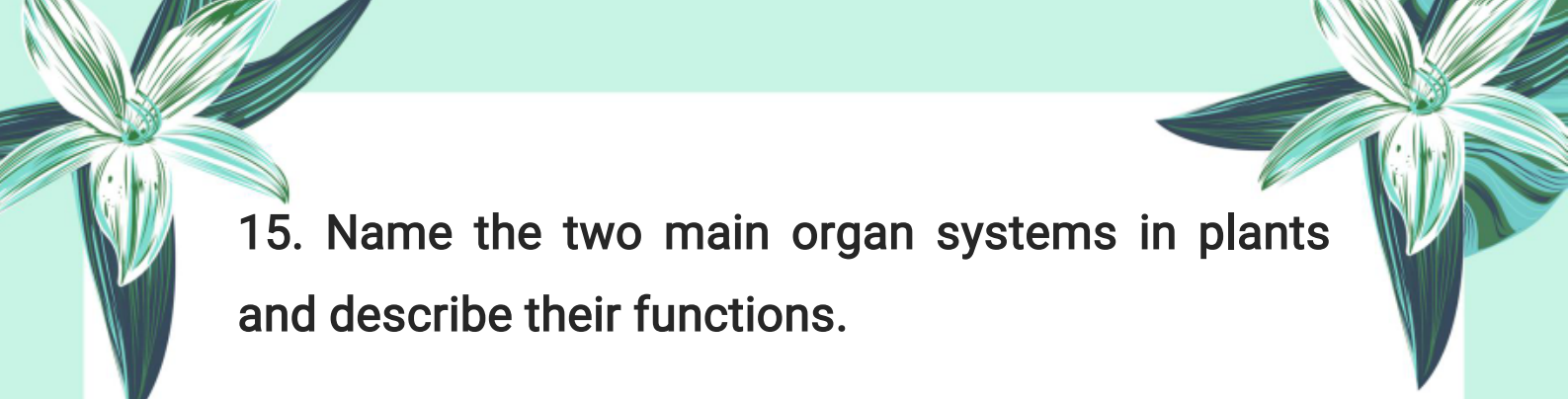
**13. What is the role of stomata in leaves?**

**Answer:** Stomata control gas exchange and the loss of water vapor in leaves.

**14. What tissues make up the mesophyll in leaves, and what are their functions?**

**Answer:** The mesophyll consists of palisade mesophyll (for photosynthesis) and spongy mesophyll (for gas exchange).






**15. Name the two main organ systems in plants and describe their functions.**

**Answer:**

**Root system:** Anchors the plant and absorbs water and nutrients.



**Shoot system:** Supports the plant and conducts photosynthesis.

**16. What is the function of the heart in humans?**

**Answer:** The heart pumps blood throughout the body, delivering oxygen and nutrients to cells and removing waste products.

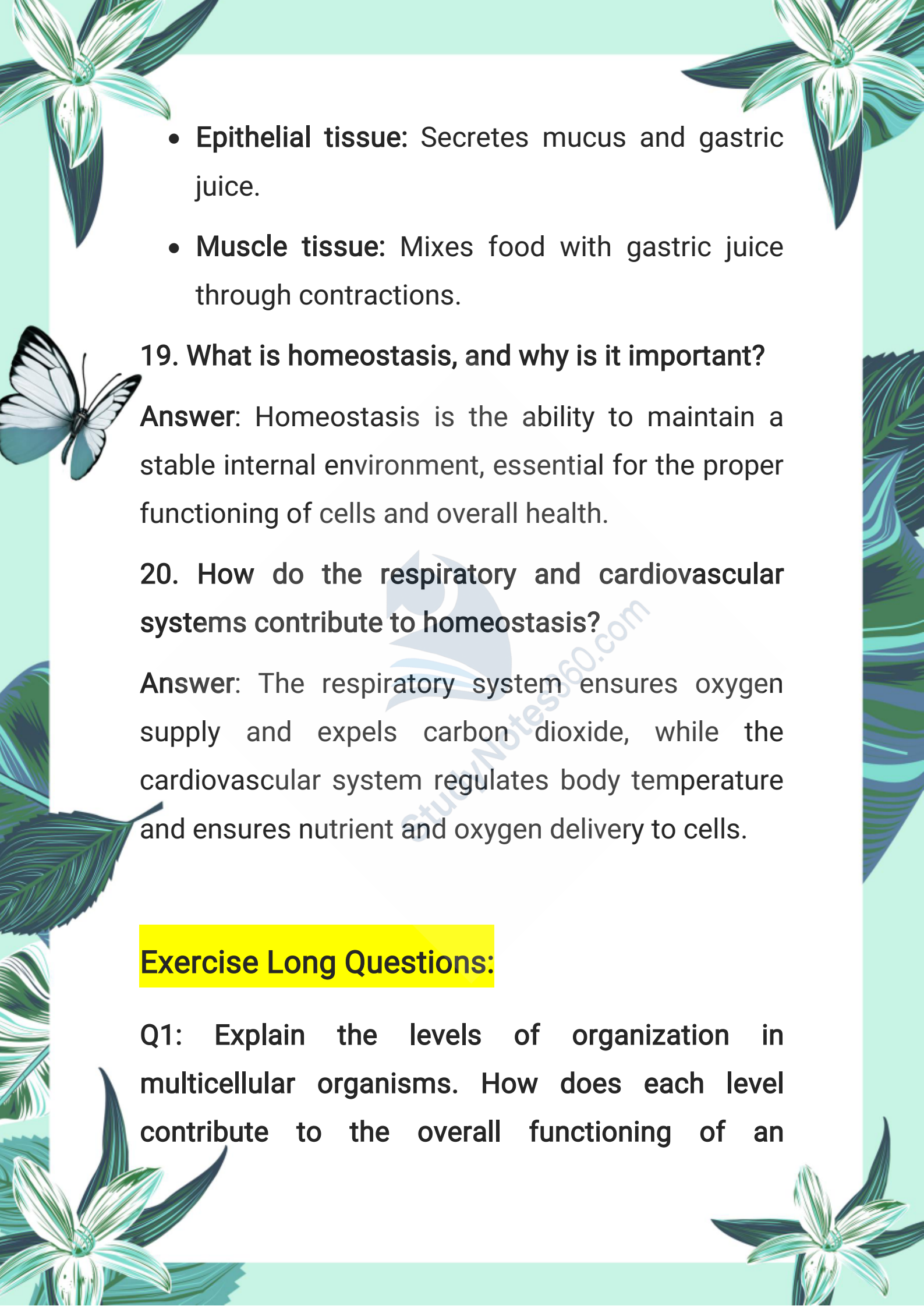
**17. How does the digestive system function in humans?**

**Answer:** The digestive system breaks down food and absorbs nutrients through organs like the mouth, stomach, and intestines.

**18. What tissues are involved in the stomach's function and what do they do?**

**Answer:**



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- The page is decorated with various illustrations: a large white flower with green leaves in the top left and bottom left corners; a white butterfly with black markings on its wings on the left side; and a large green leaf on the right side. The background is a light green color.
- **Epithelial tissue:** Secretes mucus and gastric juice.
  - **Muscle tissue:** Mixes food with gastric juice through contractions.

**19. What is homeostasis, and why is it important?**

**Answer:** Homeostasis is the ability to maintain a stable internal environment, essential for the proper functioning of cells and overall health.

**20. How do the respiratory and cardiovascular systems contribute to homeostasis?**

**Answer:** The respiratory system ensures oxygen supply and expels carbon dioxide, while the cardiovascular system regulates body temperature and ensures nutrient and oxygen delivery to cells.

### **Exercise Long Questions:**

**Q1:** Explain the levels of organization in multicellular organisms. How does each level contribute to the overall functioning of an

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organism?

**Answer:**

In a multicellular organism, the levels of organization start from the simplest unit, the atom, and progress to the most complex level, the organism. Each level contributes to the overall functioning of the organism through specialized roles and interactions. These levels are:

**1. Cell:** The smallest unit of life. Each cell performs specific tasks (e.g., muscle cell contracts, nerve cell transmits messages).

**2. Tissue:** Group of similar cells working together (e.g., muscle tissue helps in movement).

**3. Organ:** Formed by different tissues. Each organ performs a specific function (e.g., stomach digests food).


**4. Organ System:** A group of organs working together (e.g., digestive system includes stomach, intestine, liver, etc.).

**5. Organism:** All systems work together to form the



whole living body, performing all life activities.

Each level supports the next, helping the organism survive and function properly.



**Q2: What is a tissue level? Explain plant and animal tissues.**

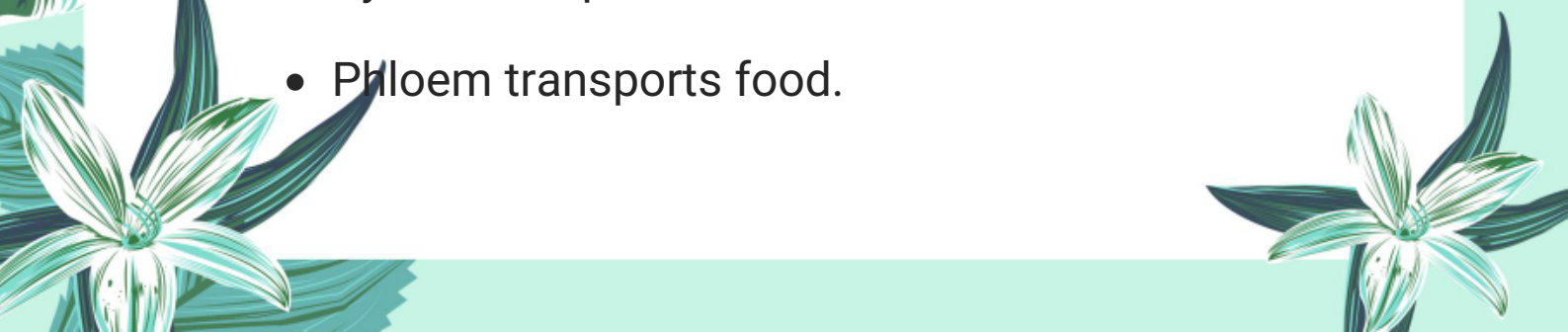
**Answer:**

The tissue level refers to a group of similar cells that perform a common function. It is one of the levels of organization in multicellular organisms, where cells come together to form tissues with specific tasks.

### **Plant tissues:**

- **Epidermal tissue:** Outer protective layer that prevents water loss.
- **Mesophyll tissue:** Middle layer in leaves where photosynthesis occurs.

### **Vascular tissue:**

- Xylem transports water.
  - Phloem transports food.
- 

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## Animal tissues:

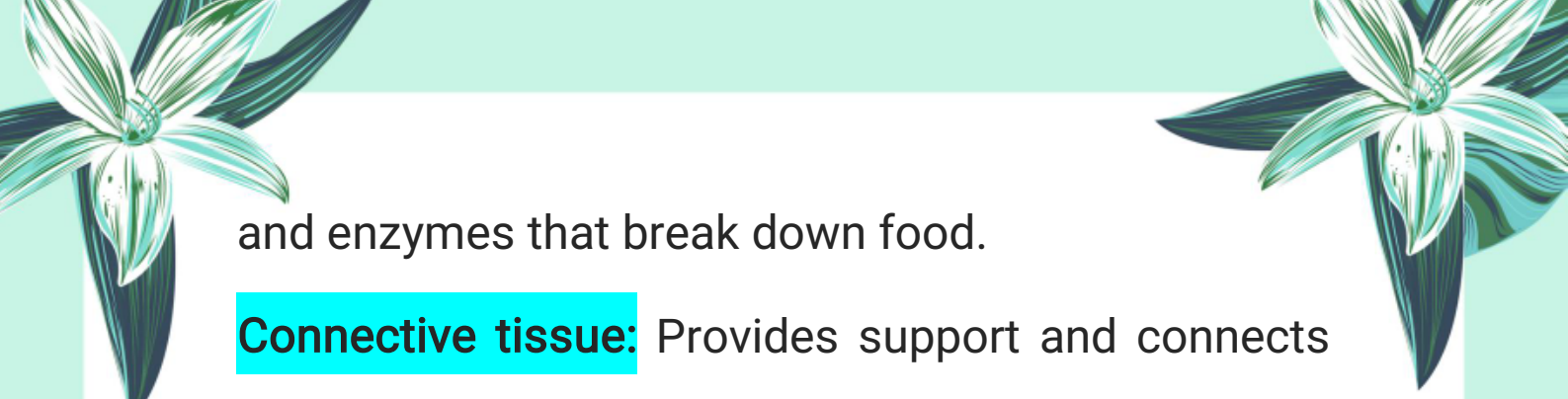
- **Epithelial tissue:** Covers body surfaces and organs.
- **Connective tissue:** Supports and connects body parts (e.g., bones, blood).
- **Muscle tissue:** Enables body movement.
- **Nervous tissue:** Sends and receives electrical messages.

**Q3:** Describe the tissue composition of the stomach. How does each tissue contribute to the digestive function of the stomach?

**Answer:**


The stomach is a key organ in the digestive system, responsible for breaking down food using mechanical and chemical processes. The stomach's tissue composition includes several types of tissues, each contributing to its function:

**Epithelial tissue:** Forms the inner lining. It secretes mucus and digestive juices like hydrochloric acid



and enzymes that break down food.

**Connective tissue:** Provides support and connects tissues. It contains blood vessels that carry nutrients and oxygen.



**Muscle tissue:** Smooth muscles contract to churn and mix the food with digestive juices, turning it into chyme.

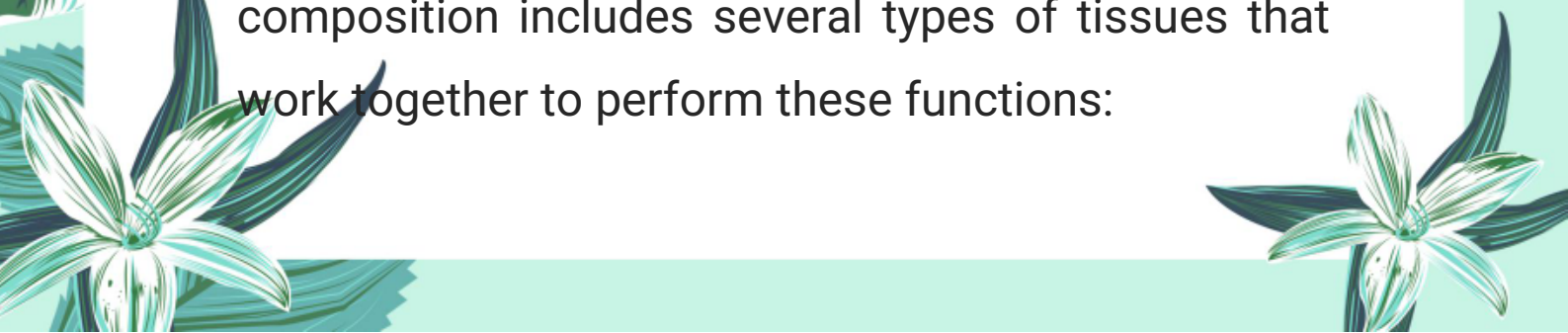
**Outer connective tissue:** Forms the outer layer that protects the stomach and connects it to surrounding organs.

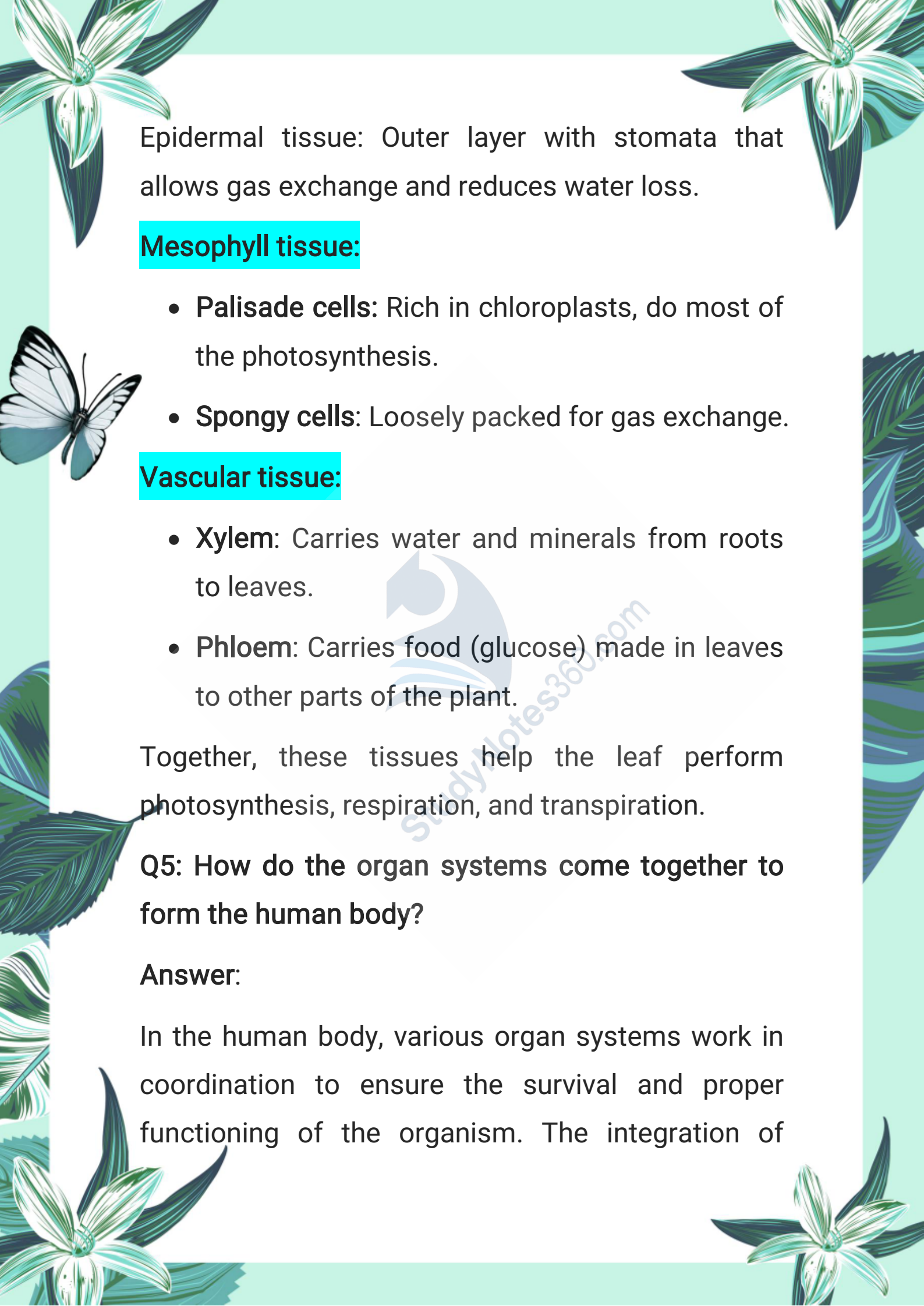
Each tissue works together to digest food efficiently.

**Q4:** Describe the tissue composition of the leaf.  
How does each tissue contribute to the functions of the leaf?

**Answer:**

The leaf is a crucial organ in plants, mainly involved in photosynthesis and gas exchange. Its tissue composition includes several types of tissues that work together to perform these functions:



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Epidermal tissue: Outer layer with stomata that allows gas exchange and reduces water loss.

### **Mesophyll tissue:**

- **Palisade cells:** Rich in chloroplasts, do most of the photosynthesis.
- **Spongy cells:** Loosely packed for gas exchange.

### **Vascular tissue:**

- **Xylem:** Carries water and minerals from roots to leaves.
- **Phloem:** Carries food (glucose) made in leaves to other parts of the plant.

Together, these tissues help the leaf perform photosynthesis, respiration, and transpiration.

**Q5: How do the organ systems come together to form the human body?**

**Answer:**

In the human body, various organ systems work in coordination to ensure the survival and proper functioning of the organism. The integration of





these systems creates a complex, functional whole.

**The major organ systems are:**

- 
- Digestive system digests food and absorbs nutrients.
  - Respiratory system supplies oxygen and removes carbon dioxide.
  - Circulatory system transports nutrients, gases, and wastes.
  - Nervous system controls and coordinates body activities.
  - Muscular and skeletal systems help in body movement and provide support.
  - Excretory system removes wastes from the body.

All these systems are interdependent and together form a complete human body that functions smoothly.

**Q6: Describe the roles of the digestive system and the excretory system in homeostasis.**





**Answer:**

Homeostasis is the maintenance of a stable internal environment in the body. Both the digestive and excretory systems play vital roles in this process:



### **Digestive System:**

It breaks down food into nutrients like glucose, amino acids, vitamins, and minerals. These nutrients are absorbed into the blood and transported to cells for energy, growth, and repair. This maintains proper energy levels and supports cell functions.

### **Excretory System:**

This system removes waste products like urea, extra water, and salts through urine. It maintains the balance of water, salts, and pH in the body. By removing toxic substances, it prevents damage to the body and helps in keeping internal conditions stable.


**Q7: Explain the functions of various plant organs.**





**Answer:**


Plants have different organs, each performing a specific function:

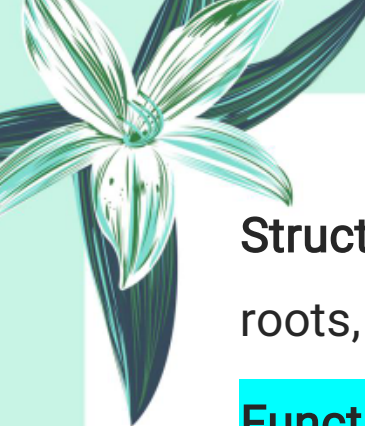
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- **Roots:** Anchor the plant in soil, absorb water and minerals, and store nutrients.
  - **Stems:** Support leaves, flowers, and fruits. They also transport water, minerals, and food through vascular tissues (xylem and phloem).
  - **Leaves:** Main site of photosynthesis. They also help in gas exchange and transpiration through stomata.
  - **Flowers:** Responsible for reproduction. They produce seeds through sexual reproduction.
  - **Fruits:** Protect and help in the dispersal of seeds.

**Q8: Describe the structure and function of the plant root system.**

**Answer:**


The root system is mainly underground and is essential for the plant's survival.





**Structure:** It includes the primary root, secondary roots, and root hairs.

**Functions:**

- 
- **Anchorage:** Roots hold the plant firmly in the soil.
  - **Absorption:** Root hairs absorb water and essential minerals from the soil.
  - **Storage:** In some plants, roots store food and nutrients (e.g., carrot, radish).
  - **Transport:** Water and minerals are transported to the stem via xylem vessels.

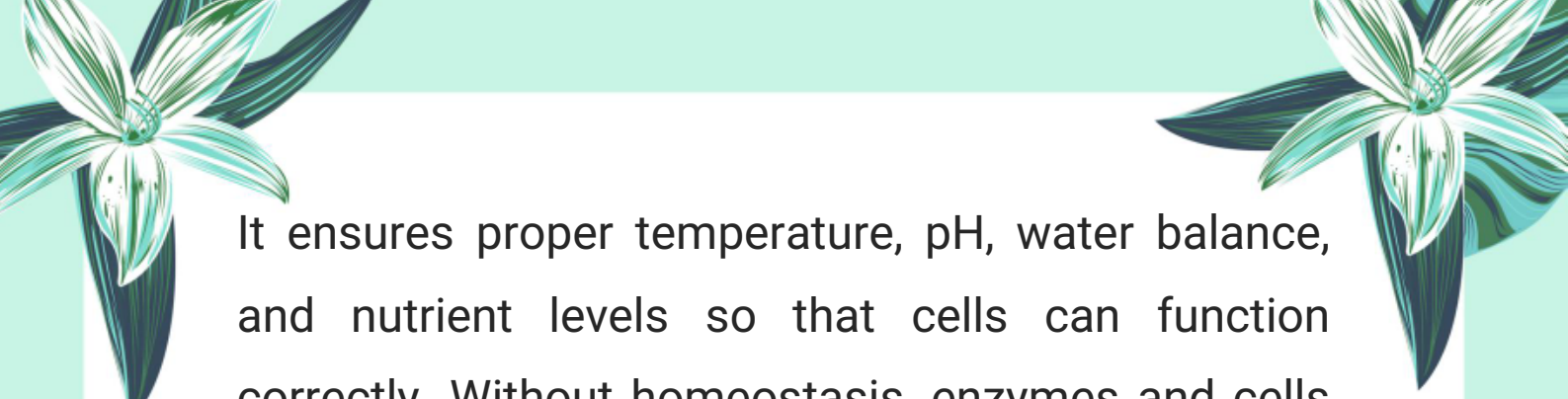
**Q9:** Define homeostasis and explain its importance. Discuss how different organ systems work together to maintain homeostasis.

**Answer:**

Homeostasis is the ability of an organism to maintain a stable internal environment despite external changes.

**Importance:**





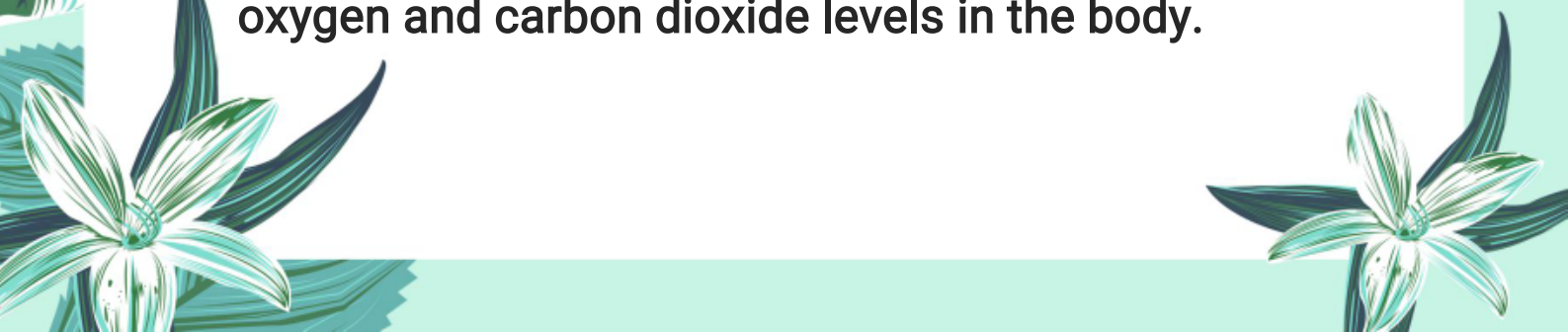
It ensures proper temperature, pH, water balance, and nutrient levels so that cells can function correctly. Without homeostasis, enzymes and cells may not work, leading to health problems.



### Organ Systems Working Together:

- **Nervous and Endocrine Systems:** Control and coordinate responses to changes (e.g., temperature or glucose level).
- **Respiratory System:** Maintains oxygen and carbon dioxide balance.
- **Circulatory System:** Transports gases, nutrients, hormones, and waste.
- **Urinary System:** Maintains water, salt, and pH balance by excreting waste.
- **Integumentary System (skin):** Regulates body temperature through sweating.


**Q10:** Describe how the respiratory and circulatory systems work together to maintain homeostasis of oxygen and carbon dioxide levels in the body.





**Answer:**

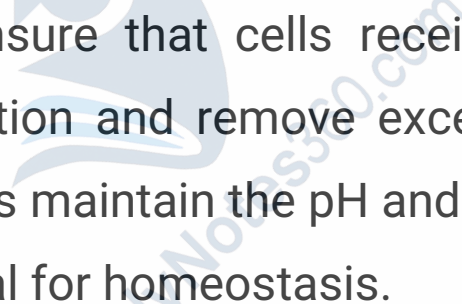
**Respiratory System:** Brings oxygen into the lungs and removes carbon dioxide from the blood through breathing.



**Circulatory System:** The heart pumps blood carrying oxygen from the lungs to body cells and transports carbon dioxide from the cells back to the lungs.

**Together:**

These systems ensure that cells receive enough oxygen for respiration and remove excess carbon dioxide, which helps maintain the pH and balance of the blood—essential for homeostasis.





## Note:

This chapter is designed to provide a solid foundation of knowledge, with the goal of deepening understanding and encouraging further exploration of the subject. The content has been carefully selected to support effective learning and inspire students to engage with the topic more deeply.

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**Purpose:** To contribute to education by offering insightful, valuable content that enhances learning and understanding.

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