

**Introduction**

What are the two biggest challenges for land plants?

---

**38.1 Transport Mechanisms**

1. Explain the forces that drive transpiration in the xylem.

---

2. How can water potential be calculated?

---

3. How do aquaporins enhance rapid water exchange in plant cells?

---

4. What is the adaptive value of root hairs?

---

**38.2 Water and Mineral Absorption**

5. Three transport routes in plants

a) \_\_\_\_\_

b) \_\_\_\_\_

c) \_\_\_\_\_

6. Why is ATP needed to transport mineral ions into the roots of plants?

---

**38.3 Xylem Transport**

7. Root pressure -

8. Guttation-

9. What is the driving force of transpiration?

---

11. What properties of water allow it to move up through the xylem?

**38.4 The Rate of Transpiration**

12. Explain how the need to regulate water loss and the need for a constant supply of CO<sub>2</sub> can be conflicting requirements.

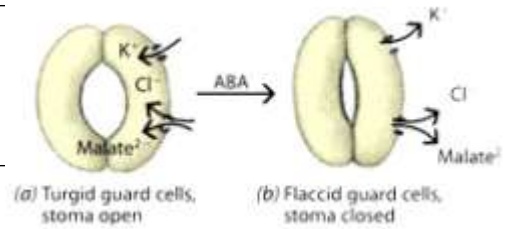
---

---

13. Describe the structural adaptations of guard cells.

---

---



14. Describe the cellular mechanism that enables guard cells to open and close stomates.

---

15. How do these mechanisms help a plant maintain turgor pressure?

---

### 38.5 Water-Stress Response

What structural adaptations help plants limit water loss?

---

### 38.6 Phloem Transport

16. Movement of sugars through the phloem is called \_\_\_\_\_?

17. In what direction do sugars move in the phloem? \_\_\_\_\_

18. Describe the bulk flow mechanism of sugar transport in the phloem.

---

---

---

19. Summarize transport in plants by explaining this diagram.

