AP Biology **Name** _____

Resource Acquisition and Transport in Vascular Plants

Guided Reading Chapter 36

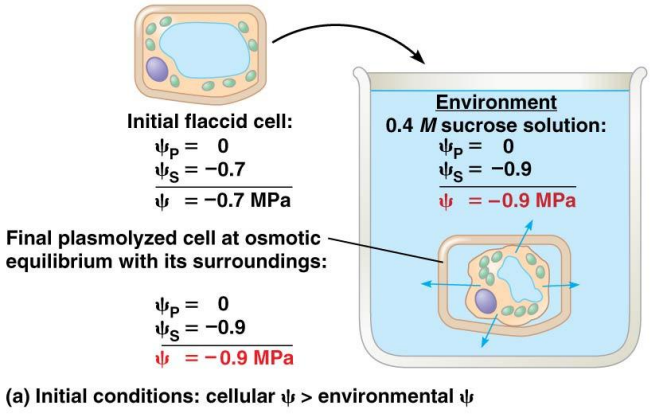
1. Competition for light, water and nutrients is intense among land plants. **How** do plants reduce *self-shading*?

2. **What** triggers *self-pruning*?

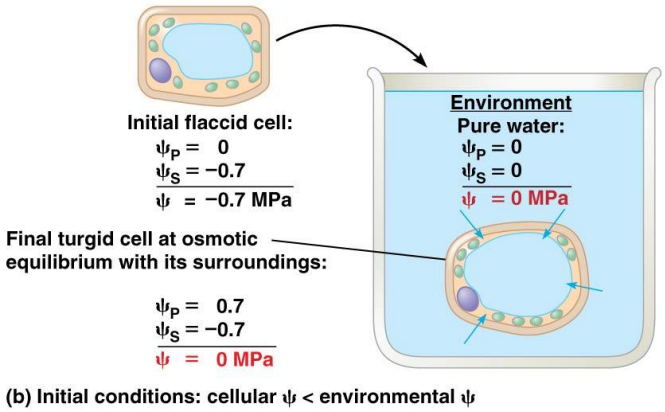
3. The evolution of *mycorrhizae* was a critical step in the successful colonization of land by plants. **What** are they and what is their role in resource acquisition?

4. *Refer back to your Chapter 7 GR for the discussion of osmosis and water potential.*
   Use the concept of water potential to **describe what** occurs in *plasmolysis.*

5. In the following figure, a plant cell that has an initial water potential of -0.7M Pa is placed into two different conditions. Explain, in terms of water potential, what happens in each case.



(a) Initial conditions: cellular ψ > environmental ψ



(b) Initial conditions: cellular ψ < environmental ψ

6. **What** are *aquaporins*?

7. **What** is bulk flow? **Does** it depend on solute concentrations?

8. **Summarize** the **three** processes that act together to transport resources through the whole plant.

9. Using Fig 36.8 answer the following questions:
    a. **Which** structure controls the movement of water and minerals into the xylem? **How** are its cells modified to achieve this function?

    b. **How** is the surface area for absorption greatly increased?

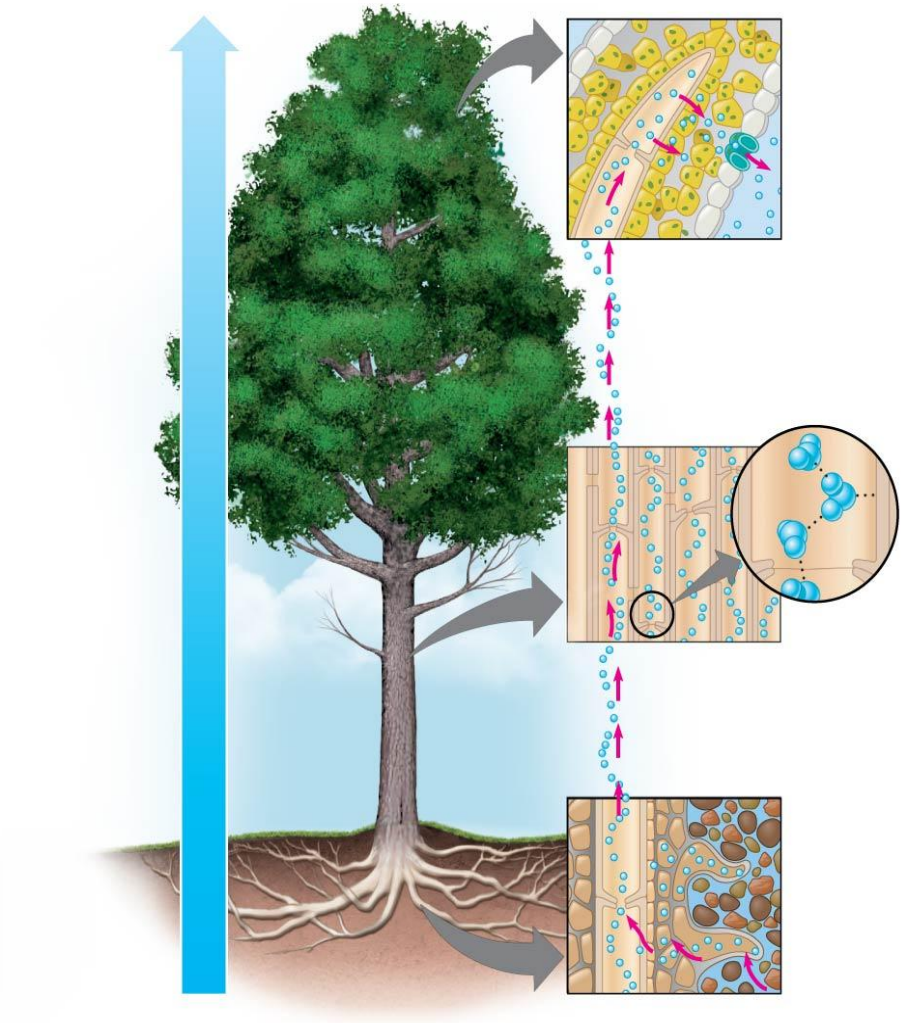
    c. **How** is it possible for water to pass from one root cell to another?

10. **What** is *transpiration*?

11. There are two mechanisms that pull water up through the plant, from roots to leaves. **Explain** root pressure.

12. **What** is the *cohesion-tension hypothesis*?

13. **Label** the following diagram and **thoroughly describe** the movement of water from the roots to the leaves.

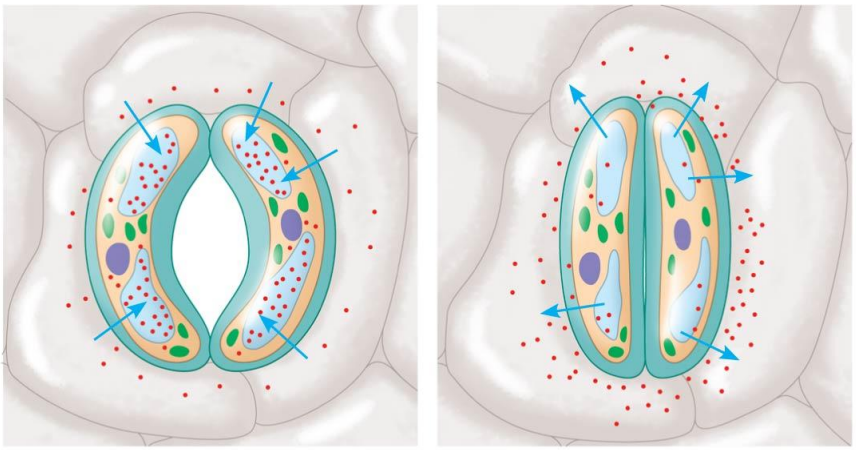


14. Leaves generally have large surface areas and high surface-to-volume ratios. **Give** an advantage and disadvantage of these traits.
    a. **Advantage**

    b. **Disadvantage**

15. Plants lose 95% of their water through stomata. **What** controls the amount of water loss?

16. On the following sketches, **label** the *guard cell, stomata, K^+ and H_2O*. **Explain** why the stoma opens when K+ accumulates in the guard cells.



17. Three types of environmental stimuli can cause guard cells to open and close stomata.

Stimulus for Stomatal Opening and Closing	**Explanation**

18. **What** plant hormone is produced in response to water deficiency?

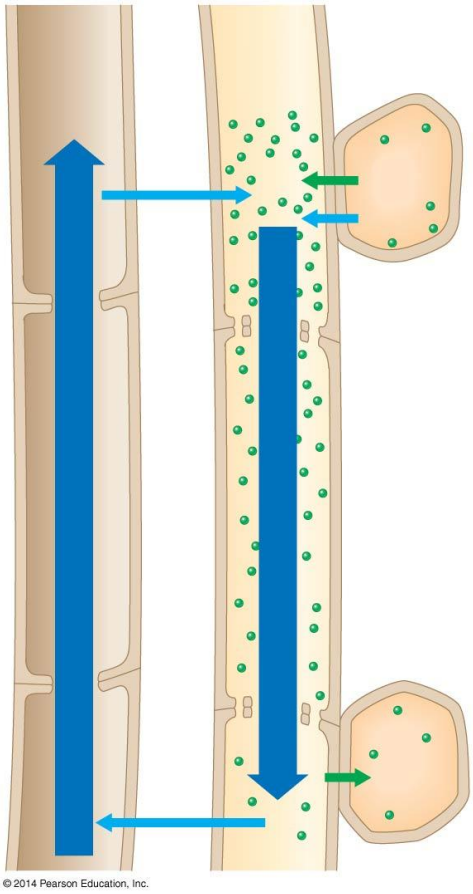
19. Reducing water loss is important for terrestrial plants and drives many evolutionary adaptations. **List four** different physiological adaptations of xerophytes and explain how each of them reduces water loss.

20. **What** is translocation?

21. **What** is sugar source, and **what** is a sugar sink? **Give** an example of each.

22. **What** types of cell types transport the sugars?

23. **Explain** the process of pressure flow by annotating the figure. Divide the process into four steps.



24. An important concept is how cells communicate with other cells in an organism. Read how phloem serves as an information super-highway. **Give two** specific signals that move through the symplast and **describe** the function of each signal