**Transpiration Questions**

**Roots**

* Outline the important roles of roots in plants.

The roots of plants serve numerous crucial functions, by providing a large surface area for the absorption and transportation of water and nutrients, anchoring the plant to the ground, holding the surrounding soil in place (preventing erosion), and storing the sugars made in photosynthesis.

**Root Hairs**

* Compare root hairs to structures with a similar function in the human body.

(Hint: what other structures increase area for absorption?)

Root hairs in plants share a similar function to the villi and microvilli that line the inner surface of some human organs, as both allow faster absorption by dramatically increasing the surface area.

**Xylem and Phloem**

* Outline the role of the xylem.

Xylem tissue is used mostly for transporting water from roots to stems and leaves but also transports other dissolved compounds.

* Outline the role of the phloem.

Phloem is responsible for transporting glucose produced from photosynthesis from leaves to non-photosynthesizing parts of a plant such as roots and stems.

**Root Pressure**

* Explain why water moves out of the soil and in to the root of a plant.

Water moves into the roots from the soil by osmosis, due to the low solute potential in the roots (lower water pressure in roots than in soil). The intake of water in the roots increases water pressure in the root xylem, driving water up.

**Transpiration**

* Define the term transpiration.

Transpiration is one of the mechanisms in a plant that allows the movement of water against gravity. It is a passive process, meaning that ATP is not required for water movement. The energy driving transpiration is the water potential difference between the water in the soil and the water in the atmosphere. Regulation of transpiration is achieved primarily through the opening and closing of specialized structures called stomata on the leaf surface.

**Cohesion – Tension**

* Why do water molecules in plants ‘stick together’

Cohesion (water molecules sticking together) occurs due to hydrogen bonding between water molecules.

**Factors that Affect Transpiration**

* List factors that affect transpiration

Temperature increases the rate of transpiration because evaporation is faster at higher temperatures. Humidity decreases the rate of transpiration because diffusion of water vapor out of the leaf slows down if the leaf is already surrounded by moist air. Wind speed increases the rate of transpiration because moving air removes water vapor, increasing the rate of diffusion of water vapor from the leaf. Light intensity increases the rate of transpiration because the stomata open wider to allow more carbon dioxide into the leaf for photosynthesis.