1. What is kinetic energy and how does it differ from potential energy?

Kinetic energy is the "energy of motion". $KE = 1/2mv^2$

Potential energy is "stored" energy. PE = mgh (mass, gravitational constant [9.8m/s²], height)

TE = KE + PE (Total energy = kinetic energy + potential energy) *Sum of kinetic and potential will be the same, to follow the Law of Conservation of Energy*

2. What environmental factors affect kinetic energy and diffusion? &

3. Why do these factors alter diffusion rates? How do they affect rates?

Temperature: lower temperatures will slow molecular movement; higher temperatures will increase movement

Solute concentration: the more solute there is, the faster diffusion will happen (higher concentration); also true in regards to osmosis... higher solute concentration translates to more water movement into/towards the solute to reach equilibrium

Diffusion is inversely proportional to **distance** traveled. If distance is increased, diffusion rate is decreased.

An increase in **pressure** will cause molecules to move more quickly, increasing molecular collisions.

Molecular size and mass affect diffusion rates. The larger a molecule, the slower it will diffuse through a medium.

Resistance can affect diffusion rates. If the molecule has to travel through a medium with a lot of resistance, the molecule will diffuse more slowly.

4. How are gradients important in diffusion and osmosis?

Gradients allow materials to move across membranes, from an area of high concentration to an area of low concentration. Particles and water can diffuse across these selectively permeable membranes to allow for nutrients to come into a cell or to move wastes out of a cell.

5. What is the explanation for the fact that most cells are small and have cell membranes with many convolutions?

Small cells are better able to transport materials in and out of a cell more efficiently. Many convolutions increase the surface area of the cell, thus allowing for more interactions between the cell and its environment.

6. Will water move into or out of a plant cell if the cell has a higher water potential than the surrounding environment?

Water will move out of a plant cell if it has a higher water potential (concentration) than the surrounding environment. Water will leave the cell, leading to equilibrium -- at which time, water movement into and out of the cell is happening at the same rate.

7. What would happen if you applied saltwater to a plant?

Saltwater will draw water out of a plant cell's vacuole. Water will leave the vacuole to try and bring the concentration of the extracellular environment to equilibrium with the cell's interior environment.

8. How does a plant cell control its internal (turgor) pressure?

Plant cells control their turgor pressure by water moving into or out of the cells' vacuoles.