How Trees Survive Winter

Name: ANSWER KEY Date: _____

Vocabulary Words: Match the definition to each word.

1. When water freezes, it **Expands** and can cause sealed containers or pipes to burst open.
2. Trees use two primary **Mechanisms** that allow them to endure harsh, freezing conditions.
3. As winter approaches, sugar is **Concentrated** inside the tree's cells to form a syrup-like substance.
4. This thick sugar solution prevents the inside of the cell from freezing even at **Subfreezing** temps.
5. Water remaining outside the cells can freeze without causing the cells to **Rupture** and break.

Word bank: Expands, Concentrated, Rupture, Subfreezing, Mechanisms

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Multiple Choice: Choose the correct answer from the choices for each question.

1. What comparison is used to explain what happens when water freezes in a closed space?
   a) A frozen river
   b) A water pipe
   c) A glass jar
   d) A wooden bucket

2. What happens to the water in tree trunks as the weather gets colder in the fall?
   a) It gets stored in the leaves.
   b) It drains out of the cells and into the ground.
   c) It turns immediately into ice inside the cells.
   d) It evaporates completely into the air.

3. What substance inside the tree cells acts like thick molasses to prevent freezing?
   a) Concentrated sugar
   b) Tree sap resin
   c) Pure water
   d) Dissolved minerals

4. Where does ice expand when the remaining water in the tree freezes?
   a) Deep inside the center of the cell nucleus
   b) Outside of the cells
   c) Inside the leaves
   d) Within the roots only

Discussion & Reflection: Answer the following questions in complete sentences

1. Describe the two main mechanisms that prevent trees from bursting during freezing winter temperatures. **First, water drains out of the cells and sugar becomes concentrated inside, creating a thick molasses-like substance that resists freezing at extreme subfreezing temperatures. Second, water drains out of the tree trunks into the ground, ensuring that any remaining water freezes outside the cells where expansion won't rupture the cell walls**

2. How does a trees survival in winter argue the existence of a designer?

Wherever complex design exists, a designer must be responsible. By showing how trees have specialized, built-in systems to survive subfreezing temperatures without bursting like man-made water pipes, God designed every cell and system for the tree to thrive

3. This shows me that God is (Circle the word):

Wise Powerful Caring Creative All of the above

Explain your choice: