Fluid Mosaic Model

Name: _____ **Period:** _____ **Date:** _____

> Open **peebedu.com** and navigate to **Fluid Mosaic Model**. Read the introduction popup, which describes the fluid mosaic model and shows a visual legend identifying six membrane components: Phospholipids, Cholesterol, Integral Proteins, Surface Proteins, Peripheral Proteins, and Glycolipids. Click **Start Visualization** to begin.

Free Response Questions

Question 1 — Conceptual Analysis

> **Simulation Task:** *Click Start Visualization and use the mouse to rotate the 3D membrane so you are viewing it from a side angle. Observe the two layers of phospholipids. Note the orientation of the purple heads and yellow tails in each layer. Then zoom in using the scroll wheel to examine the interior of the bilayer.*

(A) (1 pt) **Describe** the orientation of phospholipids in the plasma membrane relative to the aqueous environments on either side.

(B) (1 pt) **Explain** why phospholipids placed in water spontaneously arrange into a bilayer rather than remaining as individual molecules dispersed throughout the solution.

(C) (1 pt) **Predict** what would happen to a cell's ability to maintain the ion gradients necessary for nerve impulse transmission if a mutation altered the fatty acid tails of its membrane phospholipids from nonpolar to polar.

(D) (1 pt) **Justify** your prediction.

Question 2 — Analyze Model / Visual Representation

Simulation Task: *Set the cholesterol slider to 0% and observe the movement of all membrane components for 15 seconds. Then increase the cholesterol slider to 75% and observe how the movement of the phospholipids, proteins, and other components changes. Note the difference in the speed and range of lateral movement at each setting.*

(A) (1 pt) **Describe** the types of molecules embedded in or associated with the phospholipid bilayer that account for the mosaic-like composition of the plasma membrane.

(B) (1 pt) **Explain** why the lateral movement of phospholipids and proteins within the membrane decreases as cholesterol concentration increases.

(C) (1 pt) **Represent** the structural difference between a membrane with low cholesterol and a membrane with high cholesterol by drawing two side-by-side cross-section diagrams of the phospholipid bilayer, labeling the phospholipid heads, tails, and cholesterol molecules in each.

Draw your diagram here.

(D) (1 pt) **Explain** how a change in the lipid composition of a cell's membrane could disrupt the cell's ability to respond to an external signal.

2.3.B.1