

Cell Membrane And Transport Worksheet

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Part 1: Foundational Knowledge

What is the primary structural component of the cell membrane?

Hint: Think about the main building blocks of the membrane.

- A) Proteins
- B) Carbohydrates
- C) Phospholipids
- D) Nucleic acids

Which of the following are functions of membrane proteins? (Select all that apply)

Hint: Consider the roles proteins play in cellular processes.

- A) Energy storage
- B) Transport of molecules
- C) Signal transduction
- D) DNA replication

Explain the role of cholesterol in the cell membrane.

Hint: Think about how cholesterol affects membrane fluidity.

List two types of passive transport mechanisms and briefly describe each.

Hint: Consider how substances move across membranes without energy.

1. 1. Diffusion

2. 2. Osmosis

Which part of the phospholipid bilayer is hydrophobic?

Hint: Consider the properties of the phospholipid structure.

- A) The head
- B) The tail
- C) Both head and tail
- D) Neither head nor tail

Part 2: Understanding Concepts

How does facilitated diffusion differ from simple diffusion?

Hint: Think about the mechanisms involved in each process.

- A) It requires energy.
- B) It moves substances against the concentration gradient.
- C) It involves transport proteins.
- D) It only occurs in plant cells.

Which factors can affect the rate of diffusion across a cell membrane? (Select all that apply)

Hint: Consider the physical and chemical properties that influence diffusion.

- A) Temperature
- B) Membrane surface area
- C) Concentration gradient
- D) Presence of enzymes

Describe how the structure of the cell membrane contributes to its function as a selective barrier.

Hint: Think about the arrangement of molecules in the membrane.

Part 3: Applying Knowledge

A cell is placed in a hypertonic solution. What is likely to happen to the cell?

Hint: Consider the effects of solute concentration on cell volume.

- A) It will swell.
- B) It will shrink.
- C) It will remain the same.
- D) It will burst.

In which scenarios would active transport be necessary? (Select all that apply)

Hint: Think about situations where substances move against their concentration gradient.

- A) Moving glucose into a cell where it is in higher concentration inside.
- B) Expelling sodium ions from a cell.
- C) Diffusion of oxygen into a cell.
- D) Absorption of water by plant roots.

Provide an example of a real-world application of cell membrane transport in medicine or technology.

Hint: Consider how transport mechanisms are utilized in treatments or devices.

Part 4: Analyzing Relationships

Which of the following best explains why the cell membrane is described as a "fluid mosaic model"?

Hint: Consider the arrangement and movement of molecules in the membrane.

- A) It is made of a single type of molecule.
- B) Its components are rigid and immobile.
- C) It is composed of various molecules that move freely.
- D) It is impermeable to all substances.

Analyze the effects of temperature on membrane fluidity. Which statements are true? (Select all that apply)

Hint: Think about how temperature changes can impact the properties of the membrane.

- A) Higher temperatures increase fluidity.
- B) Lower temperatures decrease fluidity.
- C) Cholesterol prevents drastic changes in fluidity.
- D) Membrane fluidity is unaffected by temperature.

Discuss how the failure of membrane transport mechanisms can lead to disease. Provide an example.

Hint: Consider diseases that are linked to transport issues.

Part 5: Synthesis and Reflection

Which strategy would be most effective in designing a drug that targets a specific membrane protein?

Hint: Think about how drugs interact with proteins.

- A) Increase the drug's size to prevent it from entering the cell.

- B) Modify the drug to mimic the protein's natural ligand.
- C) Ensure the drug is hydrophobic to pass through the membrane easily.
- D) Use a drug that binds to all proteins indiscriminately.

Evaluate the potential consequences of a malfunction in sodium-potassium pump. Which outcomes are possible? (Select all that apply)

Hint: Consider the role of the sodium-potassium pump in cellular function.

- A) Disruption of cellular ion balance
- B) Altere cell volume
- C) Increased cellular energy efficiency
- D) Impaired nerve impulse transmission

Design an experiment to test the effects of a new drug on cell membrane permeability. Describe your approach and expected outcomes.

Hint: Consider the methods you would use to measure permeability.