Cellular Transport Worksheet

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Part 1: Foundational Knowledge

What is the primary function of the cell membrane in cellular transport?

Hint: Think about the role of the cell membrane in regulating substances.

- ◯ To provide structural support
- ◯ To regulate the movement of substances in and out of the cell
- ◯ To store genetic information
- ◯ To produce energy

Which of the following are types of passive transport? (Select all that apply)

Hint: Consider processes that do not require energy.

- ☐ Diffusion
- ☐ Osmosis
- ☐ Facilitated Diffusion
- ☐ Endocytosis

Explain the process of osmosis and its importance in maintaining cell homeostasis.

Hint: Consider how water movement affects cell balance.

List two examples of active transport mechanisms and briefly describe their functions.

Hint: Think about processes that require energy to move substances.

1. Example 1: Sodium-Potassium Pump

2. Example 2: Endocytosis

Part 2: comprehension

Which statement best describes facilitated diffusion?

Hint: Consider the role of transport proteins in this process.

- ◯ It requires energy to move substances against their concentration gradient.
- ◯ It involves the movement of water molecules only.
- ◯ It uses transport proteins to move substances down their concentration gradient.
- ◯ It is a form of endocytosis.

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

Hint: Think about physical and chemical properties that influence diffusion.

- ☐ Temperature
- ☐ Membrane permeability
- ☐ Surface area
- ☐ Genetic material

Describe how the concentration gradient influences the direction of diffusion.

Hint: Consider how molecules move in relation to their concentration.

Part 3: Application and Analysis

If a red blood cell is placed in a hypertonic solution, what is likely to happen?

Hint: Think about the effects of solute concentration on cell volume.

- ◯ The cell will swell and burst.
- ◯ The cell will shrink.
- ◯ The cell will remain unchanged.
- ◯ The cell will become turgid.

Which scenarios are examples of active transport? (Select all that apply)

Hint: Consider processes that require energy to move substances against their gradient.

- ☐ Uptake of glucose in the intestines
- ☐ Movement of oxygen into the bloodstream
- ☐ Secretion of neurotransmitters into a synapse
- ☐ Absorption of water in plant roots

How might the principles of osmosis be applied in medical treatments, such as intravenous therapy?

Hint: Consider how fluid balance is maintained in patients.

Part 4: Evaluation and Creation

Which component of the cell membrane is primarily responsible for selective permeability?

Hint: Think about the structure that allows certain substances to pass through.

- ◯ Phospholipid bilayer
- ◯ Cholesterol molecules

- ◯ Transport proteins
- ◯ Carbohydrate chains

Which transport mechanism would be most efficient for a cell to quickly intake large quantities of water?

Hint: Consider the processes that facilitate rapid water uptake.

- ◯ Diffusion
- ◯ Osmosis
- ◯ Facilitated diffusion
- ◯ Pinocytosis

Evaluate the following statements and identify which are true regarding active transport. (Select all that apply)

Hint: Consider the characteristics of active transport mechanisms.

- ☐ It requires energy input.
- ☐ It moves substances down their concentration gradient.
- ☐ It can involve transport proteins.
- ☐ It is unaffected by temperature changes.

Design an experiment to test the effects of temperature on the rate of diffusion in a liquid medium. Outline the steps and expected outcomes.

Hint: Consider how you would set up the experiment and what you would measure.

Propose two real-world applications of cellular transport knowledge in biotechnology or medicine and explain their significance.

Hint: Think about how cellular transport principles are applied in these fields.

1. Application 1: Drug Delivery Systems

2. Application 2: IV Fluids