Name: **Date:** **Section:**

Na-K Pump Activity: Active Transport in Cells

The Amazing Cell Pump

Phase 1: ENGAGE (2 minutes)

Getting Started:

Open peebedu.com and navigate to Sodium-Potassium Pump Interactive

Watch the pump in the cell membrane.

Think About It:

Imagine trying to pump water uphill - it takes energy!

This pump moves ions "uphill" against their natural flow.

Quick Look:

- Orange ions (Na^+) want to flow: IN / OUT
- Purple ions (K^+) want to flow: IN / OUT
- But the pump forces them the OPPOSITE way!

Phase 2: EXPLORE (5 minutes)

Work the Pump

Click to run the pump cycle.

Watch What Happens:

1. **Loading Dock (Inside):**

- Green ATP energy attaches

1. **Energy Use:**

- ATP breaks apart (POP!)
- Pump changes shape
- Opens to: INSIDE / OUTSIDE

1. **Swap Time:**

- Orange ions jump OFF

1. **Return Trip:**

- Pump flips back
- Purple ions jump off INSIDE

Count the Trade:

For each ATP used:

- _____ Na^+ go out

Phase 3: EXPLAIN (4 minutes)

Why This Matters

1. **Energy Required:**

The pump needs ATP because it's:

1. **The Trade-Off:**

Why move 3 out but only 2 in?

This makes the outside more _____ charged.

This creates an electrical "_____"

1. **Cell Jobs:**

This gradient helps with:

- Sending nerve signals
- Making muscles move
- Bringing in food

Phase 4: ELABORATE (1 minute)

Real Life

Athletes and Salt:

Athletes drink sports drinks with sodium and potassium.

Why? Their pumps need these ions to:

Pump Problems:

If the pump stops working:

- Cells swell with water
- Nerves can't send signals
- Muscles get weak

Phase 5: EVALUATE (Quick Check)

Circle the best answer:

1. The pump uses energy to move ions:

1. Each pump cycle trades:

Big Question:

Why do cells use 30% of their energy on this one pump?

- --

Fun Fact:

Your body has trillions of these pumps working right now!

Key Vocabulary:

See activity for vocabulary specific to this topic.