Name: _____ **Date:** _____

Section: _____

Osmosis Simulator Activity

The Amazing Water Balance Game!

Phase 1: ENGAGE (5 minutes)

Getting Started: Open peebedu.com and navigate to Osmosis Simulation

First Look: What do you see? Circle all that apply: _____

- Red circle (cell)
- Blue dots (water)
- Green dots (salt/sugar)
- A slider bar

The red circle represents a _____ blood cell

Make a Prediction: If we add lots of salt outside the cell, will the cell: _____ a) Get bigger b) Stay the same c) Get smaller

Fun Fact: Your body has about 25 trillion red blood cells!

Phase 2: EXPLORE (18 minutes)

Part A: The Goldilocks Zone

Set the slider to 50% (middle)

- Cell size: Normal / Big / Small

- Cell mass: _____ pg

Watch the water molecules for 10 seconds

- Are they moving? Yes / No
- Do they go in AND out? Yes / No

Part B: The Swelling Adventure

Move the slider to 0% (all the way left)

- What happens to the cell? _____

- Water is moving: INTO / OUT OF the cell

Try 10%, 20%, 30%

- The cell is biggest at _____%

Part C: The Shrinking Mystery

Move the slider to 100% (all the way right)

- What happens to the cell? _____

- Water is moving: INTO / OUT OF the cell
- The cell looks: Smooth / Wrinkled

Try 70%, 80%, 90%

- The cell is smallest at _____%

Data Detective Table:

Phase 3: EXPLAIN (12 minutes)

The Science Behind the Magic

What is Osmosis?

Osmosis = Water moving through the cell membrane

Think of it like this:

- Cell membrane = A fence with tiny water-only gates
- Water = Kids who can go through the gates
- Salt/Sugar = Adults who can't fit through the gates

The Three Types of Solutions:

Draw and label each:

Hypotonic (Low salt outside) "' Outside: °°° (few particles) Cell: [Draw swollen cell] Water goes: IN → Cell gets: BIGGER Like: A balloon filling with water "'

Isotonic (Equal salt) "' Outside: °°°°° (medium particles) Cell: [Draw normal cell] Water goes: BOTH WAYS Cell stays: SAME SIZE Like: A perfect balance "'

Hypertonic (High salt outside) "' Outside: °°°°°°°° (many particles) Cell: [Draw shrunken cell] Water goes: OUT ← Cell gets: SMALLER Like: A raisin (dried grape) "'

Why Does Water Move?

Water wants to make things EQUAL!

- If there's more salt outside, water goes _____ to dilute it

It's like sharing candy to make it fair!

Phase 4: ELABORATE (8 minutes)

Real-Life Connections

Mystery Solver:

Why do these things happen? Use osmosis to explain!

a) Your fingers wrinkle in the bath: _____ The bath water is _____ (hypo/iso/hyper)

b) Salt on a slug makes it shrivel: _____ The salt creates a _____ solution

c) Vegetables get crispy in water: _____ Plain water is _____ to the vegetables

d) Ocean fish die in freshwater: _____ Freshwater is _____ to their cells

Hospital Helper:

Doctors use IV bags with special water. Why not pure water? _____

- Pure water would be _____tonic
- This could cause cells to _____!

Plant Power:

How do plants use osmosis? _____

- Roots absorb water because soil water is _____
- Watering makes cells _____ again

Sports Science:

Design a sports drink:

- Should it be: Hypotonic / Isotonic / Hypertonic? _____
- What would you add? _____

Phase 5: EVALUATE (7 minutes)

Show What You Know!

Quick Quiz: (Circle the answer)

a) Osmosis is the movement of: _____ WATER / SALT / CELLS

b) In a hypotonic solution, cells: _____ SHRINK / SWELL / STAY SAME

c) Water moves from: _____ HIGH SALT → LOW SALT / LOW SALT → HIGH SALT

Label the Solutions:

[Three cell drawings provided] Type: _____ Type: _____ Type: _____

Problem Solving:

A cell has 100 pg mass in normal conditions.

- In 0% solution: Mass = _____ pg (Gained _____ pg)

- Which is more dangerous? Why? _____

Creative Challenge:

You're a water molecule! Write your journey: _____ '`I'm outside a cell in a hypertonic solution. I see...`'

Application:

Your friend says: '`I'm going to drink ocean water!`' Explain why this is dangerous using osmosis:

Exit Ticket:

Draw an emoji showing how you feel about osmosis:

- I totally get it!
- I mostly understand
- I need more practice
- I'm confused

One thing I learned: _____ One question I have: _____

- –

Key Vocabulary

See activity for vocabulary specific to this topic.