

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Section: \_\_\_\_\_

## Osmosis Simulator Activity

### The Amazing Water Balance Game!

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#### Phase 1: ENGAGE (5 minutes)

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**Getting Started:** Open [peebedu.com](http://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)

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### 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)

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### 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 “

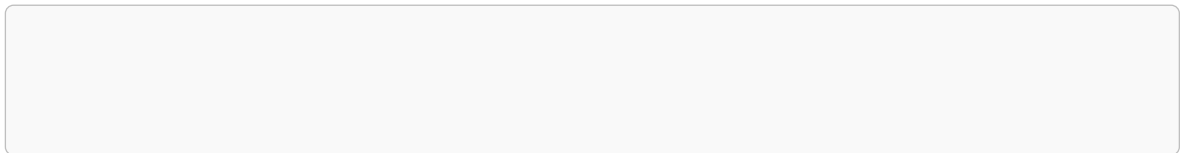
**Isotonic** (Equal salt) “ Outside: °°°° (medium particles) Cell: [Draw normal cell] Water goes: BOTH WAYS Cell stays: SAME SIZE Like: A perfect balance “

**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)

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### 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)

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### 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: \_\_\_\_\_

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**Key Vocabulary**

See activity for vocabulary specific to this topic.