Name: _____ **Date:** _____

Section: _____

Cell Diffusion Explorer Activity

The Amazing Cell Shape Race!

Phase 1: ENGAGE (5 minutes)

Getting Started: Open peebedu.com and navigate to Cell Diffusion Explorer

Read the introduction popup to learn about cells and diffusion.

Think About It: Have you ever wondered why you can't see most cells without a microscope? Why aren't there any basketball-sized cells rolling around? _____

Opening Challenge: Draw what you think the '`best`' cell shape would be for absorbing food:

[Drawing space]

Quick Vote: Which shape would absorb nutrients fastest?

Ball shape Star shape Snake shape Cube shape

Phase 2: EXPLORE (18 minutes)

The Great Cell Shape Experiment

Part A: Shape Testing

Look at the Cell Shapes panel. Each shape has:

- V = Volume (how much space inside)
- SA = Surface Area (how much '`skin`' it has)

Drag these 4 shapes into the beaker:

- Circle
- Star
- Tall Rectangle
- Wide Rectangle

Prediction Time! Which will turn blue fastest? _____ Why? _____

Click '`Start/Resume All`' and watch what happens!

Data Table:

- ——————

Part B: Weird Shapes

Reset and try these strange shapes:

- T-Shape
- Amoeba
- Squiggle

Quick Notes:

- Fastest weird shape: _____

Part C: Do the Math

Calculate SA/V for two shapes:

Circle: SA ÷ V = _____ ÷ 100 = _____ Star: SA ÷ V = _____ ÷ 100 = _____

Which has a bigger SA/V ratio? _____ Which diffused faster? _____

Coincidence? Yes / No

Phase 3: EXPLAIN (12 minutes)

Discovering the Rules of Cell Survival

Pattern Hunt (Find 3):

- Pattern 1: Shapes with arms/points absorb _____ (faster/slower)

- Pattern 3: The bigger the SA/V ratio, the _____ the diffusion

Cause and Effect Map: Fill in what leads to what:

More surface area → More _____ → Nutrients enter _____ Less volume → Less _____ inside → Nutrients reach _____ faster High SA/V ratio → _____ absorption → Cell stays _____

The Size Problem: Imagine a cell that doubles in size like a balloon:

- Surface (outside): Gets _____ (a little/a lot) bigger

- Problem: Not enough _____ for all the _____

Real Cells Are Smart! Match the cell to its clever shape:

Cell Type: Shape Trick:

- Red blood cell • Has tiny fingers (microvilli)
- Nerve cell • Flat like a pancake
- Intestine cell • Long and branched
- Lung cell • Super thin

Phase 4: ELABORATE (10 minutes)

Cell Shapes in Your Body

Body Cell Detective: Different cells have different jobs. Look at their shapes:

Red Blood Cells (carry oxygen):

- Shape: Flat disc with dent

- What if they were spheres? _____

Nerve Cells (send messages):

- Shape: Long with branches

- Trade-off: _____

Design Challenge:

You're designing a new cell for absorbing vitamins. Draw it:

[Drawing space]

Three features that help it absorb fast: _____ _____ _____

Think Big Picture: Why do elephants have the same size cells as mice?

Phase 5: EVALUATE (5 minutes)

Check Your Understanding

True or False (circle one):

- T / F: Star-shaped cells absorb nutrients faster than round cells
- T / F: Cells can grow as big as they want
- T / F: More surface area helps cells survive

Fill in the Blanks: Cells need to stay _____ because as they grow, their inside space grows _____ than their outside surface. This means not enough _____ can get in to feed the whole cell.

Problem Solver: Your pet cell is having trouble getting enough food. Give it 2 pieces of advice:

- _____

Draw and Explain:

Draw the worst possible cell shape for survival:

[Drawing space]

Why is it bad? _____

Fun Fact Investigation: Look up one of these and share:

- Why octopus blood cells are different
- How cactus cells deal with being big
- What the largest single cell is

Model Rating: This simulation helped me understand cells: _____ Not much Some A lot!

One question I still have: _____

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Vocabulary Box:

- **Diffusion:** Stuff spreading from where there's lots to where there's little
- **Surface Area (SA):** The outside '`skin`' of the cell
- **Volume (V):** The inside space of the cell

- **SA/V Ratio:** How much skin per inside space
- **Nutrients:** Food for cells

Key Vocabulary

See activity for vocabulary specific to this topic.