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

Cell Diffusion Explorer Activity: Transport Across Membranes

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**

1. Look at the Cell Shapes panel. Each shape has:

- V = Volume (how much space inside)

- SA = Surface Area (how much "skin" it has)

1. Drag these 4 shapes into the beaker:

- Circle
- Star
- Tall Rectangle
- Wide Rectangle

1. **Prediction Time!**

1. Click "Start/Resume All" and watch what happens!

- *Data Table:**

Shape	**Time to Turn All Blue**	**Rank (1=fastest, 4=slowest)**
Circle		
Star		
Tall Rectangle		
Wide Rectangle		

  - *Part B: Weird Shapes**
  1. Reset and try these strange shapes:
  - T-Shape
  - Amoeba
  - Squiggle
  - *Quick Notes:**
  - What made it fast? _____

- *Part C: Do the Math**

1. 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**

1. **Pattern Hunt (Find 3):**

- Pattern 2: Round shapes absorb _____ (faster/slower)

1. **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 _____

1. **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 _____

1. **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:

1. **Red Blood Cells** (carry oxygen):
- Shape: Flat disc with dent

- What if they were spheres? _____

1. **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:

1. _____
2. _____
   - *Think Big Picture:**

Why do elephants have the same size cells as mice?

Phase 5: EVALUATE (5 minutes)

- *Check Your Understanding**

1. **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
1. **Fill in the Blanks:**
1. **Problem Solver:**

Your pet cell is having trouble getting enough food.

Give it 2 pieces of advice:

- _____

1. **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: _____

- --

****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.