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

Cell Cycle Simulator Activity: Modeling Cell Division

How Do Cells Make More Cells? _____

Phase 1: ENGAGE (5 minutes)

Getting Started:

Open peebedu.com and navigate to Cell Cycle Simulator

Read the introduction popup to learn about how cells divide.

Think About It:

Your body started as one single cell. Now you have trillions! How do you think one cell becomes many cells? _____

Quick Draw:

Sketch what you think happens when one cell becomes two:

[Space for drawing]

Partner Talk:

- Why do you think cells need to divide? _____

Phase 2: EXPLORE (15 minutes)

Discovering How Cells Divide

Part A: Watch a Normal Cell

1. Click "Place Starting Cell" and choose "Patient 1 (Normal)"

2. Place a cell on the screen

First Observation:

- Cell color: _____

1. Click "Add Nutrients"

- **Result:** What actually happened? _____

Track the Cell's Journey:

Watch carefully and record what you see:

- ----------

Cell splits in two

Part B: Testing Different Conditions

1. **Temperature Test:**

Place a new cell and add nutrients

- Normal (37°C): Time to divide = _____ seconds

- **Pattern:** Cold makes cells divide _____

1. **Medicine Test:**

Select "Patient 3 (Colchicine-sensitive)"

- Add nutrients and let cell start dividing
- When cell is pink/purple, spray colchicine

Part C: Problem Cells

1. Select "Patient 4 (Cancer)"

- Add nutrients and observe
- **Different from normal?** Yes / No

Phase 3: EXPLAIN (15 minutes)

Making Sense of Cell Division

1. **The Cell Cycle Steps:**

Number these events in the correct order (1-8):

___ Cell splits into two cells

___ Cell grows bigger (G1)

___ Cell copies its DNA (S)

___ Cell prepares to divide (G2)

___ Chromosomes line up in middle

___ Chromosomes pull apart

___ Two new nuclei form

___ Cell checks if ready to divide

1. **Finding Patterns (List 3):**

- Pattern 2: Cell division always follows the same _____

1. **Cause and Effect:**

Draw arrows to connect causes to effects:

CAUSES: EFFECTS:

- No nutrients → - Cell divides faster
- Add colchicine → - Cell waits in G1
- Cancer mutation → - Cell gets stuck
- Warm temperature → - Cell ignores stop signals

1. **Why Control Matters:**

Explain why cells need to control when they divide:

Phase 4: ELABORATE (10 minutes)

Cell Division in Your Body

Different Cells, Different Rates:

Some cells in your body divide often, others rarely. Match each cell type to how often it divides:

Skin cells • • Never (in adults)

Stomach lining • • Every few days

Nerve cells • • Every 2-3 weeks

Red blood cells • • Every 120 days

Design an Experiment:

If you were a scientist studying cancer cells:

1. What would you want to know? _____
2. Why is this important? _____

Real-World Connection:

Watch what happens when you keep adding nutrients to cancer cells for 2 minutes.

- Number of normal cells: _____
- **Why is this a problem in real life? _____**

Phase 5: EVALUATE (5 minutes)

Show What You Know

1. **Label the Diagram:**

Draw and label a cell going through division. Include:

- Starting cell
- DNA copying
- Division stages
- Two new cells

1. **Explain to a Friend:**

Your friend asks "What's cancer?" Use what you learned to explain in 2-3 sentences:

1. **Make a Prediction:**

What would happen if:

- A cell had no nutrients for a week? _____
- All your cells divided like cancer cells? _____

1. **Rate This Model:**

😕 Not really 😐 Somewhat 😊 Yes! 😄 A lot!

One thing that could make it better: _____

Vocabulary Bank:

- **Cell Cycle:** The process of a cell growing and dividing
- **Interphase:** When the cell grows and copies its DNA (G1, S, G2)
- **Mitosis:** When the nucleus divides
- **Cytokinesis:** When the cell splits into two
- **Nutrients:** What cells need to grow and divide
- **Cancer:** When cells divide without control

Key Vocabulary:

See activity for vocabulary specific to this topic.