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

Cell Cycle Simulator Activity: Modeling Cell Division

The Life of a Cell: Growth, Replication, and Division

Phase 1: ENGAGE (5 minutes)

Getting Started:

Open peebedu.com and navigate to Cell Cycle Simulator

Read the introduction popup to learn about the cell cycle stages.

The Big Question:

Your body replaces millions of cells every day. How do cells "know" when to divide, and what happens when this process goes wrong? _____

Initial Thinking:

1. Sketch what you think happens when one cell becomes two:

[Space for drawing]

1. **Partner Discussion:**

- Why can't cells just split in half randomly? _____

Phase 2: EXPLORE (20 minutes)

Investigation: Mapping the Cell Division Process

Part A: The Cell Cycle Journey

1. Place a normal cell (Patient 1) and observe:

Color-Code Key: (Match what you see)

- Blue = _____
- Orange = _____
- Red/Purple/Pink = _____ stages

1. **Initial State:**

- What happens without nutrients? _____

1. **Add Nutrients** and track the journey:

- ------ Blue

Anaphase Treatment Ideas

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1. **Design a Treatment:**

For the cancer patient:

- What makes their cells different? _____
- Test your idea in the simulator

1. **Population Dynamics:**

Start with 1 cell, add nutrients regularly for 3 minutes

- Normal cells reach _____ cells
- Graph the growth curves

Phase 5: EVALUATE (8 minutes)

Assessment & Application

1. **Cell Cycle Mastery:**

List the phases in order and one key event in each:

- _____: _____
- _____: _____

(continue for all phases)

1. **Prediction Challenge:**

A new drug blocks cells in S phase.

- What would happen to the cells? _____
- What side effects might occur? _____

1. **Systems Analysis:**

Explain why cell division must be carefully controlled:

- What happens with too little division? _____
- How do checkpoints help? _____

1. **Model Evaluation:**

This simulation shows well:

- _____

Not shown/simplified:

- _____

Key Terms:

- **Interphase:** G1, S, G2 - cell growth and DNA replication
- **Mitosis:** Nuclear division (prophase → telophase)
- **Cytokinesis:** Cell splits into two
- **Checkpoint:** Control point ensuring proper progression
- **G0:** Non-dividing state