

Name: _____ Per: _____ Date: _____

Cell Cycle for Dinner Activity



Learning Target: Students will be figuring out what proportion of cell cycle steps occur and what happens at each step.

Science and Engineering practices: Developing and using models, Using mathematics and Computational Thinking

Cross-Cutting Concepts: Patterns, Scale and Proportions

Materials: Ruler, Paper plate, Colored pencils, pipe cleaner chromosomes, beads and thread.

Your Task: Label and take notes on your model to help understand the importance of the cell cycle. Be sure to include on your model:



- Each phase of the cell cycle
- What happens at each stage (use slide show notes and class notes)
- Add Checkpoints symbolized by a stop sign
- Practice forming DNA, single and duplicated chromosomes as they would appear at each stage.

Cycle Cycle Phase		Time	Ridges on plate (1 hour =3 ridges)	Proportion of time in each stage (%)
Interphase	G1	11 hours	33	
	S	6 hours	18	
	G2	4 hours	12	
Mitosis	Prophase	1 hours	3	
	Metaphase	20 min	1	
	Anaphase	20 min	1	
	telophase	20 min	1	
Cytokinesis		1 hour	3	
Total Time		24 hours	72	100%

Content: Use the linked [Slide show](#) to take notes for each stage and to include on your model.

Analysis:

1. What is the proportion of each stage in percentage? Fill-in the column on the chart.
2. Which phase takes the longest? The shortest? Why do you think?
3. When is the cell committed (has to) to go through cell division? Why is this important?

4. If the first checkpoint does not work correctly what might be the impact on the cell?

5. If a group of cells were constantly dividing, which phase(s) would appear frequently?

PART II. DNA Packaging, Genes, & Chromosomes

Investigate the copying (diploid state) of DNA during interphase using pipe cleaners (chromosomes) and plastic beads (genes) to better understand the process of the cell cycle. Follow the steps below and answer the questions afterward.

1. Create a 3 chromosome cell that has just started the G₁ phase.

How many total chromosomes are present? _____ Where did each of the chromosomes come from?

2. Now add the correct number and make-up of the chromosomes that are copied during _____.

How many total chromosomes are present now? _____ How did this differ from the number present during the G₁ phase?

3. Move the chromosomes through the remainder of the steps of the cell cycle until you end up with two daughter cells. How does the daughter chromosomes (number of them and appearance) compare to those that were present in the parent cell?

4. Sketch out the chromosomes within a cell and nuclear membrane below. Use colored pencils to help you differentiate between the chromosomes.