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Topic: Cell Cycle Modeling Project

Summary: Students will model the cell cycle using pipe cleaners.

Goals & Objectives: Students will be able to explain and list each phase of the cell cycle.

NGSS Standards: *HS-LS1-4.* Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

Time Length: 90 minutes

Materials:

- 5 colored pipe cleaners (2 one of 1st color, 2 of 2nd color, 1 of 3rd color)
- Camera, can be cell phone
- Pictures of each stage of the cell cycle, can be from textbook

Prerequisite Knowledge: Difference between chromatin and chromosome and what are cell organelles and the cell membrane.

Procedures:

- Make sure each group of two have the capability to take a picture with their phone.
- Introduce to students a second membrane (nuclear envelope) is what makes up the nucleus.
- Have students pick-up the pipe cleaners at one central location.

Accommodations: Students with an IEP can be grouped with two other students. Make sure they build at least two of the stages.

Editable DOCX File and Answer Key:

Available at www.ngsslifescience.com

Name: _____ Row: _____

Date:_____ Period:_____

Cell Cycle Modeling Project

Objective:
You will be able to see the cell cycle in action by creating a pipe cleaner model.

Pipe Cleaners:
State the color of each item: _____ DNA (chromatin, chromosomes, chromatids)
_____ nucleus
_____ cell membrane
_____ organelles

Requirements:

- You will use the different colored pipe cleaners for DNA (chromosomes), nucleus, cell membrane, and organelles on all the note cards.
- You will show your teacher your pictures while your teacher will ask you and your partner questions to check to make sure you understand what is happening.

Procedure:
You are going to take pictures of each phase of the cell cycle. First create the model using pipe cleaners. Then take a picture before reconfiguring the model for the next step. Below are all the steps you need to model and take pictures of.

1. Interphase (G1).
    a. The cell includes organelles, cell membrane, nucleus, and DNA inside of the nucleus.
2. Interphase (S).
    a. The same as G1 phase but double the DNA.
3. Interphase (G2).
    a. The same as S phase but double the number of organelles
4. Prophase.
    a. The nucleus disappears and DNA coils to forms chromosomes
5. Metaphase.
    a. The chromosomes line up down the center
6. Anaphase.
    a. The chromosomes split in half and start moving towards the poles
7. Telophase.
    a. Two nuclei appear around both chromatids and the center of the cell pinches in
8. Cytokinesis.
    a. The two separate cells are in interphase (G1).