Unit 6:
CELL DIVISION PACKET

This packet is designed to help you understand several concepts about Cell Division.

As you practice the exercises on each handout, you will be able to:

- Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. (*HS-LS1-4*)
- Describe the stages of the Cell Cycle (interphase, mitosis, cytokinesis). (*HS10-LS1-4.1*)
- Understand that chromosome come in pairs, carry genes, and determine the sex of an organism. (*HS10-LS1-4.2*)
- Describe the identifying features of the phases of cell division: interphase, prophase, metaphase, anaphase, telophase, cytokinesis. (*HS10-LS1-4.4*)
- Describe the significance of the final products of cellular division: 2 genetically identical cells with the same # of chromosomes as the parent cell. (*HS10-LS1-4.5*)

Record this packet in the Table of Contents for Unit 6.
This will be the next “HANDOUT.”

**Contained in this Packet:**

1. Video #1: Stages of Mitosis
2. Cell Division Hands-on
In order to be considered alive, certain requirements must be met. One of these requirements is reproduction: the ability to create offspring. Cell Division is one way living things produce offspring. During Cell Division, a series of steps must be followed in a particular sequence. Each step is unique and important in its own way. Understanding each step will increase your understanding of this type of reproduction.

Objectives:
The purpose of this video is to provide information so that students can:
- Describe the stages of the Cell Cycle (interphase, mitosis, cytokinesis). (HS10-LS1-4.1)
- Describe the identifying features of the phases of cell division: interphase, prophase, metaphase, anaphase, telophase, cytokinesis. (HS10-LS1-4.4)

Directions:
1. **FUN NOTES:** Use as a resource as you watch the video.
2. Go to the class website: thsclaybio.weebly.com
3. Click Semester #2.
4. Scroll down to Unit 6: Cell Division.
5. Click the button: Video #1: Stages of Mitosis
6. Turn on the closed captioning by clicking: **CC**
7. Watch the video at least 1 time without stopping.
8. As you answer the questions that follow, PAUSE and REWIND OFTEN!

The questions below are designed to explain important concepts about the stages of Cell Division. Answer each question. **INCLUDE DETAILS!**

1. Why is cell division required for living things?

2. Using the diagram below, label the parts to the cell cycle.

Name of the phase shown in this part of the Cell Cycle.

BRIEFLY, what happens in the G2 stage?

Name the phases IN ORDER that take place in this part of the Cell Cycle.

BRIEFLY, what happens in the S stage?

Name the last stage of the Cell Cycle.

BRIEFLY, what happens in the G1 stage?
3. For many Eukaryotic cells, a cell is duplicated every 24 hours, but most of the life of a cell is spent in what phase of the Cell Cycle?

4. What are the 3 phases in INTERPHASE?

5. What happens in each stage of INTERPHASE in question #4 (and also question #2)?

6. What are the identifying characteristics of PROPHASE (this also includes prometaphase)?

7. What are the identifying characteristics of METAPHASE?

8. What are the identifying characteristics of ANAPHASE?

9. What are the identifying characteristics of TELOPHASE?

10. Telophase is the last stage in mitosis. After telophase, cytokinesis occurs. What are the identifying characteristics of CYTOKINESIS?
Objectives:
The purpose of this activity is to provide information so that students can:

- Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. *(HS-LS1-4)*
- Describe the stages of the Cell Cycle (interphase, mitosis, cytokinesis). *(HS10-LS1-4.1)*
- Understand that chromosome come in pairs, carry genes, and determine the sex of an organism. *(HS10-LS1-4.2)*
- Describe the identifying features of the phases of cell division: interphase, prophase, metaphase, anaphase, telophase, cytokinesis. *(HS10-LS1-4.4)*
- Describe the significance of the final products of cellular division: 2 genetically identical cells with the same # of chromosomes as the parent cell. *(HS10-LS1-4.5)*

Directions:
Use the notes, textbook (pgs. 244-252) and instructor as a guide for this activity.

- **MODEL:** Use the poster & envelope, set up each stage of Cell Division (begin with Interphase).
- **ANSWER:** On a separate sheet of paper, answer all 9 questions about each stage.
  1. What stage of Cell Division is this?
  2. Does this stage have a nuclear membrane?
  3. If this stage has a nuclear membrane, is the nuclear membrane in pieces or one piece?
  4. How many chromosomes are there in this stage?
  5. How is the DNA organized in this stage? (chromatin, individual chromosomes or chromatid pairs)
  6. Where is the DNA located in this stage? (nucleus, middle, opposite sides)
  7. Where are the centrioles located in this stage?
  8. Where are the spindle fibers located in this stage AND what are the spindle fibers doing?
  9. What is the purpose of Cell Division?
  10. Write the name of each stage described on the “Stage Identification Cards” below.

- **CHECK:** Show answers to Questions #1-9 to the instructor & GET INITIALS in the table below.
- **GOAL:** PASS OFF ALL THE STAGES OF CELL DIVISION.

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<thead>
<tr>
<th>Stage of Cell Division</th>
<th>Q#1</th>
<th>Q#2</th>
<th>Q#3</th>
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<th>Q#5</th>
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<th>Q#8</th>
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<th>Q#10 CARD</th>
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<td>Interphase</td>
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**Stage Identification Cards**

**Interphase**
- Nuclear membrane present (one piece).
- DNA is the form of chromatin.
- DNA & chromosomes get doubled.
- Cell increases in size.

Stage Name: ___________________________________________________________________

**Prophase**
- Chromatid pairs line up in the middle.
- Centrioles now on opposite sides of the cell.
- Spindle fibers attach to centromeres.

Stage Name: ___________________________________________________________________

**Metaphase**
- Chromatid pairs separate
- Individual chromosomes move to opposite sides of the cell.

Stage Name: ___________________________________________________________________

**Anaphase**
- Chromatid condenses into chromatid pairs.
- Nuclear membrane dismantles around chromatid pairs.
- Centrioles start to move to opposite sides of the cell

Stage Name: ___________________________________________________________________

**Telophase**
- Cytoplasm pinches around individual chromosomes.
- Forms 2 new cells that are identical to the parent.

Stage Name: ___________________________________________________________________

**Cytokinesis**
- Nuclear membrane reassembles around individual chromosomes.
- Cytoplasm starts to pinch forming a cleavage furrow.
- Cell plate starts to form (in plant cells).

Stage Name: ___________________________________________________________________
1. Identify each stage of Cell Division represented in the pictures below.

   A. 
   B. 
   C. 
   D. 
   E. 

2. Name the parts to this structure.
   A. (entire structure)
   B. 

3. During normal Cell Division, a parent cell with 10 chromosomes will produce ______ daughter cells each with ______ chromosomes. Therefore, the purpose of Cell Division is to produce ______ new daughter cells that are ____________________________ to the parent cell.