



HANDS-ON ACTIVITY

Animating Mitosis

In nature, the events leading up to the production of the two new daughter cells during the process of cell division are continuous, but it is often necessary—and easier—to discuss the process as a series of separate steps.

In this lab, you will make a flipbook that animates the stages of mitosis in an animal cell so that they flow from one to the next as they would in real life.

MATERIALS

- colored pencils
- hole punch
- index card (40+)
- scissors
- string, 8-inch piece (2)

**PROCEDURE**

1. Review the lesson content to be sure you are familiar with the stages of the mitosis and cytokinesis before beginning the lab.
2. Using colored pencils, draw each of the stages of mitosis on four index cards. Use different colors to show all of the following parts: chromatin, chromosomes, sister chromatids, spindle fibers, centrioles, new nuclear membranes, centromere, and daughter cell. The colors for each part should remain the same on each card. Each of your drawings should show the cell at the same size. They should also be in the same position on the card.
3. Choose a fifth and sixth card. Draw a cell during cytokinesis and interphase.
4. Look at your drawings of interphase and prophase. A lot of action has taken place between these two stages. In a fixed location (such as the upper left-hand corner), number the interphase card "1" and place it facedown on your desk.
5. On separate index cards, draw the movement from interphase to prophase. Since you are making a flipbook, remember that the more drawings you make, the smaller the differences between each drawing. Your animation will be smoother. In the same fixed spot, number each of the cards in the order they will appear. This will help keep your cards in order.
6. As you complete each drawing, number it and place it facedown on top of the card pile.
7. Now look at prophase and metaphase. Repeat steps 4 through 6, this time showing what happens as the cell moves from prophase to metaphase.
8. Repeat steps 4 through 6 showing the cell moving from metaphase to anaphase, anaphase to telophase, and telophase to cytokinesis. Remember to number each card and place it upside down on your pile as you finish it.
9. Once you have finished the cards, turn them over. Now interphase will be on top.
10. Check that all the cards are in the correct numeric order.
11. Punch two holes on the left-hand side of the cards. The holes should line up as they do in a spiral notebook. As you finish punching the cards, place them back face down on your desk. This will ensure that interphase will be your first card.
12. Check once more to make sure that your cards are in order. Then, cut two pieces of string with your scissors. Tie a string through each of the holes, and tie them loosely.
13. Flip your book!

Name:

Date:

ANALYZE AND CONCLUDE

1. Explain how this model compares to other models of the cell cycle. What are the pros and cons of illustrating a process this way?

2. A human somatic cell has 23 pairs of chromosomes. How many chromosomes are in each daughter cell after mitosis? Explain your answer.

3. If you had instead shown mitosis in a plant cell, which feature would you have to change and how would you show it?

4. What would happen if spindle fibers did not form during mitosis?

EXTEND

What other cell or body processes could you illustrate using a flipbook? Draw out a preliminary plan for making a flipbook to illustrate the process you chose.