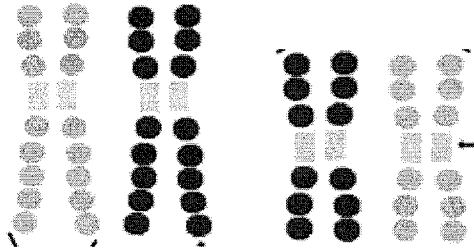


**Cell Division:  
Mitosis and Cytokinesis in Plant and Animal Cells**

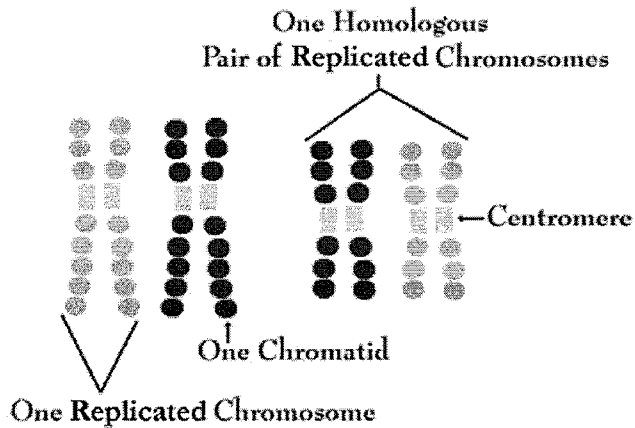
**Objective:** Identify the stages of cell division in animal and plant cells

**Part I: Mitosis Simulation**

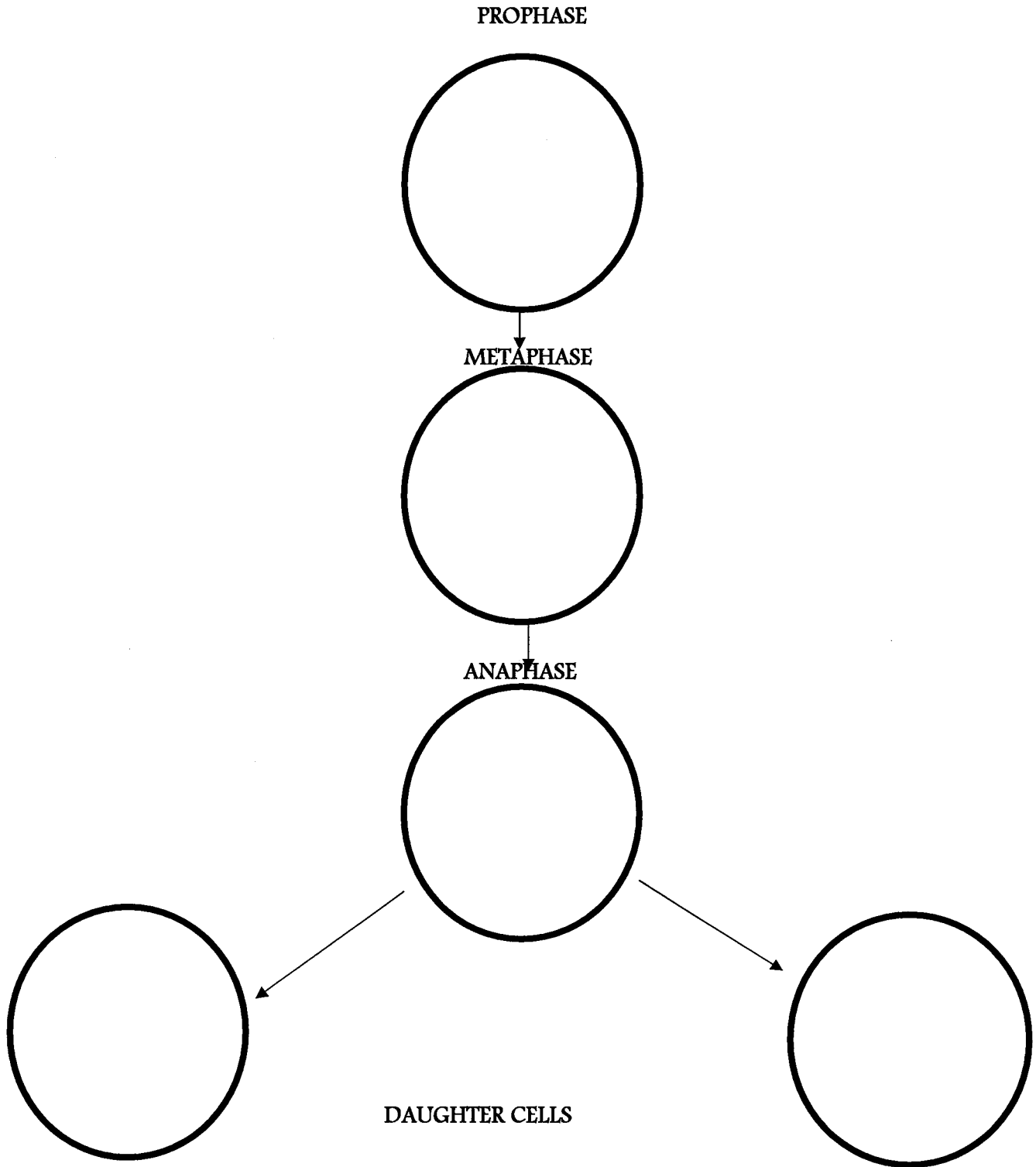
1. Assemble two long chromosomes (one red and one yellow) and two short chromosomes (one red and one yellow)



2. Duplicate each of the chromosomes so that you have a chromosome and its copy



3. Using your pop bead chromosomes to simulate mitosis, draw each phase of this process in the diagram below starting with prophase (on the next page)
4. **Answer the following questions based on the mitosis simulation below.**
  - a. As a cell readies itself for mitosis, the chromosomes replicate, so they are double stranded or daughter chromosomes. What is each chromosome now called? \_\_\_\_\_
  - b. How are the daughter chromosomes held together? \_\_\_\_\_
  - c. How many chromosomes are there in the parent cell? (remember, don't count the copies) \_\_\_\_\_
  - d. How many chromosomes are there in each daughter cell? \_\_\_\_\_



**Part II: Animation of Mitosis and Cytokinesis**

**Procedure:** Log onto <http://www.cellsalive.com/mitosis.htm>

1. Click on start animation.
2. Listed on the right side of the animation are the events of cell division. Click on each one and read the text that corresponds with the stage (found below the animation).
3. In which stage does the following occur?
  - a. Chromatin condenses into chromosomes \_\_\_\_\_
  - b. Chromosomes align in the center of the cell \_\_\_\_\_

- c. Longest part of the cell cycle \_\_\_\_\_
- d. Nuclear envelope breaks down \_\_\_\_\_
- e. Cell divides into two daughter cells \_\_\_\_\_
- f. Spindle fibers shorten and chromatids move toward the poles \_\_\_\_\_
- g. Chromatids arrive at the poles; nuclear membrane begins to form around each set of chromosomes, \_\_\_\_\_
- h. How many chromosomes are visible at the beginning of mitosis \_\_\_\_\_
- i. How many chromosomes are present in each daughter cell at the end of mitosis? \_\_\_\_\_

### Part III: Stages of Mitosis in Whitefish and Onion Root Tip

**Procedure:** Log onto <https://www.biologycorner.com/projects/mitosis.html>

#### 1. Whitefish mitosis

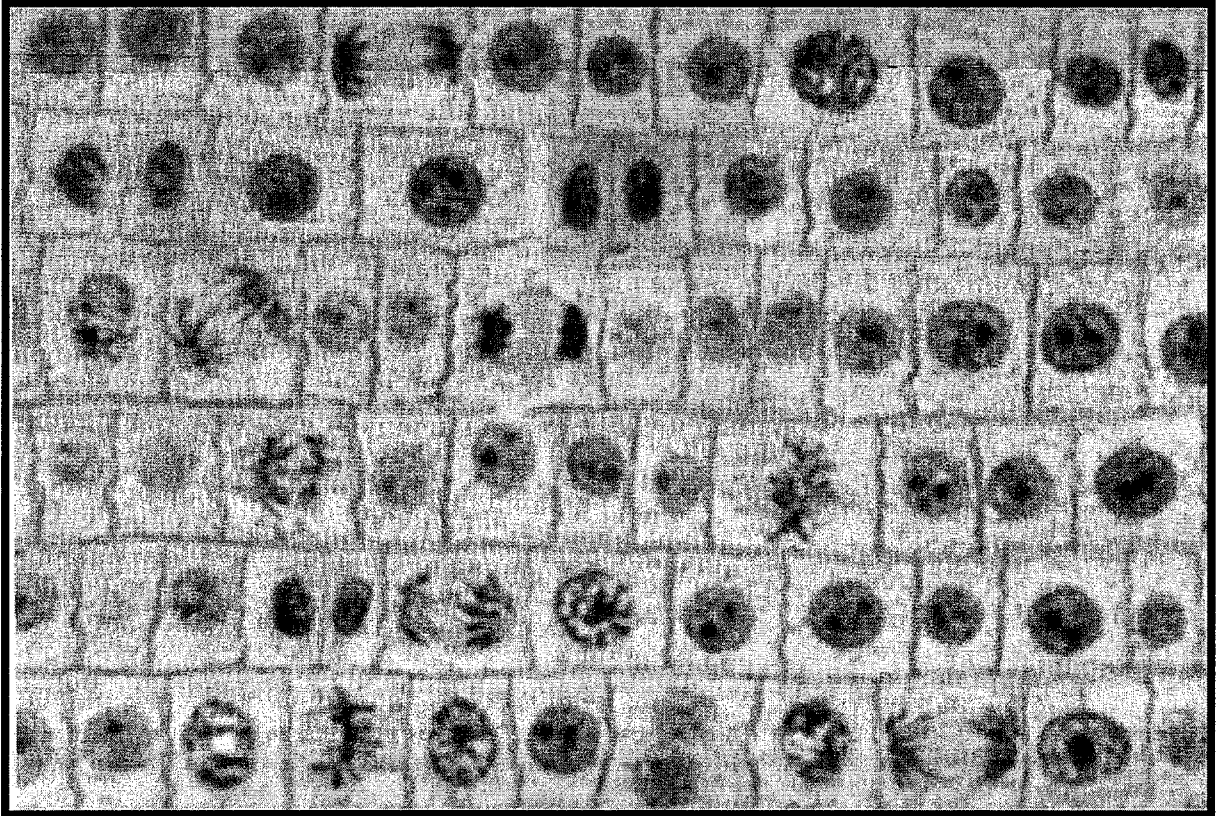
- a. Click on the whitefish.
- b. Click on each view of a stage of mitosis and enlarge. Identify the stage of, mitosis for each view in the table below.
- c. Go back to first screen and click on the onion.
- d. Drag each view to the box to enlarge. Identify the stage of mitosis for each view in the table below.

	View 1	View 2	View 3	View 4	View 5
<b>Whitefish Mitosis</b>					Omit
<b>Onion Root Tip Mitosis</b>					

#### Analysis and Conclusions:

1. Below is a micrograph of onion root tip cells in various stages of cell division. **Identify a cell in INTERPHASE and label that cell with a capital I.** Repeat this process for the following phases:
  - a. Prophase (P)
  - b. Metaphase (M)
  - c. Anaphase (A)
  - d. Telophase (T)
  - e. Cytokinesis (C)

## ROOT TIP CELLS IN MITOSIS



2. How do daughter cells compare to the parent cell? \_\_\_\_\_

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3. Describe the differences between whitefish mitosis and onion root tip mitosis?

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4. How does the process of mitosis help an organism maintain homeostasis?

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