

Time For Mitosis

Name _____

Do all phases of mitosis require the same amount of time for completion? This question can be answered by counting the number of onion root tip cells in the four phases of mitosis and in interphase. Many cells in one specific phase indicate that a long period of time is required for completion of that phase. Few cells in a specific phase indicate a short period of time is required for completion of that phase.

In this investigation, you will

- count the number of cells in each of the phases of mitosis and in interphase.
- compute the length of time in minutes needed to complete each phase.
- compare data of the time needed for normal cells to complete each phase with that of abnormal cancer cells.

Materials

STAGES OF MITOSIS / ONION ROOT TIP SAMPLE DIAGRAM

Procedure

Part A. Locating and Counting Cells in Mitosis

- Count and record in Table 16-1 the number of cells in each mitotic phase and in interphase. Count all cells in the field of view. Use Figure 16-1 as a guide to the phases of mitosis.
- Total the number of cells counted in each phase and interphase. Record this figure in the column marked "Number of Cells in Each Phase" of Table 16-1.
- Add the number of cells viewed in each phase and interphase together to get the total of all cells counted.
- Record this number in Table 16-1.

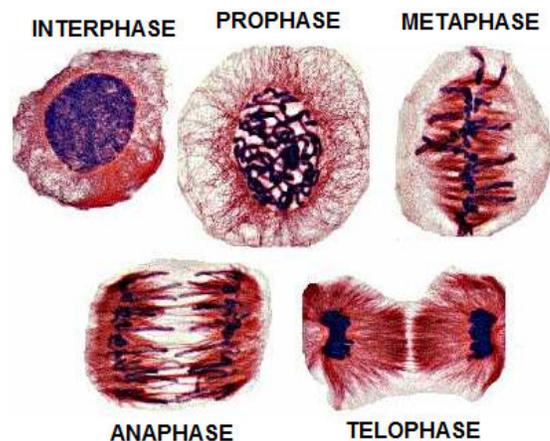


Figure 16-1

- a. In normal chicken cells, which phase requires the longest time for completion? _____

- b. In normal chicken cells, which phase requires the next longest time for completion? _____

- c. How do your answers to questions 4a and 4b compare with answers to questions 1 and 2? _____

5. a. What is the total time needed for a normal chicken stomach cell to complete mitosis? (Total up the time in minutes for each phase.) _____
- b. What is the total time needed for a cancerous chicken stomach cell to complete mitosis?

6. How do cancer cells differ from normal cells in total time required for mitosis? _____

7. How do cancer cells differ from normal cells in time spent for each phase? _____

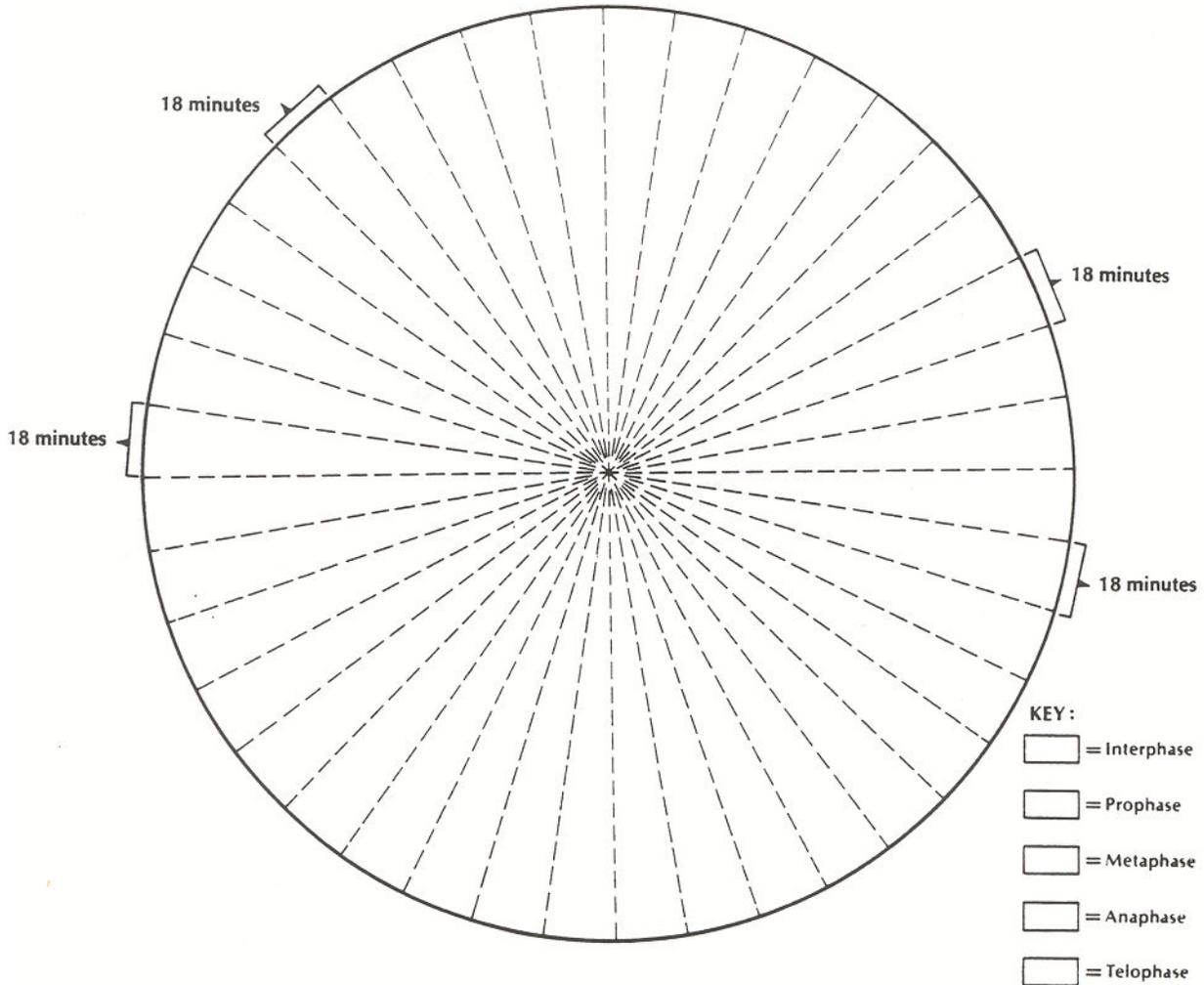
8. Table 16-3 shows the length of time (in minutes) needed for mitosis to occur in 2 different normal living organisms.
- a. Which organism, salamander or pea, shows time needed to complete mitosis most like the data you recorded in Table 16-1? _____
- b. Why might the time required for these two organisms to complete mitosis be similar? (HINT: Where did the cell material you used in Part A come from?) _____

TABLE 16-3. TIMES NEEDED FOR MITOSIS

	PROPHASE	METAPHASE	ANAPHASE	TELOPHASE	TOTAL
Salamander kidney cells	60	50	6	70	186
Pea root cells	80	40	4	12	136

Using your data from Table 16-1 and the outline below, prepare a circle graph which shows the number of minutes that onion cells spend in each phase of mitosis. The following suggestions may aid you in preparing your graph.

- Graph your data using the "Time in minutes" column from Table 16-1.
- The circle is divided into 18 minute sections. Each section of the graph equals 18 minutes. If a phase is not exactly 18 minutes long (or some interval close to a multiple of 18 minutes), approximate the position of the line on the graph.
- Shade each phase on your graph with colored pencils or various degrees of pencil shading.
- Identify each phase by shading the key to correspond with the shading on your graph.



STAGES OF MITOSIS / ONION ROOT TIP SAMPLE DIAGRAM

