



## Hands-On Activities

### MiniLAB (page 3)

1. prophase and telophase
2. two new cells

### MiniLAB: Try at Home (page 4)

#### Analysis

Answers will vary with the bases chosen, but bases should be in the same order as the original DNA.

### Lab (page 5)

#### Lab Preview

1. Using both high and low power will enable you to see different things about the root tip.
2. several large round cells at the tip of the root

#### Data and Observations

##### Table 1

Prophase—78, 65  
Metaphase—23, 19  
Anaphase—12, 10  
Telophase—7, 6  
Total—120, 100%

#### Conclude and Apply

1. The cells behind the root cap are smaller than those in the root cap. Mitosis occurs at a faster rate in cells behind the root cap.
2. See student page; prophase takes the longest.

### Lab: Use the Internet (page 7)

#### Analyze Your Data

1. Answers will vary. Color can result from a mutation.
2. Answers will depend upon animals chosen.
3. Answers will vary, but dominant genes are not necessarily more common.
4. Students may need help posting data.

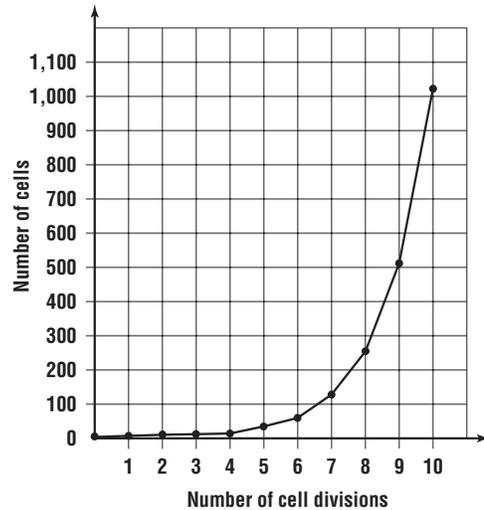
#### Conclude and Apply

1. Answers will vary. Remind students that the most common traits may be the result of mutations.
2. Answers will vary. Have students think about the mutation they are investigating and how helpful or harmful it is to the animal.
3. If you had investigated the mutation when it first appeared, you may have seen fewer animals with the trait. With the passage of time, you can determine if the mutation is beneficial.
4. Organisms with mutations may be better suited to a particular environment. These traits would be passed on to their offspring. Many mutations may lead to a new species.

### Laboratory Activity 1 (page 9)

#### Data and Observations

- |       |           |
|-------|-----------|
| 1. 2  | 6. 64     |
| 2. 4  | 7. 128    |
| 3. 8  | 8. 256    |
| 4. 16 | 9. 512    |
| 5. 32 | 10. 1,024 |



#### Questions and Conclusions

1. Cells with a longer cell cycle length will spend more time in the interphase step.
2. Students should infer that exponential growth cannot continue; resources, including food and space are limited.
3. Students should recognize that exponential growth of cancer cells would rapidly crowd out normally functioning cells.

### Laboratory Activity 2 (page 11)

**Lab Note:** The lines on the chromosome models represent genes. When matching chromosomes by length, genes should also match.

#### Questions and Conclusions

1. 14
2. 6
3. 2
4. yes
5. 14
6. 7
7. no
8. a male—one set does not match
9. yes, yes, Each chromosome duplicates itself before separating into two cells. Each new cell receives an identical complement.
10. Sex cells contain half the number of chromosomes found in all other cells.
11. Sex cells have only half as many chromosomes and none of the chromosomes are paired; all are unmatched.