

10.1 Cell Growth, Division, and Reproduction

Lesson Objectives

-  Explain the problems that growth causes for cells.
-  Compare asexual and sexual reproduction.

Lesson Summary

Limits to Cell Size There are two main reasons why cells divide:

- ▶ Information “overload”: The larger a cell gets, the more demands it places on its DNA. Eventually, the cell’s DNA cannot meet the cell’s needs.
- ▶ Exchange of materials: Cells take in nutrients and eliminate wastes through the cell membrane.
 - The larger a cell’s volume, the more materials it needs to function and the more waste it creates.
 - A cell’s volume increases at a faster rate than its surface area. As a cell grows, its surface-area-to-volume ratio becomes too small.
 - The larger a cell gets, the harder it is for enough materials to move across its cell membrane.
- ▶ **Cell division** solves the information overload and materials exchange problems.

Cell Division and Reproduction Cell division is part of both types of reproduction:

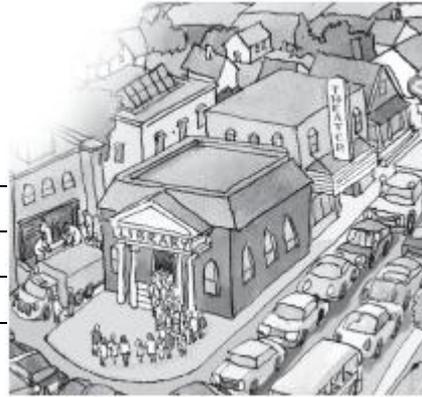
- ▶ **Asexual reproduction:**
 - produces genetically identical organisms.
 - occurs in many single-celled organisms and in some multicellular organisms.
 - allows rapid reproduction of organisms in favorable environments.
- ▶ **Sexual Reproduction:**
 - produces organisms with genetic information from both parents.
 - occurs in most animals and plants and in many single-celled organisms.
 - increases genetic diversity, which aids species survival in changing environments.

Limits to Cell Size

For Questions 1–4, write True if the statement is true. If the statement is false, change the underlined word or words to make the statement true.

- _____ 1. As a cell’s size increases, its amount of DNA also increases.
- _____ 2. The amount of activity in a cell is related to its volume.
- _____ 3. The smaller the cell, the smaller its ratio of surface area to volume.
- _____ 4. The information crisis in a cell is solved by the replication of the DNA before cell division.

5. **VISUAL ANALOGY** In the visual analogy of the growing town, what does the library represent? Identify two characteristics that make it a good choice for this analogy.



Cell Division and Reproduction

For Questions 6–8, complete each statement by writing the correct word or words.

6. _____ is the formation of new individuals.
7. For single-celled organisms, cell division is a form of _____ reproduction.
8. Most multicellular organisms reproduce by _____ reproduction.
9. Use the table to compare and contrast asexual and sexual reproduction.

Asexual and Sexual Reproduction	
Similarities	Differences

