

Time

30–45 min

Skills and Processes

The Chapter Review provides an opportunity for students to demonstrate their understanding of and their ability to apply the key ideas, vocabulary, and skills and processes.

Program Resources

WS 2.0-1 Concept Map, Cell Division
Chapter 2 Quiz
Nelson Science Probe 9 website
www.science.nelson.com

Chapter 2 Review Chart

- For every point in the Key Ideas, have students provide an example that illustrates and reinforces that point (e.g., the point: “Cell division produces new cells to increase the size of the organism” could allow the student to respond: “I have grown because I have more cells than when I was born”).
- Divide students into small groups to answer and discuss the questions. Circulate to address problems. Common difficulties can be addressed as a class.
- Have students complete *WS 2.0-1 Concept Map, Cell Division* to reinforce their grasp of the topics within the chapter.
- Have students complete the *Chapter 2 Quiz* to review the vocabulary and concepts in this chapter.

Review Key Ideas and Vocabulary—Suggested Answers

1. Cells are replaced because they are worn out or damaged. New cells are produced by mitosis.
2. (c)
3. (d)
4. (c)
5. (b)
6. (a)
7. (b)
8. Skin cells and cells lining the upper digestive tract reproduce faster than many other cells in the body. Because they are exposed to difficult conditions, they wear out quickly and must be replaced more often than other cells. This would be true of any cells with a short lifespan.
9. (a) phosphate (b) sugar (c) nitrogenous bases
10. The daughter cells of a single-celled organism are identical to the parent. The daughter cells of a multicellular organism are genetically identical, but may appear different because of specialization. A skin cell and a muscle cell for a given organism have the same genes, but are very different in appearance.
11. Mutations in the genes that control cell division are responsible for cancer.

12. Asexual reproduction requires only one parent and in most cases does not require specialized cells, produces offspring that are identical to the parent, and may produce a large number of offspring in a (relatively) short time. Sexual reproduction requires two parents producing specialized cells, which results in offspring with a combination of parental traits and takes much longer to produce large numbers of offspring.
13. Genetic material is duplicated before cell division so that when the double quantity is divided between the daughter cells, each will receive a complete set of chromosomes. If division took place without replication, the daughter cell would have half of the parental chromosomes.
14. (a) vegetative reproduction (b) vegetative reproduction
(c) budding (d) spore formation

Use What You've Learned—Suggested Answers

15. After eight divisions there will be 71 680 cells.
16. (a) Pine seedling roots are actively multiplying to produce new cells needed for the growth of the plant.
(b) When a tadpole turns into a frog, new cells are being produced (e.g., lungs and legs), so division must happen quickly to produce these new cells.
(c) Human cheek cells are being worn out by hard and rough foods; these cells must be replaced as fast as they are destroyed.
(d) White blood cells fight disease. When a person has chicken pox, more white cells are needed to fight the infection and must be produced quickly to stop the infection from spreading.
17. (a) interphase
(b) anaphase
(c) prophase, metaphase, anaphase, telophase
(d) interphase
(e) telophase
(f) telophase
18. (a) If a parent cell has 12 pairs of chromosomes, after mitosis, each daughter cell would also have 12 pairs of chromosomes.
(b) If all of the chromosomes moved to the same pole during anaphase, one daughter would have twice as many chromosomes as the parent and the other would have no chromosomes.
19. Vegetative reproduction would most likely be used by a plant nursery. Several versions are commonly used: cuttings of mature plants such as shrubs are rooted and grown into plants for sale, daffodil bulbs are split and replanted to produce multiple plants, and strawberries send out runners that grow new plants. In all cases, the new plants are identical to the parent, a benefit to the nursery.

20. DNA is a double strand, looks like a twisted ladder (double helix), codes for proteins, and is found in the nucleus of a cell. RNA is a single strand found in the nucleolus and ribosomes and is part of the mechanism used to make proteins.
21. There is a gene that codes for a protein that gives the eye its colour. Within this gene are several variations. These “variations on a theme” produce the different eye colours that are seen.

Think Critically—Suggested Answers

22. Every cell in the body came from one fertilized egg and contains the same genes. Different cells have used different genes to specialize; the skin cell used the genes to produce a skin cell, a muscle cell used the genes to produce a muscle cell, and so on. Despite these differences, every body cell is genetically identical to every other body cell.
23. Many possible answers may be used here; some examples follow: If hospitals knew how quickly cells divide, they could provide exact times for recovery from disease or injury. Farmers would know exactly when to plant and harvest crops if cell division rates (therefore, growth) were known.
24. During interphase, plant cells would be performing photosynthesis to obtain energy for growth. During cell division, cell activity stops. A herbicide that forced a plant to stay in a cell division stage would eventually “starve the cell to death.” With no energy from photosynthesis, the cell would die.
25. Some pesticides contain chemicals that cause mutations. If these mutations affect the genes that control division, the chemicals are said to be carcinogenic. Some of the chemicals in some pesticides fall into this category.

Reflect on Your Learning—Suggested Answers

26. Students’ answers will depend on their original opinions and the strengths and weaknesses of the evidence brought out during debate. Those who strongly believe in the technology may not be swayed by the negative evidence. Similarly, those strongly against the technology, especially for religious reasons, will rarely change their opinion. The reasons expressed will be personal and should be respected. The explanation is the important part of this question.
27. During examination of the root tip and whitefish egg cells, all stages of division were observed. In most cases, the cells did not match the Student Book illustrations exactly, but were close. This suggests that cells were in transition between one stage and the next. (Note: this can be compared to a family photo album that shows only events, not everyday activities. Students know that they did not jump from one size or grade or holiday, but changed gradually. The views of the stages of mitosis are like snapshots taken during a continuous process.)