



15.1 Selective Breeding

Lesson Objectives

-  Explain the purpose of selective breeding.
-  Explain how people increase genetic variation.

Lesson Summary

Selective Breeding Through **selective breeding**, humans choose organisms with wanted characteristics to produce the next generation.

- ▶ This takes advantage of natural variation among organisms and passes wanted traits to offspring.
- ▶ The numerous breeds of dogs and varieties of crop plants and domestic animals are examples of selective breeding.

Hybridization crosses dissimilar individuals to bring together the best of both parents in the offspring. **Inbreeding** is the continued breeding of individuals with selected characteristics. It ensures that wanted traits are preserved, but can also result in defects being passed on.

Increasing Variation Mutations are the source of biological diversity. Breeders introduce mutations into populations to increase genetic variation. **Biotechnology** is the application of a technological process, invention, or method to living organisms. Selective breeding is one example of biotechnology.

- ▶ Radiation and chemicals can increase the mutation rate. Diverse bacterial strains have been bred from mutated lines.
- ▶ Drugs can prevent the separation of chromosomes during mitosis, leading to polyploidy in plants. Such plants may be larger or stronger than their diploid relatives.

Selective Breeding

For Questions 1–5, write True if the statement is true. If the statement is false, change the underlined word or words to make the statement true.

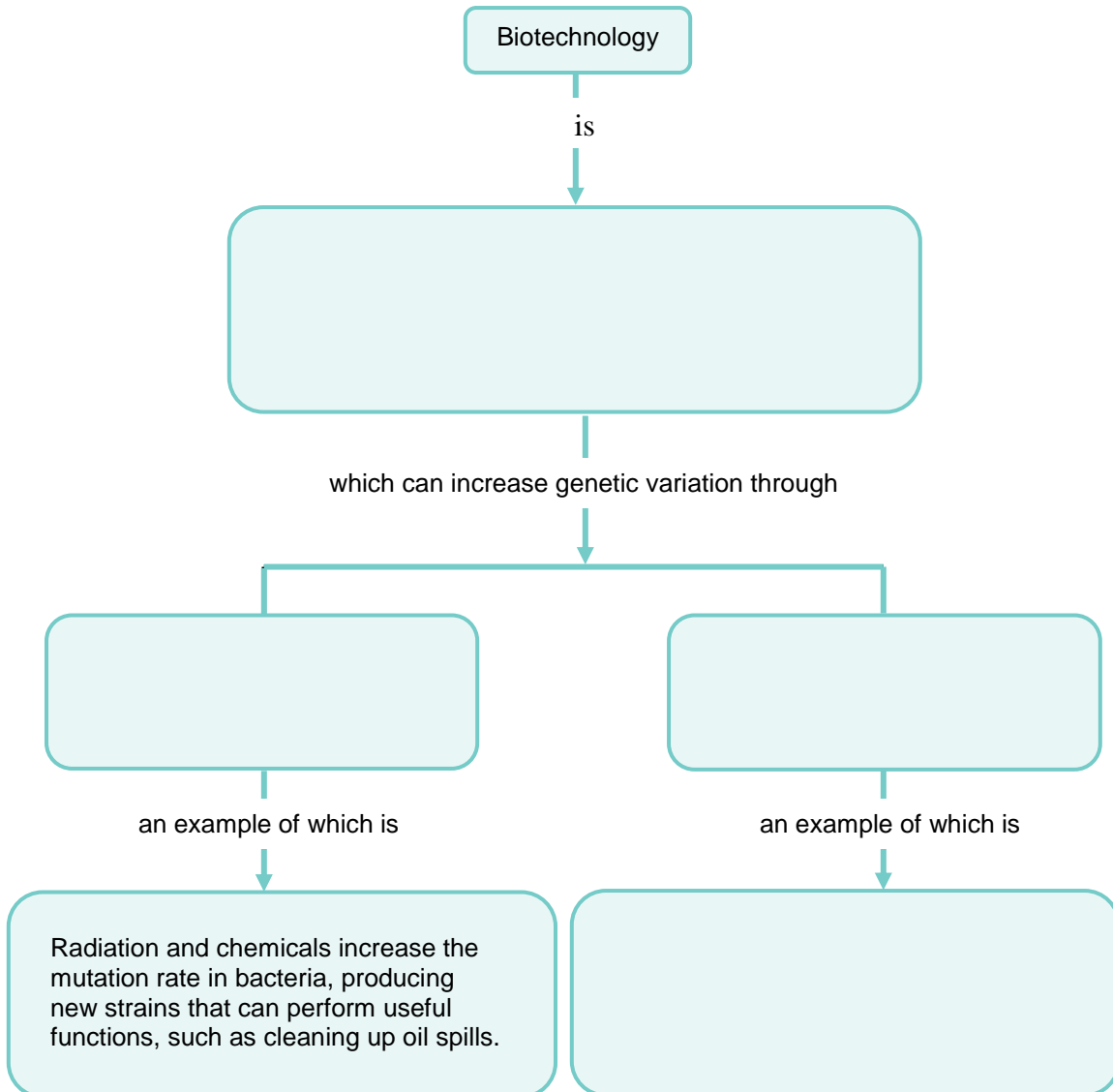
- _____ 1. Selective breeding works because of the natural genetic variation in a population.
- _____ 2. Hybridization crosses similar individuals to bring together the best of both.
- _____ 3. The individuals produced by crossing dissimilar parents are purebreeds.
- _____ 4. The continued crossing of individuals with similar characteristics is hybridization.
- _____ 5. Inbreeding increases the risk of genetic defects.

6. Complete the table describing the types of selective breeding.

Selective Breeding		
Type	Description	Examples
	Crossing dissimilar individuals to bring together the best of both organisms	
	The continued breeding of individuals with similar characteristics	

Increasing Variation

7. Complete this concept map about biotechnology.



For Questions 8–11, match the example with the probable method used to introduce the mutation. Each answer can be used more than once.

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|--------------------------------------------------------|----------------------------------|
| _____ 8. Bacteria that clean up radioactive substances | A. radiation or chemicals |
| _____ 9. Larger, stronger banana trees | B. polyploidy |
| _____ 10. Bacteria that clean up metal pollution | |
| _____ 11. Watermelons that grow faster and larger | |

12. Is it easy for breeders to produce mutants with desirable mutations? Explain.

13. Why are radiation and chemicals useful techniques for producing mutant bacteria?

14. What technique do scientists use to produce mutant plants?

15. What are polyploid plants?

Apply the Big idea

16. The muscles that racehorses use to move their legs are strong, heavy, and powerful. The bones of racehorses are very lightweight. How are these traits advantageous in racehorses? Describe a process that breeders might have used, over time, to produce racehorses with these characteristics.
