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# 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.

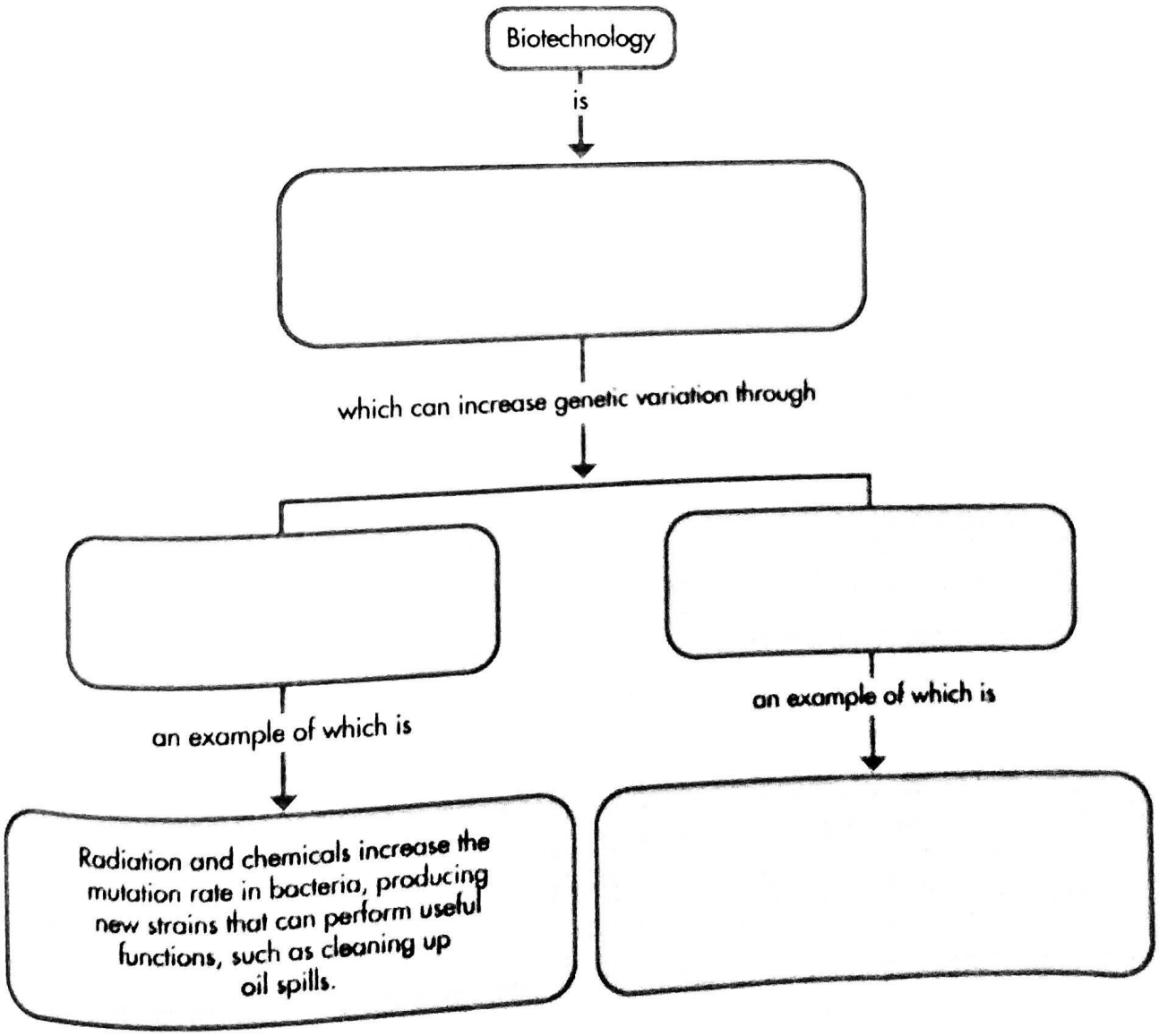
 

6. Complete the table describing the types of selective breeding.

| 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.



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

**A.** radiation or chemicals

**B.** polyploidy

_____ **8.** Bacteria that clean up radioactive substances

_____ **9.** Larger, stronger banana trees

_____ **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.

 