

1.3 Assessment

Match each term on the left with the best descriptor on the right. Each descriptor may be used only once.

Term	Descriptor
1. ____ mutation	A. a substance that causes cancer
2. ____ mutagen	B. a change in the DNA of an organism
3. ____ carcinogen	C. an agent that causes changes in the genetic materials of an organism

Circle the letter of the best answer for questions 4 to 24.

4. In which of the following situations would mutations disappear from the population when the organism dies?
- A. when they occur in an egg cell
 - B. when they occur in a nerve cell
 - C. when they occur in a sperm cell
 - D. when they occur during meiosis
5. Which of the following mutations could be passed on to future generations?
- A. a change in a nucleotide in a brain cell
 - B. a break in the chromosome of a skin cell
 - C. a change in a gene during the formation of a sperm cell
 - D. exposure to X-rays that causes cells to divide more rapidly
6. What does a selective advantage do for an organism?
- A. eliminates the organism in a changing environment
 - B. increases its chance of survival in a changing environment
 - C. decreases its chance of survival in a changing environment
 - D. has no effect on its chance of survival in a changing environment
7. What must be present within a species for natural selection to occur?
- A. genetic diversity
 - B. no random mating
 - C. similar adaptations
 - D. identical traits and behaviour

8. Natural selection acts on which of the following?
- A. genes
 - B. alleles
 - C. individuals
 - D. populations
9. A physiological process that helps an organism survive and reproduce in its environment is known as
- A. an allele.
 - B. an adaptation.
 - C. natural selection.
 - D. adaptive radiation.
10. Which of the following is an adaptation to prevent water loss?
- A. dogs panting when they are hot
 - B. trees with broad leaves that increase the surface area
 - C. rabbits with big long ears that increase the surface area
 - D. plants with needle-like leaves that decrease the surface area
11. Which of the following are examples of adaptations for cold climates?
- | | |
|-----|---|
| I | Bears hibernate. |
| II | Foxes have thick fur. |
| III | Arctic plants grow low to the ground and are covered in hair. |
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II, and III
12. If two populations of rodents were separated by a canyon, this would most likely result in
- A. extinction.
 - B. speciation.
 - C. competition.
 - D. codominance.

13. Which of the following could result in the isolation of populations and lead to the formation of two new species?

I	a flood forming a new river
II	erosion forming a new valley
III	new trees growing in a forest after deforestation

- A. I and II only
B. I and III only
C. II and III only
D. I, II, and III
14. If speciation occurs, members of the two new isolated populations would
- A. exhibit no genetic diversity.
B. not be able to produce fertile offspring.
C. have more characteristics in common than before.
D. be capable of interbreeding and producing viable offspring.
15. Which of the following is true about adaptive radiation?
- A. It occurs only on islands.
B. It occurs over one generation.
C. It causes many different species to converge into one common species.
D. It starts with one common ancestral species and produces many new species.

Use the following information to answer questions 16 and 17.

Ten different species of birds are found on some islands in the middle of the Pacific Ocean. The islands all have different types of trees. Each of the bird species has feet that are adapted for walking, climbing, or perching.

16. The structural adaptations that the birds possess are due to which of the following?
- A. extinction
B. artificial selection
C. adaptive radiation
D. selective breeding
17. Which of the following influenced the different feet structures in these birds?
- A. unchanging environmental conditions
B. extinction of birds with similar feet structures
C. artificial selection of desired characteristics in birds
D. natural selection of favourable variations in feet structure

18. What effect do mass extinctions generally have on the number of species?

- A. double the number of species
- B. decrease the number of species
- C. have no effect on the number of species
- D. increase the number of species exponentially

19. What is a positive impact of a mutation?

- A. reducing genetic diversity
- B. providing variation in genes
- C. reducing natural selection
- D. causing all the genes to be the same

20. Which of the following are examples of physical mutagens?

I	dental X-rays
II	food preservatives
III	ultraviolet radiation from the Sun

- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II, and III
21. Cigarette smoke is an example of a
- A. mutation.
 - B. monoculture.
 - C. physical mutagen.
 - D. chemical mutagen.

22. Carcinogens can cause

- A. cancer.
- B. speciation.
- C. regeneration.
- D. sexual reproduction.

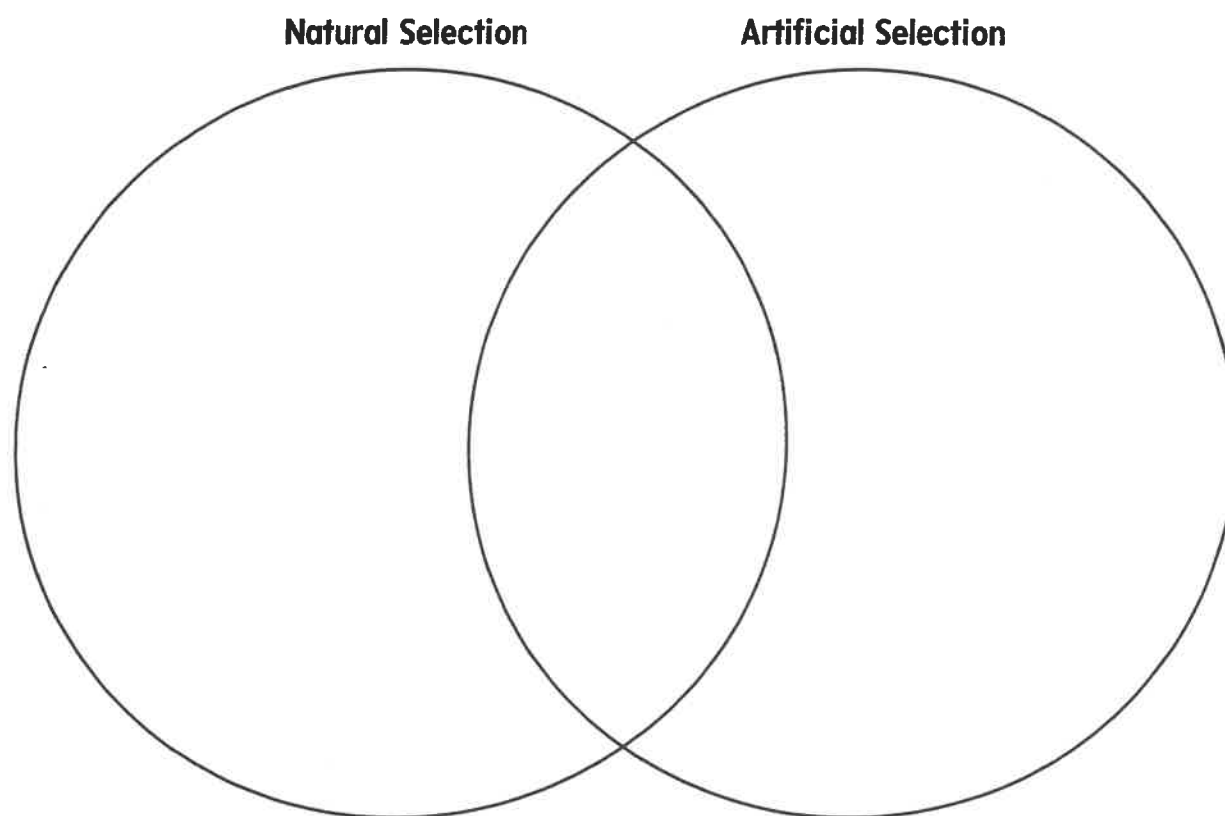
23. Who or what is in control of choosing the desired trait in artificial selection?

- A. nature
- B. humans
- C. predators
- D. environment

24. Which of the following is an example of artificial selection?

- A.** random mating of moose in the boreal forest
- B.** a species of rhinoceroses disappearing due to poaching
- C.** the formation of a new species of squirrels isolated on a mountain
- D.** a dog breeder producing a shepsky by crossing a German shepherd and a Siberian husky

25. Complete the Venn diagram to compare and contrast natural selection and artificial selection.

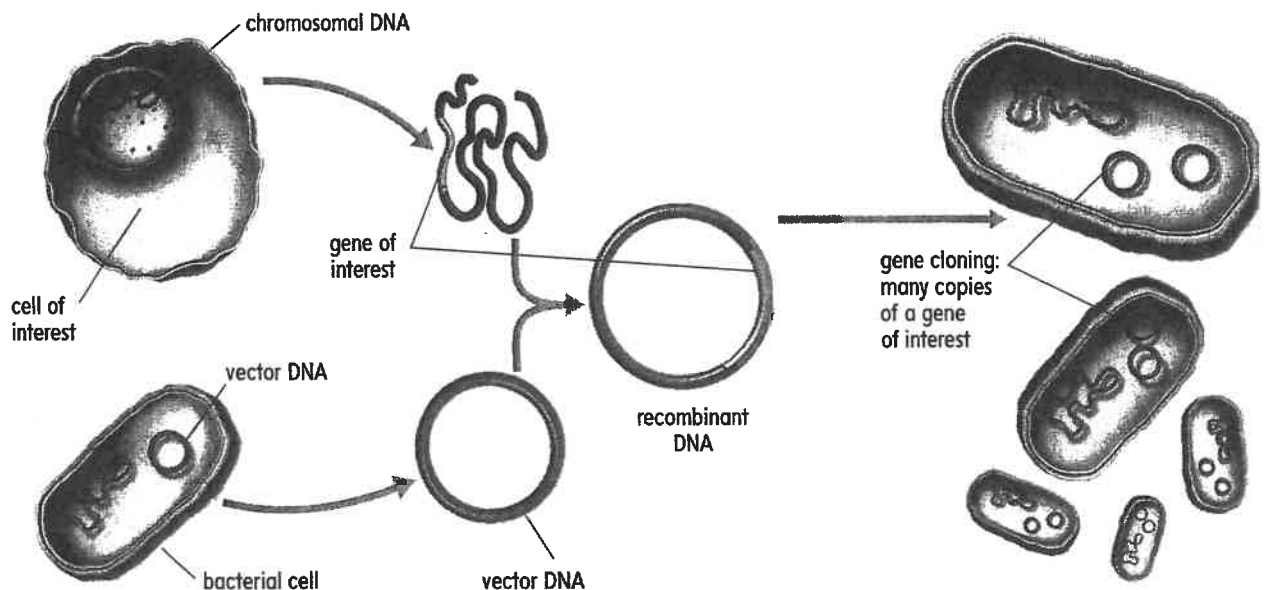


How and why are the genes of organisms manipulated?

Use with textbook pages 70–85.

Gene Cloning

With advancements in science and technology such as **biotechnology**, we can now modify and manipulate genes of organisms to produce beneficial products. For example, **cloning** is a process that produces exact copies of DNA, cells, and organisms. An application of cloning is **gene cloning**, which is the production of identical copies of a gene. These copies are then used to make large amounts of proteins or to alter an organism in a useful way. Insulin is an example of a protein that is made through gene cloning. During cloning, DNA from one organism is inserted into the DNA of another organism. The result is a molecule called **recombinant DNA**.



Transgenic Organisms

Plants and animals that have DNA from other organisms inserted into them are known as **transgenic organisms**. They are also called **genetically modified organisms**, or **GMOs**. Transgenic plants can have increased nutritional content or they can be resistant to herbicides, pests, or diseases. Transgenic animals are used to make commercial and medical products for humans. They are also used to study diseases, find treatments, and produce drugs to treat disorders.