

**Modern Genetics**

**Advances in Genetics (pages 123–128)**

**Selective Breeding (page 124)**

**Key Concept:** Selective breeding is one method for developing organisms with desirable traits.

- **Selective breeding** is when organisms with desired traits are chosen to be the parents of the next generation. At least some of the offspring may have the desired traits.
- Corn plants that produced the most and the best food were developed by selective breeding.

*Answer the following question. Use your textbook and the ideas above.*

1. When organisms with desired traits are chosen to be the parents of the next generation, it is called \_\_\_\_\_.

**Cloning (page 125)**

**Key Concept:** Cloning is one method for developing organisms with desirable traits.

- A **clone** is an organism that has exactly the same genes as the organism from which it was produced.
- Some plants are very easy to clone. Just cut a stem from the plant and put the stem in soil. The stem will grow into a new plant. The new plant is genetically identical to the plant the stem was cut from.
- Scientists have cloned some animals. Cloning animals is more difficult than cloning plants. The nucleus of an animal's body cell is used to produce an animal clone.

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Answer the following questions. Use your textbook and the ideas on page 57.

2. Which is an example of a clone? Circle the letter of the correct answer.
  - a. Corn developed by selective breeding.
  - b. A plant grown from the stem cut from a plant.
  - c. Kittens that look different from their mother.
  
3. Is the following sentence true or false? Animals are easier to clone than plants. \_\_\_\_\_

**Genetic Engineering** (pages 126–127)

**Key Concept:** Genetic engineering is a method for developing organisms with desirable traits.

- In **genetic engineering**, genes from one organism are put into the DNA of another organism.
- Scientists use genetic engineering to create bacteria that can make useful human proteins such as insulin. The human insulin gene is put into a bacterial cell. The bacterial cell makes the insulin. Then scientists collect the insulin, which is used to treat a disease.
- In **gene therapy**, scientists put copies of a needed gene directly into a person's cells. For example, scientists could replace the allele of the gene that causes cystic fibrosis with a copy of the normal allele.

Answer the following questions. Use your textbook and the ideas above.

4. Circle the letter of each sentence that is true about genetic engineering.
  - a. Scientists put bacteria into human cells.
  - b. Scientists put human proteins into bacterial cells.
  - c. The bacterial cells make the human protein.

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5. Scientists put genes directly into a person's cells in a process called \_\_\_\_\_.
6. Scientists transfer genes from one organism into the DNA of another organism in \_\_\_\_\_.

### Learning About Human Genetics (page 128)

**Key Concept:** The main goal of the Human Genome Project has been to identify the DNA sequence of every gene in the human genome.

- A **genome** is all the DNA in one cell of an organism.
- In the Human Genome Project, scientists are working to identify the sequence, or order, of nitrogen bases for all the genes on the human chromosomes.
- Every person has a different sequence of nitrogen bases in their DNA, except for identical twins.

*Answer the following question. Use your textbook and the ideas above.*

7. Draw a line from each term to its description.

<b>Term</b>	<b>Description</b>
genome	a. have the same DNA sequence
Human Genome Project	b. all the DNA in one cell of an organism
identical twins	c. identify the base sequence for all human genes

Changes Over Time

## Darwin's Theory (pages 138–145)

### Darwin's Observations (page 139)

**Key Concept:** Charles Darwin's important observations included the diversity of living things and the remains of ancient organisms.

- In 1831, Charles Darwin left from England on a ship that made many stops along the coast of South America. Darwin's job was to learn about the living things he saw.
- Darwin saw many plants and animals that he had never seen before. The living things he saw in South America were all very different from those in England.
- A **species** is a group of similar living things that can mate with each other and produce offspring.
- Darwin saw fossils in South America. A **fossil** is the preserved remains of an organism that lived long ago.

*Answer the following questions. Use your textbook and the ideas above.*

1. Is the following sentence true or false? Darwin saw that living things in South America were just like those in England. \_\_\_\_\_
2. Read each word in the box. In each sentence below, fill in the correct word or words.

fossil	living thing	species
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- a. The preserved remains of an organism that lived long ago is a \_\_\_\_\_.
- b. A group of similar living things that can mate and produce offspring is a \_\_\_\_\_.