Human Inheritance (pages 110–116)

Patterns of Human Inheritance (pages 111–112)

Key Concept: **Some human traits are controlled by single genes with two alleles, and others by single genes with multiple alleles. Still other traits are controlled by many genes that act together.**

- Many human traits are controlled by one gene with one dominant allele and one recessive allele. These traits have two specific phenotypes. For example, the allele for a widow's peak in the hairline is dominant over the allele for a straight hairline.
- Some human traits are controlled by one gene that has more than two alleles. Genes with more than two alleles have **multiple alleles**. Even though a gene has multiple alleles, a person can have only two of the alleles. This is because a person has chromosomes in pairs. Each chromosome in the pair carries only one allele for a gene. Human blood type is controlled by a gene with multiple alleles.
- Some human traits are controlled by many genes. These traits have a wide range of phenotypes because the genes act as a group to produce a single trait. Height and skin color are controlled by many genes.

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

1. Circle the letter of each sentence that is true about human traits.

a. All human traits are controlled by one gene.

b. Even though a gene has multiple alleles, a person can have only two alleles for the trait.

c. Traits controlled by many genes have a wide range of phenotypes.

2. Draw a line from each example to the pattern of inheritance.

Example	Pattern of Inheritance
human blood type	**a.** single gene with two alleles
height	**b.** single gene with multiple alleles
widow's peak	**c.** many genes

The Sex Chromosomes (pages 113–115)

Key Concept: **The sex chromosomes carry genes that determine whether a person is male or female. They also carry genes that determine other traits.**

- The **sex chromosomes** are one pair of the 23 pairs of human chromosomes.
- Sex chromosomes are the only chromosomes that do not always exactly match. Females (women) have two X chromosomes. Males (men) have one X chromosome and one Y chromosome. The Y chromosome is much smaller than the X chromosome.
- When sex cells form, the sex chromosomes separate just like the other chromosomes. All egg cells have an X chromosome. Half of the sperm cells have an X chromosome and half have a Y chromosome.
- When a sperm cell with an X chromosome fertilizes an egg cell, the fertilized egg develops into a girl. When a sperm cell with a Y chromosome fertilizes an egg cell, the fertilized egg develops into a boy.
- Genes for some human traits are also carried on the sex chromosomes. These genes are called **sex-linked genes** because their alleles are passed from parents to child on a sex chromosome. One sex-linked trait is red-green colorblindness.

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Answer the following questions. Use your textbook and the ideas on page 50.

3. When a sperm cell with an Y chromosome fertilizes an egg cell, the fertilized egg develops into a(an)

_____.

4. Women have two _____ chromosomes.

5. The Punnett square below shows the possible phenotypes of the children whose mother has one allele for colorblindness. Normal vision (X^C) is dominant over colorblindness (X^c). The Y chromosome does not carry a gene for color vision. Circle the genotypes of the children that will be colorblind.

Father X^CY

Mother X^CX^c	X^C	Y
X^C	X^CX^C Daughter	X^CY Son
X^c	X^CX^c Daughter	X^cY Son

6. Look again at the Punnett square above. What is the probability that this couple will have a daughter who is colorblind? Circle the letter of the correct answer.

a. No daughters will be colorblind.

b. The daughters have a 50 percent chance of being colorblind.

c. All the daughters will be colorblind.

The Effect of Environment (page 116)

Key Concept: **Many of a person's characteristics are determined by an interaction between genes and the environment.**

- The phenotypes of all living things are not the result of their genes alone. A living thing's environment, or surroundings, also affects the living thing's characteristics.
- Height is determined by several genes that work together. However, people's diets also influence height. A poor diet or poor health can keep a person from growing as tall as might be possible.

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

7. Is the following sentence true or false? The environment has an effect on a person's characteristics. _____

8. Circle the letter of the effects of a poor diet.

a. can make a person grow taller than possible

b. can keep a person from growing as tall as possible

c. has no affect on height