

# Lesson Self-Check

## CAN YOU EXPLAIN IT?

**FIGURE 17:** Perhaps if you were given different food choices as a young child, you would make different food choices today.



You have explored throughout this lesson about inherited traits. Both genes and the environment play a role in shaping who we are. Eating a healthy diet is an important part of growing up and maintaining good health as we age. Nonetheless, some foods are just not that appealing to some people. Researchers are looking at how our food preferences develop—is it genetic, or is it our environment? This question is an example of the long-standing “nature vs. nurture” debate. Doctors and scientists alike have always maintained that parents should provide a variety of healthy foods to children so that they are familiar with these tastes from a young age. But do we have genes that predispose us to like or not like—as in the case of broccoli—certain foods? Several studies have linked a specific gene to a taste receptor that perceives broccoli and similar vegetables as bitter, whereas people without this gene do not detect the bitterness. This makes sense from a biological standpoint, as taste reception is a biochemical process. However, other studies have suggested that a “food window” of sorts exists when children are as young as four months old. During this sensitive time period, exposure to different foods may influence the child’s food choices later in life. Some feel that this critical period is when children should be exposed to as many different foods and flavors as possible.



**Explain** When it comes to something like food preferences, how do genetics and the environment influence traits? In your answer, discuss the following:

- How are traits generally passed from parents to offspring?
- How can dominant-recessive relationships influence which trait is expressed in the phenotype of the organism?
- How is the expression of genes influenced by other genes and the environment?

**CHECKPOINTS****Check Your Understanding**

1. Which of the following statements best describes how genes relate to traits?
  - a. Genes code for the production of specific proteins. These proteins lead to different traits.
  - b. Genes and traits function together to produce proteins.
  - c. Traits contain instructions for making proteins, and genes are the observable outcome of such proteins.
  - d. Genes are expressed according to instructions in traits.
  
2. Why did Mendel remove the stamens of some pea plants during his first experiments? Select all correct answers.
  - a. to prevent reproduction from occurring
  - b. to control which parent plants were allowed to reproduce
  - c. to prevent self-fertilization of the pea plants
  - d. to allow the pea plants to reproduce asexually
  
3. Mendel's F<sub>1</sub> generation of pea plants were heterozygous. What does this mean?
  - a. All of the offspring plants would have the recessive trait.
  - b. Half of the offspring plants would have the dominant trait, while the other half would have the recessive trait.
  - c. The offspring had two identical alleles for the same gene.
  - d. The plants had two different alleles for the same trait.
  
4. Which of the following statements best describes why a recessive trait is not observed in the offspring of a cross between a homozygous-dominant and a homozygous-recessive parent?
  - a. The offspring will be heterozygous, and the dominant allele masks the appearance of the recessive allele.
  - b. Recessive alleles are blended with dominant alleles to make an intermediate trait.
  - c. The offspring will likely be homozygous dominant for this trait and therefore show the dominant trait.
  - d. The dominant alleles will destroy the recessive alleles.

5. Which of the following questions can be answered by Mendel's Law of Segregation?
  - a. Why do the offspring of a plant that is homozygous tall (TT) and homozygous short (tt) all appear tall?
  - b. In what way do traits pass from one generation to the next?
  - c. How can a plant that is heterozygous for height (Tt) have both tall and short offspring?
  - d. Why don't tall pea plants also all have purple flowers?
  
6. Use the following words to complete this statement: *phenotype, genotype, heterozygous, homozygous, traits, alleles, genes*  
 Chromosomes contain \_\_\_, which help to determine an organism's \_\_\_. Genes come in alternate forms called \_\_\_, and both parents may not have the same type of allele. The actual gene combination that an organism receives from its parents is called its \_\_\_, while the trait that gets expressed as a result is referred to as its \_\_\_. If an offspring receives the same type of allele for a given gene from each parent, it is said to be \_\_\_ for that trait. If the alleles differ, it is \_\_\_.
  
7. Explain why a recessive allele can only be expressed when the organism is homozygous.

**MAKE YOUR OWN STUDY GUIDE**

In your Evidence Notebook, design a study guide that supports the main idea from this lesson:

**Both genes and the environment influence the expression of traits passed from parents to offspring.**

Remember to include the following information in your study guide:

- Use examples that model main ideas.
- Record explanations for the phenomena you investigated.
- Use evidence to support your explanations. Your support can include drawings, data, graphs, laboratory conclusions, and other evidence recorded throughout the lesson.

Consider how genes function to produce traits, how different genes interact, and how the environment influences genes.