# **Traits and Heredity Discussion Guide (for use during or after reading)**

1. Why are blue eyes considered a trait, but eyes in general are not? (What Are Traits?, p. 6-7)
   1. Traits are things that not all living things of a particular type have in common. Because all people and others in the animal kingdom have eyes, having eyes is not considered a trait. However, people have a variety of colors of eyes so specific eye colors, such as blue, are considered traits.
2. How are the genes located within DNA similar to blueprints for a house? (Traits and Genes, p. 10-11)
   1. Genes located within DNA can be compared to blueprints for a house because they provide the instructions for making all the different components needed to create a strong, well-functioning structure, just like a blueprint does for building a strong house.
3. Why does asexual reproduction result in identical offspring? (Genes and Reproduction, p. 12-15)
   1. Asexual reproduction results in identical offspring because it involves copying every chromosome from a single parent to split or propagate to create new offspring. The offspring are identical because their chromosomes are identical.
4. When are recessive traits expressed or seen? Why is this? (Genes and Variation, p. 16-19)
   1. Recessive traits are only expressed or seen when an organism has two recessive alleles for that trait. Whenever even one dominant allele is present, it will hide any recessive alleles making it impossible for them to be expressed or seen.
5. What is a carrier of a trait? (Genes and Variation, p. 16-19)
   1. A carrier is an organism that has and transfers a recessive gene, but does not show that trait physically because of the presence of a dominant gene.
6. Explain how Mendel’s famous purple flower pea plant experiment illustrates the differences between dominant and recessive alleles and traits. (Genes and Variation, p. 16-19)
   1. Mendel studied the purple flower pea plant over multiple generations. He noticed that the recessive white flower gene only showed in flowers that inherited two recessive alleles. All other flowers were purple, even the ones that inherited one recessive allele. This is because the dominant allele in those pairs took over and hid the recessive allele so it was not expressed. This helps us understand how traits can be passed from generation to generation.
7. What are hybrids and what is crossbreeding? Why do some farmers use these? (Hybrids, p. 20-21)
   1. A hybrid is the offspring of parents from different breeds, varieties, or species. Although hybrids can occur in nature, most often people are referring to when farmers crossbreed their crops or even their livestock to improve the quality or quantity. This can help farmers not only be more efficient but solve problems related to hunger.
8. What is one major cause of mutation? (Mutation, p. 22-23)
   1. Mutations are often caused by factors in an organism’s environment, such as pollution. When pollution enters plant and animal cells, it can cause mutations or other life cycle disruptions.
9. Describe the debate about nature versus nurture. (Environmental Influences, p. 24-27)
   1. Some debate the ideas of nature versus nurture when it comes to what affects organisms and their traits. Through experiments and observations, however, scientists have found that both nature (heredity) and nature (the environment) can affect the traits of organisms.
10. How has studying heredity helped scientists in the field of disease? (Environmental Influences, p. 24-27)
    1. Studying heredity has helped scientists understand the causes of certain diseases. It has also helped them develop ways to treat certain diseases. We hope studying heredity will give us more clues for treatments for currently uncurable diseases.