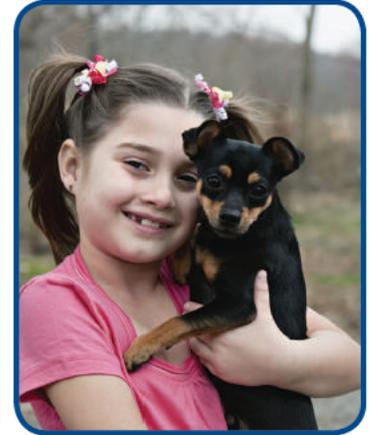


Reading 1.3 – Where Did You Get Those Eyes?

Getting ready

As a woman walked by a little girl who was playing with her dog, the woman asked, “Where did you get those big brown eyes?” The little girl wrinkled up her face as she thought about the question. After a little while, she responded in a happy tone of voice, “I got them from my dog!”

Why is the little girl’s answer amusing?



That answer is cute from a young child, who does not understand how she gets her traits from the people and the environment around her. As a middle school student, however, you know that traits originate from different sources, and that your pet is not a source of any of your traits. As you read, think about your own traits and where you think they originated.

In class, you and your classmates collected data on traits. Traits are characteristics that distinguish one organism from another. Inherited traits are traits that you are born with. Traits that are acquired or learned traits can be changed depending on how you interact with your environment. Some traits are both. You are born with a muscular structure. If you exercise with weights, you can develop larger muscles. If you have light skin, but you are outdoors in the sun a lot, your skin color darkens. Traits can have many variations. Hair, for example, can be brown, blonde, black, or red, but even within each of those colors are many shades of difference. The same thing is true for eye color. Other traits you either have, or you do not have. Dimples are an example; either you have dimples or you do not.

Why do Scientists Care about Traits?

The little girl had big, brown eyes. Her dog had eyes that also were big and brown. It seemed natural to the little girl that since her eye size and color traits were the same as her dog, she must have gotten her eyes from the dog. You know that was a humorous but incorrect response. Heredity, the passing down of traits from one generation to another, gave her eyes the variations of brown and big. DNA, a molecule in the nucleus of a cell, carried instructions for the size and color of her eyes from her parents. Scientists want to find out how these traits are passed down. They investigate genetics, the mechanisms of how traits are passed down.

Why do you think scientists are interested in studying genetics? Have You Ever Wondered:

- Why do my brother and I have the same nose, but our sister's nose looks very different?
- Why do people say I look like my grandfather?
- Why do my cousin and I look more alike than my sister and I do?
- Why do my dog's puppies look so different from one another?
- Why do hamsters in the same litter look alike, but kittens in a cat's litter do not look alike?

If you wonder about questions like these, you have already started your study of genetics. Genetics is an interesting field of study, but it is also an important one. As you read the following section, consider reasons why studying genetics is important.

The principles of heredity explain how one generation of a plant or an animal shares similar characteristics with the generations that came before it. Corn plants come from the seeds of corn plants. Puppies are born from dogs that were once puppies born from another generation of dogs. Dogs and corn have very different traits. Principles of heredity always apply, but one of those principles is that some traits vary. Tall parents tend to have tall children, but everyone probably knows an example where that is not true. A short child born to tall parents may be exhibiting a characteristic that had not been seen in parents, or grandparents, or in their parents or grandparents.

Characteristics like height, eye color, and hair color are obvious through observation. But not all inherited traits are obvious. Some people may inherit the tendency to develop a certain disease, for example. You cannot see that in another person or even in yourself. Whether someone actually develops the disease, however, might depend on factors in their environment.

Although the field of genetics is interesting to many people, scientists study genetics to learn important information. One area of study is the role of genetics in how diseases or disease resistance may be passed from one generation to another through particular traits. You might imagine how this information would be helpful in preventing or treating diseases in humans, in animals, or in plants. Farmers are especially interested in plants that are resistant to diseases that could threaten to ruin an entire crop, for example. Scientists who study genetics are interested in many aspects of genetic material, including how traits get passed from one generation to another.

Your Driving Question Board contains an area for species traits and an area for individual traits. Based on the reading, list one trait that can vary between individuals within the species, and one trait that is a species trait.

In the reading, an example is given of a trait that is both inherited and is influenced by the environment. Describe that example.



Recently, scientists have determined that a particular gene affects whether you would be better as a marathon runner, who has endurance for running long distances, or as a sprint runner, who has speed for short distances. People who are really good at those two sports engage in rigorous training, too. So, if you want to become a super athlete, do you count on your genes or on a really good workout program? Before you read the next section, list some of your ideas.



Genes or Environment: What Influences Athletic Performance?

Genetics influence many things about you. Your athletic ability is one of them. Athletic ability is a characteristic in which you can see the influence of both genetic material you inherited and of environmental factors. For example, someone may come from a family of people with exceptional speed, or endurance, or other abilities. Genetics play a role in strength, flexibility, lung capacity, and other factors, as well. But factors that affect performance include eating habits, mental skills, and things like balance and reaction time. Genetics have less influence or no influence over factors like these. Environment and genetics, together, play a role in athletic performance. If a person overeats and never exercises, his or her genetic potential to be an exceptional athlete will not be realized. Genetics may also limit your potential to be a strong athlete. But still, some people with limited genetic potential might be able to train and become a strong competitor. Some shorter basketball players, for example, can become great because of their extreme quickness, or by training to develop their skills in ball handling, or other aspects of the game.

Think about your own athletic abilities. Do you think they are more influenced by genes or by environment? Explain your ideas.



Genetics can also affect how your body responds to various influences. Research has shown that some people's bodies respond to training better than other people's bodies. For example, some kinds of training can improve how your heart works as you exercise, but genetics may limit the extent to which training can improve how your heart works. People who inherit genetic ability may also have bodies that respond better to training. Both genetics and environmental factors, together, affect athletic performance. Athletic performance is not just about what people think of as natural ability, or raw talent, or being born a gifted athlete.

Think about your previous response. Do you have any new ideas about what factors shape your own athletic performance? Explain your ideas.

