

ACT Reading Practice #8

PASSAGE IV—NATURAL SCIENCE “Eye Color”

Physically, we cannot change much about who we are. Certainly gaining and losing weight or packing on muscle can alter our appearances, but most of how we look is based on our genes. Though modern science is beginning to meddle with the human genetic code in order to identify and manipulate certain genes, there is no need for a genetic scientist's interference when attempting to determine the natural heredity of some common human features. Nearly all physical traits are inherited through the genes of one's parents; a widow's peak, attached earlobes, and a rolling tongue are common traits studied in science classes. Eye color, and more specifically, how one ends up with a certain eye color, seems to be the trait that interests students most. When people strongly desire a certain trait to be passed down to their children, they can simply search for the complementary traits in a mate, or, as science improves, may simply call up the doctor for an eye color change.

Why do we have the eye colors we do? One only has to look at his or her own genetics to arrive at the reason for eye color. Melanin, or dark pigment (also responsible for hair and skin color), is what is present in the eye that determines eye color, and more specifically, the amount of melanin in the iris. Brown eyes reflect a heavy amount of the pigment, whereas green and blue eyes have significantly less melanin. Three genes have thus far been determined by scientists as those responsible for eye color, and, of course, these genes are inherited from one's parents. Genes from parents sketch out a “body road map,” including eye color and practically everything else for children. Children inherit one copy of a gene from their mothers and one from their fathers. Looking at children's parents, therefore, will help determine the likelihood of a certain eye color. The combination of genes for a given trait is called the genotype, whereas the appearance of the genes is called the phenotype.

An entertaining activity for a student of basic biology is to determine the likelihood of a certain eye color for his or her future children with a possible mate. First, one should learn the eye colors of both the mate and both pairs of parents. By examining inheritance, the potential phenotypes are revealed. When working with eye color inheritance, though, it is important to know that brown eyes are dominant while blue eyes are recessive. This means that in the realm of possibilities, a brown eye gene will essentially “override” a blue eye gene when put in combination. For example, if a blue-eyed female and brown-eyed male, each with parents showing the same phenotype as their children, had a child together, the likelihood of a brown-eyed child would be about 75%. A child in this simple scenario would have a 25% chance to have something other than brown eyes (green or blue). This is because the dominant brown eye gene masks the recessive blue eye gene in 50% of the possibilities. In more complex situations, in order to discover all the potential combinations of genotypes, a small chart called a Punnett Square is typically used because genetic possibilities can vary greatly.

Although studying genetic possibilities can help predict future children's traits, it does little for the eye color one already has. In fact, many teens and adults focus on eye color as a characteristic they can change since it takes little effort. Since the mid-eighties, color contacts have been available to those who wanted a quick, easy, and painless physical change, but now a permanent solution for changing brown eyes to blue is in the works. One California doctor says that he has developed a process to laser away the brown pigment to leave the underlying blue. Though this is still being studied, other doctors have doubts about the procedure's safety. Some claim that the destruction of melanin would leave behind remnants similar to the ashes left behind from a burned log. This may lead to future issues with cataracts, or worse, glaucoma, a serious eye

condition that can lead to permanent vision loss.

With an expected price tag of \$5,000, are the combined price and risk worth altering what nature created?

The genes inherited from our parents determine essentially everything about an individual, and methods for predicting future generations' traits can be used. Our own eye color, determined by the amount of melanin in our irises, is truly the result of our parents' genotypes. However, as technology continues to change our physical traits, can altering our eye color eventually lead to our vision of the future becoming dark?

1. The passage indicates that a genotype is:

- A. the genetic makeup of a trait.
- B. the bodily manifestation of a trait.
- C. the gene required to produce a certain trait.
- D. a parent's chosen trait for a child.

2. The primary purpose of the passage is to:

- A. describe the process by which students can determine the eye color of their future offspring.
- B. inform readers of simple genetics and options available to alter some inherited traits.
- C. inform readers of scientific breakthroughs.
- D. persuade readers to rethink surgery altering physical features.

3. It is reasonable to conclude that the author ends the fourth paragraph with the question, "Are the combined price and risk worth altering what nature created?" (lines 75-76) in order to:

- A. make the reader think about the choice he or she is about to make.
- B. state that natural characteristics should not be altered.
- C. suggest that the risk involved does not justify such a minor cosmetic change.
- D. suggest that a medical procedure involving important parts of one's body should not be attempted.

4. The author identifies all of the following as ways to modify one's appearance EXCEPT:

- A. medical procedure.
- B. working out.
- C. wearing color contact lenses.
- D. adding melanin to one's eyes.

5. The passage indicates that a recessive gene:

- A. will always be hidden unless there is a dominant trait.
- B. can remain physically unseen in a brown-eyed individual.
- C. may change the eye color of an individual over time.
- D. has a 25% chance to be evident in all circumstances.

6. The central argument doctors have against permanently changing eye color is:

- A. the doctor from California doesn't use lasers as intended.
- B. scar tissue may seriously damage vision.
- C. cataracts form from eye procedures involving lasers.
- D. the cost of such a procedure would be too expensive for how simple a process it is.

7. It can reasonably be inferred from information in the passage that one would find a Punnett Square to be most helpful in which of the following circumstances?

- A. When attempting to determine what color eyes a child will have if one parent has brown eyes and the other has green eyes
- B. When attempting to determine what color eyes a child will have if one parent has blue eyes and the eye color of the other parent is unknown
- C. When wishing to determine the likely eye color of a child when both parents have brown eyes
- D. When determining what gender a child will be

8. It can be reasonably inferred from the passage that the less melanin one has in his or her skin:

- A. the lighter a bruise on the skin will be.
- B. the lighter the eye color will be.
- C. the tanner one will get when exposed to the sun.
- D. the lighter his or her skin will be.

9. Which of the following statements best describes the way the second paragraph functions in the passage as a whole?

- A. It provides information required to understand the function and purpose of a Punnett Square.
- B. It divides the passage into two parts, one focused on heredity, the other on surgical methods.
- C. It provides basic information about genetics that is required to understand the sources of eye color.
- D. It functions as a transition between the first paragraph and the author's personal feelings about altering genetics.

10. Which of the following is NOT a phenotype inherited from one's parents?

- A. brain damage
- B. hair color
- C. toe length
- D. teeth straightness