1. What causes the symptoms of sickle cell anemia?
   a. There are not enough red blood cells to carry gases back and forth from the lungs to the cells of the body.
   b. The red blood cells stick together, clumping and blocking major blood vessels.
   c. The hemoglobin molecules in the red blood cells stick together, forming fibers that cause the cell to be sickle shaped.
   d. The cells of the organs in the body become sickle shaped, so they can’t accept oxygen or release carbon dioxide properly.

2. Proteins are made up of
   a. nucleic acids
   b. amino acids
   c. codons
   d. triplets

3. How many mutations exist in the chromosomes of a person who has sickle cell anemia?
   a. 1
   b. 2
   c. 3
   d. 4

4. What impact does the change in one amino acid have on the hemoglobin molecule?
   a. Both alpha and both beta chains stick together differently, forming long chains.
   b. The proteins that form the molecule don’t fold at all.
   c. The proteins fold but they have a different shape than the normal proteins.
   d. Only one of two beta chains is affected, causing the molecule to form fibers.

5. When different parts of a single amino acid chain bind to other parts of the same chain to form a three-dimensional structure, this is called
   a. transcription
   b. translation
   c. mutation
   d. protein folding

6. An array of three bases on a DNA molecule is called a
   a. codon
   b. triplet
   c. amino acid
   d. molecule
7. What is the likelihood that this couple will have a healthy child with no genetic mutations for sickle cell anemia?
   a. 25%
   b. 50%
   c. 75%
   d. 100%

8. What does it mean when someone is referred to as a ‘carrier’ for a genetic disease?
   a. They suffer from the disease themselves.
   b. They don’t show signs of the disease, usually.
   c. Both of their parents show marked symptoms of the disease.
   d. The person will die in infancy if they are born at all.

9. Genetic counselors help couples in a number of ways. Which of the forms of assistance listed below are NOT part of a genetic counselor’s job?
   a. directing parents toward resources and medical facilities that will help them raise a child born with a genetic disease.
   b. advising parents about the likelihood their children might be born with a genetic disease
   c. making a decision about the amount of risk parents are willing to take
   d. advising parents on testing options before, during and after pregnancy