From: <http://www.dnai.org/>

& <http://www.ygyh.org/index.htm> select “Sickle Cell Disease” and go to “Causes”

**Sickle Cell Anemia**

1. Sickle cell is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ common genetic order in the USA.
2. Occurs about 1:375 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ children.
3. Inside red blood cells is a protein called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This protein’s role is to carry another molecule called \_\_\_\_\_\_\_\_\_\_\_\_\_.
4. Hemoglobin is made from 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ globins. Each of the globins has its own \_\_\_\_\_\_\_\_\_\_\_\_\_ group.
5. Inside the heme group each globin has an \_\_\_\_\_\_\_\_\_\_ atom and this is where the oxygen binds.
6. Beta globin genes are located on Chromosome \_\_\_\_\_\_\_\_. Every individual has \_\_\_\_\_\_\_\_\_\_\_ [number] of these genes.
7. Genes are:
8. *[This question is review and is not shown in the “incorrect” animation!]*

Inside the gene, the sequence of \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dictate the sequence of transcribed \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The latter molecules leave the nucleus and are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by ribosomes into a sequence of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This sequence is called a poly\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and when it is folded into its three-dimensional shape then it is a functional \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. The difference between sickle cell and normal, in terms of nucleotide sequence is:
2. The difference in nucleotide sequence causes:
3. This amino acid called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ causes the protein to be sticky when …
4. When separate Hb come near each other:
	1. the \_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ stick together.
	2. Many of these attachments cause \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [shape] formed by many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	3. This in turn stretches the red blood cell into a sickle or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shape.
5. The red blood cell returns to normal shape:
	1. when it travels to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. then the heme group captures more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and this makes the globins less \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. so the Hb separate and the red blood cell changes from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shape into its normal bi-concave disc shape.
6. This rapid change in shape causes the red blood cells to become damaged and last for {more / less} time.
7. This causes a {build-up / shortage} of red blood cells, {increasing / lowering} the amount of oxygen the blood can carry.
8. The result is a condition called: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Symptoms of this condition include:
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Besides change in blood cell number, this condition also causes red blood cells to:
10. … which causes cell in tissue downstream to \_\_\_\_\_\_\_\_\_\_ resulting in very localized pain which can last from \_\_\_\_\_\_\_\_\_\_\_ up to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. produces symptoms of:
11. These blockages can occur anywhere, but are particularly vulnerable in highly vascular areas like the:
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ causing …
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ causing …
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ causing …
12. Answer questions #1-4 from textbook p 93 by hand in writing.