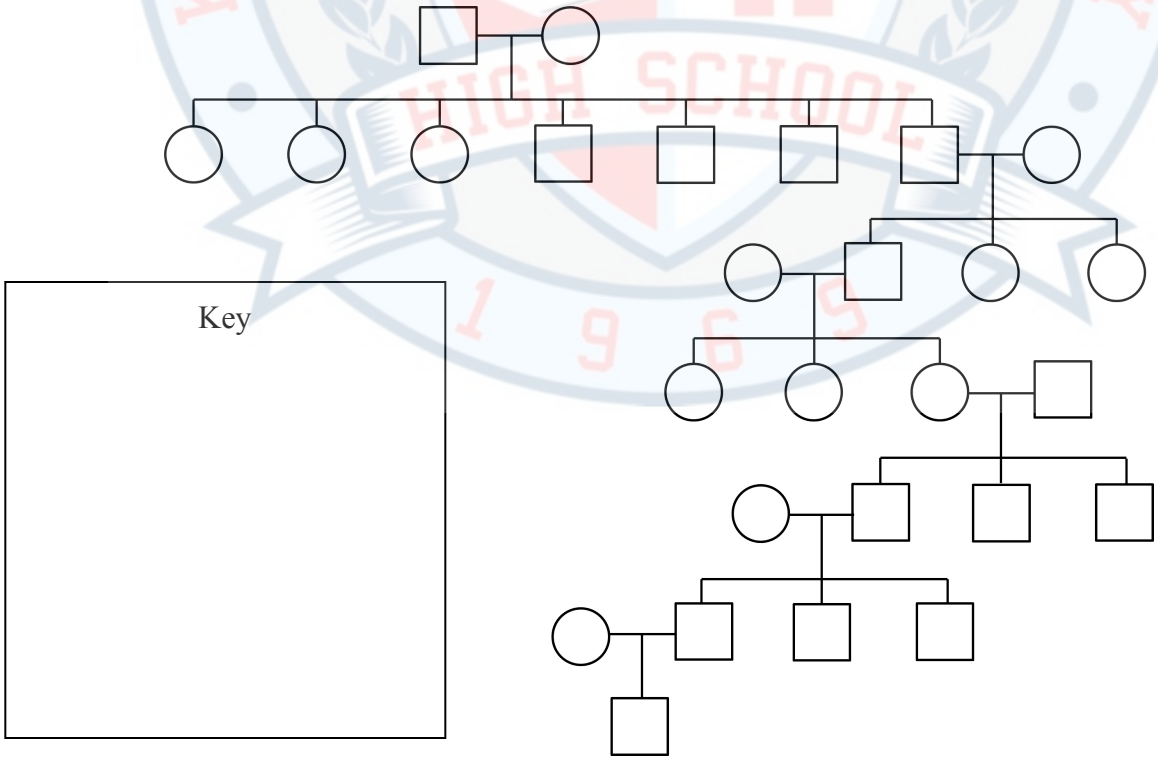
Name: _____ Date: _____ Period: ____

The Blue Fugates Week #____

Directions: Read the passage below and box the names of every family member.

Martin Fugate was an orphan who moved to Kentucky in 1820 to find a place to live near Troublesome Creek. Family stories say that Martin's skin looked blue! The odds were very much against it, but Martin Fugate managed to find and marry a woman who carried the same recessive gene. His wife, Elizabeth, carried one copy of the blue gene, but her skin was white as snow. Martin and Elizabeth began a family. They had seven children- three girls followed by four boys. Their first, second, sixth, and seventh children were blue. Zach, their youngest, married Rachel and they had three non-blue children –one boy and two girls. Levy, Zach's son, married a girl named Sarah and bought a large farm. The couple had three daughters, including Luna, the youngest, who was blue. As it turns out, the girl that Levy married carried the recessive gene. A fellow by the name of John spotted Luna at Sunday services of the Old Regular Baptist Church back before the century turned. John dated her and married her. Luna was healthy, like most blue people, and had three sons, none of which were blue. Her first son Steve married a local girl named Susie, and they had three non-blue sons, including the oldest, Alva. As coal mining and the railroads changed Kentucky, the blue people started moving around and marrying other people. Not too long back Alva found himself a bride in a local woman named Hilda and the two had a son named Benjy. You can only imagine how shocked they were when their little son Benjy popped out blue! As it turns out, Hilda had Fugate blood carrying the recessive gene!

<u>Directions</u>: In the space below, use the passage to draw the complete Fugate pedigree. Each line represents a generation. Shade all individuals that are identified as being blue and half shade any individuals that are identified as carriers.



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After extensive research, scientists determined that being blue, methemoglobinemia, is a rare blood condition that is inherited as a recessive trait. In other words, to get the disorder, a person would have to inherit two recessive alleles, one from each parent. Someone with only one allele for the disorder would be a carrier. Knowing this, go back to the pedigree and label the genotype for every individual. It may be necessary to identify individuals that must be carriers based on the phenotypes of their offspring.

1. What is the probability of Martin and Elizabeth's children being blue?

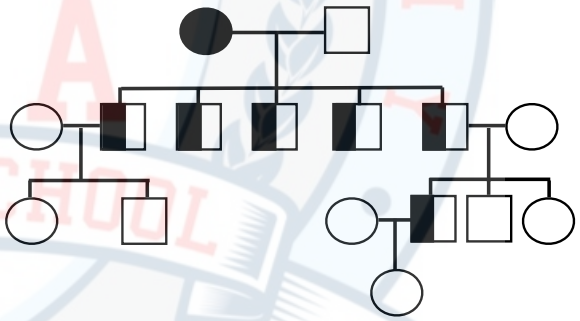
2. What is the probability of Sarah and Levy's children being blue?

3. What is the probability of Steve and Susie's children being blue?

In the passage, the author says that, "As coal mining and the railroads changed Kentucky, the blue people started moving around and marrying other people." The pedigree below traces the family of Jane Fugate, who moved to a new area of Kentucky, with no history of methemoglobinemia.

Directions: Complete the table and answer the questions by analyzing the pedigree.

Generation	Phenotype		Genotype(s)
	Blue	Non-Blue	
I	1	1	bb and BB
II			
III			
IV			



4. What do you notice about every individual that married into Jane Fugate's family?

_____

5. Explain what is happening to the frequency of the b allele through each generation of the pedigree.

_____

6. Use this pedigree as evidence to explain how recessive traits can, over time, diminish within a population.

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