Honors Biology
Unit 5: Patterns of Inheritance

Due Tuesday February 28th
Worth participation credit

Name: _____ Period: _____

Genetic Analysis of the Blue People of Troublesome Creek

Read the article provided and answer the analysis questions below in FULL THOUGHTFUL SENTENCES!

1. What is hemoglobin?

2. What molecule does hemoglobin decay into over time? How is this molecule different from hemoglobin?

3. What is the role of the enzyme diaphorase?

4. Explain why the Blue People of Troublesome Creek were blue (give as much detail as possible!):

5. What was the cure for methemoglobinemia? Why is this cure ironic, or why is this cure "funny"?

6. What is the reason that methemoglobinemia was isolated to the Troublesome Creek area of Kentucky? (In other words, why was the disorder only common in this area of Kentucky; why didn't other states see cases?)

Following the article is an excerpt that describes part of the blue Fugate family of Troublesome Creek, Kentucky. Because this is only part of the family, this would be called a *partial* pedigree. Read the excerpt carefully and use it to construct a pedigree tracing methemoglobinemia in the space provided on the next page. Use the symbols below to indicate each person accurately. Note, unaffected means normal skin color while affected means the person was blue. The carrier symbols mean the person carried a "blue" allele but didn't show signs of it.

On your pedigree chart, you must have the following:

- **Clearly labeled names when provided**
- **Symbols associated with male or female people**
- **Shading showing affected persons or carriers**

*****It is recommended that you do this in pencil!*****

Due Tuesday February 28th
Worth participation credit

Fugate Family Pedigree:

1. How many generations are seen in this pedigree? _____ Go back and label them using Roman numerals.
2. Is methemoglobinemia recessive or dominant? Provide evidence from the pedigree and/or excerpt that has led you to this conclusion.

3. Assuming John Stacy does not carry the methemoglobinemia allele, do Punnett square between Luna Fugate and John Stacy to show the possible genotypes of their children.

4. Can you tell for certain if Eleanor is a definite carrier for methemoglobinemia? Why or why not?

5. Review your pedigree and determine which individuals are carriers by shading half the circle or square. Only do this for carriers that you have enough information to do so.
6. Why didn't Bill Stacy have blue skin even though his mother did?

7. What advantage does a pedigree have over a written passage?