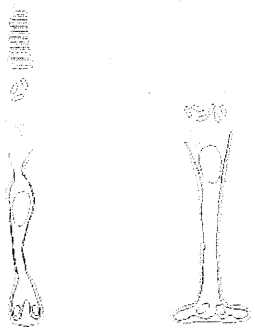
YOUR NAME: _____ PERIOD: _____

MLKHS BIOLOGY

ISHIHARA TESTS FOR COLOR VISION

INTRODUCTION:



Human eyes contain two types of cells in the retina that detect the light that hits them:

- RODS are more numerous, but they only detect shades of grey – they allow you to see in "black and white"
- CONES are located clustered at the center of the retina and are responsible for detecting the color of the light (actually the wavelength, but lets not get too technical) that hits them.

All people do <u>not</u> see all colors equally. There is much variation, as there is with other genetically controlled traits. For example different heights, different skin color and so on.

STANDARD: 3A. *Students know* how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and mode of inheritance (autosomal or X-linked, dominant or recessive).

PURPOSE:

To perform a clinical test to identify differences (if any) in the way members of the class see colors.

METHOD:

The teacher will show the class a number of cards. (These were first developed by Dr Ishihara in Japan.)

Students will record the numbers that they see (or not) on the cards in the Table below.

Perhaps, if is seems necessary, the teacher will add a few more cards for people who see "differently" to identify.

Students will answer the discussion questions that follow.

DATA TABLE:

Card #	I SEE	Card #	I SEE	Card #	I SEE
1		10		19	
2		11		20	
3		12		21	
4		13		22	
5		14		23	
6		15		24	
7		16		25	
8		17			
9		18			

DISCUSSION QUESTIONS:

1. Did all students see the cards the same way? _____

2. How many students saw the cards differently? _____

3. If there were students who saw them differently, what was the gender of those students? _____

4. Even if everyone in your class saw the cards the same, there are about 1 in 10 males who see them differently. These people have a MUTATION. Explain what is meant by the term mutation and explain how it may affect a person's color vision (phenotype).

MUTATION IS _____

PHENOTYPE IS AFFECTED BECAUSE _____

_____

5. The gene for color vision is described as SEX-LINKED. Explain this term.

_____

_____

6. Explain why it is more likely to find boys with different ways of seeing colors. _____

_____

7. Explain why it is less likely to find girls with different ways of seeing color. _____

_____

SUMMARY:

What did you do? _____

_____

What did you find out? _____

_____

APPLYING WHAT YOU KNOW:

Answer this fully on a separate sheet of notebook paper and staple it to the lab report before you turn in the whole thing.

"In humans, the genes for colorblindness are located on the X chromosome with no corresponding gene on the Y. These are recessive alleles. If a man and a woman, both with normal vision, marry and have a colorblind son, draw the Punnett square that illustrates this. If the man dies and the woman remarries to a colorblind man, draw a Punnett square showing the type(s) of children that could be expected from her second marriage. How many/what percentage of each could be expected?