

Part 2 (1 point each= 5 points)

Instructions: All the sentences below are incorrect. Rewrite them to make them correct in the lines below.

1. James Watson and Francis Crick took photo 51 using X-rays in 1962.

2. Gregor Mendel's family paid for his education at the University of Viena.

3. In incomplete dominance, red flower with white flowers create yellow flowers.

4. Rosalind Franklin won the Nobel Prize for her discovery in DNA.

5. Gregor Mendel used sunflowers to perform his experiments.

Part 3 (1 point for correct Punnett square, 1 point for correct genotype, 2 points for correct phenotype and 1 point for correct ratio= 5 points each problem/ 15 points)

Instructions: Solve the following Punnett problems. Find the genotype, phenotype and ratio. Read carefully at the alleles needed for each problem.

1. Hornless (H) in cattle is dominant over horned (h). A homozygous hornless bull is mated with a homozygous horned cow. What will be the genotype, phenotype, and ratio of the offspring?

1. Genotype:

2. Phenotype:



Hornless bull

3. Ratio:



Horned bull

2. In humans, being a tongue roller (R) is dominant over non-roller (r). A man who is a non-roller marries a woman who is heterozygous for tongue rolling. What will be the genotype, phenotype, and ratio of the offspring?

4. Genotype:

5. Phenotype:



Tongue roller

6. Ratio:



Non roller

3. Brown eyes in humans are dominant to blue eyes. A brown-eyed man, whose mother was blue-eyed, marries a brown-eyed woman whose father had blue eyes. What will be the genotype, phenotype, and ratio of the offspring?

8. Genotype:

7. Phenotype:

9. Ratio:

Part 4 (2 points each=10 points)

Instructions: Read the case below. Answer the questions based on the information read. Remember to give constructive and not destructing opinions where needed.

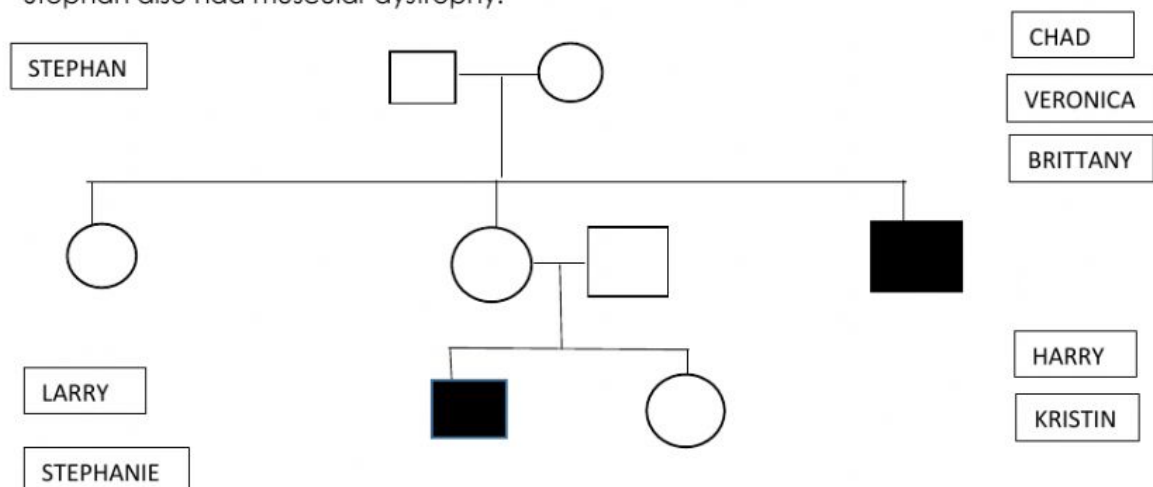
The victim of this case is a young man named Dylan. Though he is 24 years of age, he looks like a man of 40 years. Firstly, his friends introduced him to drugs as a means of enjoyment. Gradually he became addicted. He started with marijuana. He sometimes changes his drugs to meet his satisfaction level. He changes drugs one after another from marihuana to alcohol to phensidyl. Now he is fully addicted to 'phensidyl' for 4.5 years, and has to take it four times in a day. Without having it, he cannot do anything. He spends Q300-500 every day for drug purposes. For the excess money, sometimes he takes loan from friends or steals his own household materials. He collects drugs from the local spots or a particular person. On physical examination he was dirty, anxious looking, and irritated. Speech is slow. He looked too skinny. Mild anemia was present.

To what drugs is he addicted to?	
What physical consequences he has in his body?	
What bad consequences he got after drug consumption?	
Why does he look older than his real age?	
What is the clue that tells you he is dependent of drugs?	

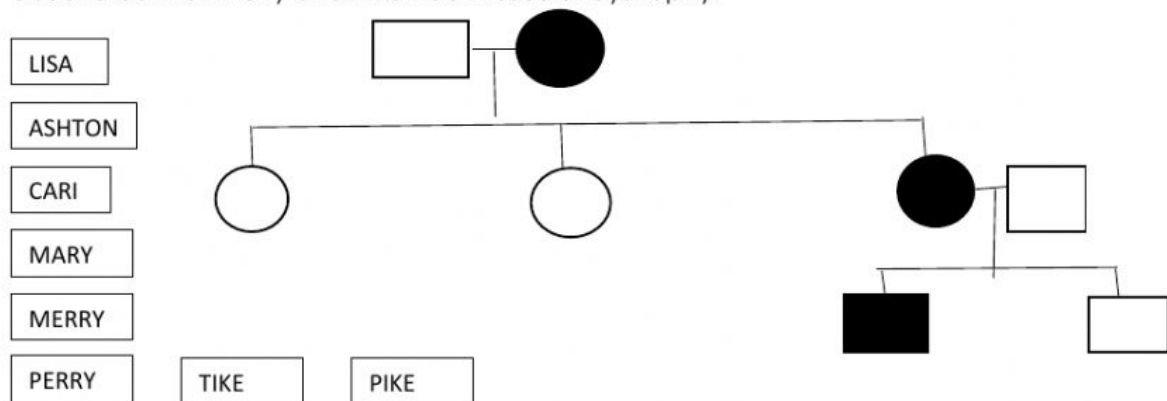
Part 5 (4 points each=20 points)

Instructions: Label the pedigree with names of the individuals. In the problem with no name, organize the figures representing the family members.

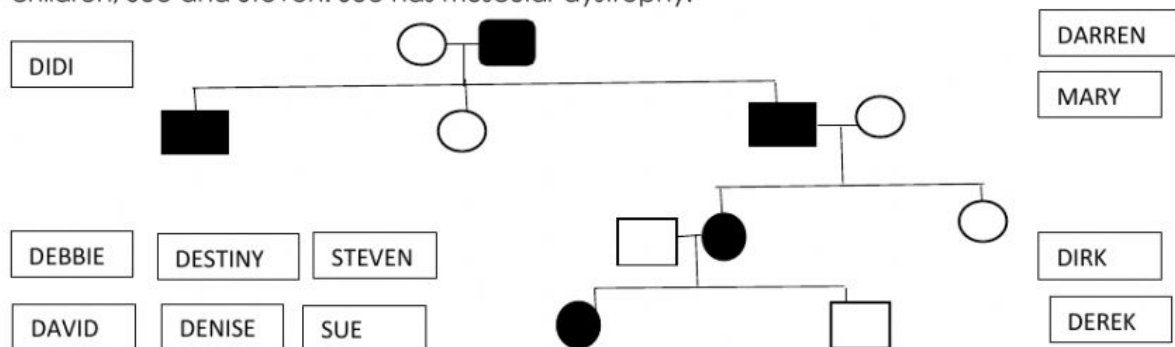
Chad and Veronica got married and had Brittany, Kristin, and Harry. It was discovered that Harry had muscular dystrophy. Brittany married Larry and had Stephan and Stephanie. Stephan also had muscular dystrophy.



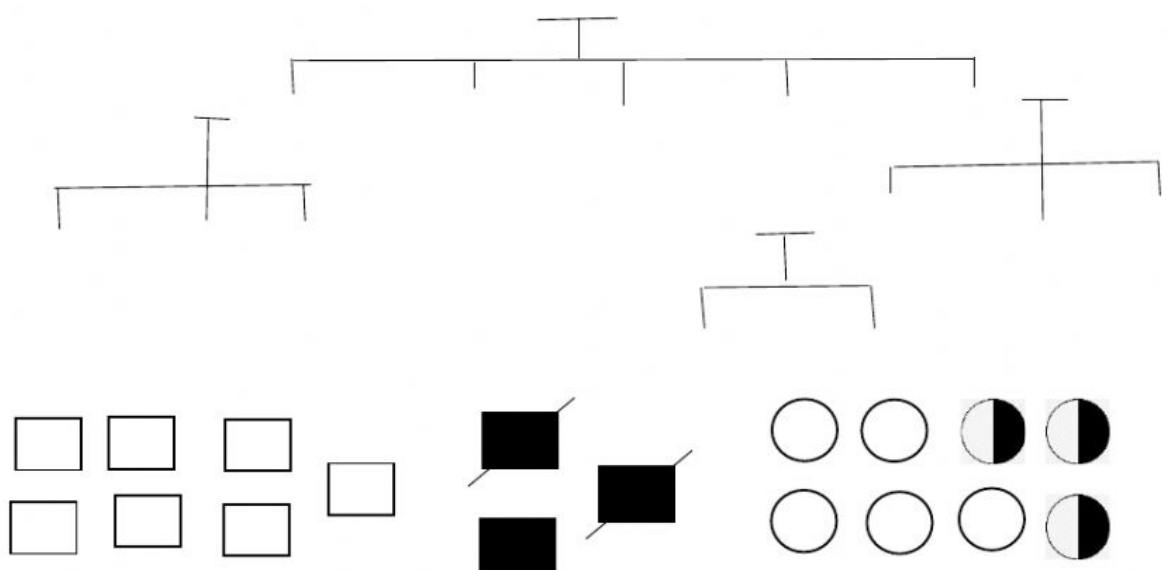
Lisa and Ashton got married and had three girls, Cari, Mary, and Merry. It was discovered that Lisa had muscular dystrophy. Merry married Perry and had two boys, Pike and Tike. It was discovered that Merry and Pike had muscular dystrophy.



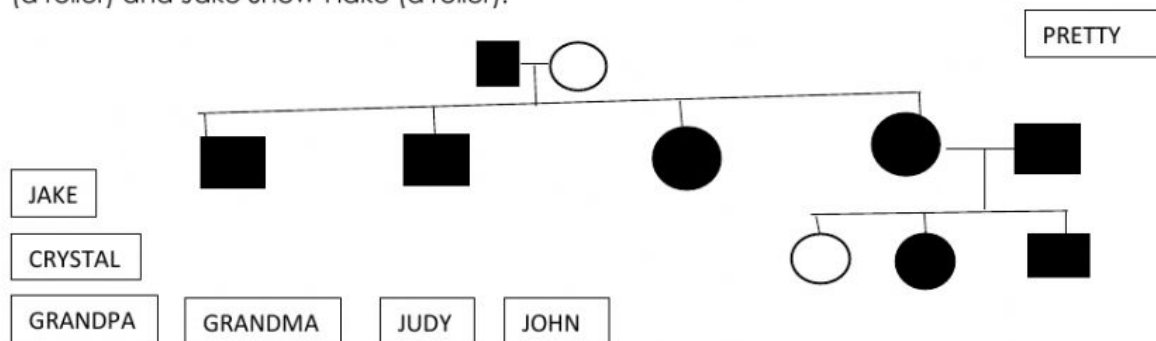
Debbie married David and had three children, Darren, Mary, and Derek. David, Darren and Derek discovered they have muscular dystrophy. Derek married Didi and had two children, Denise and Destiny. Denise also has muscular dystrophy and married Dirk. They had two children, Sue and Steven. Sue has muscular dystrophy.



A man and woman marry. They have five children, 2 girls and 3 boys. The mother is a carrier of hemophilia, an X-linked disorder. She passes the gene on to two of the boys who died in childhood and one of the daughters is also a carrier. Both daughters marry men without hemophilia and have 3 children (2 boys and a girl). The carrier daughter has one son with hemophilia. One of the non-carrier daughter's sons marries a woman who is a carrier and they have twin daughters.


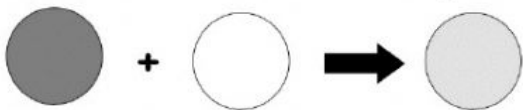



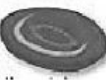



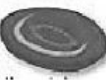



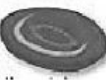
































Grandpa Snow is a tongue roller but Grandma Snow is not. They have four children (2 sons and 2 daughters) who are all rollers. Their last daughter, Judy, married John Flake. John's parents are both rollers, but John's two sisters are non-rollers. John is a roller. John and Judy Snow-Flake have three children named Crystal Snow-Flake (a non-roller), Pretty Snow-Flake (a roller) and Jake Snow-Flake (a roller).




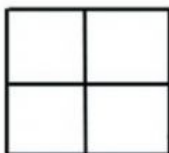
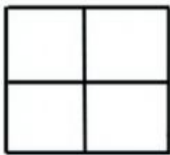

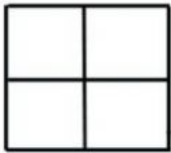
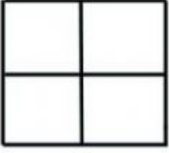
Part 6 (1 point each=5 points)

Instructions: Classify the following examples as: incomplete dominance, codominance, polygenic inheritance or multiple alleles. Write the correct term in the space provided.

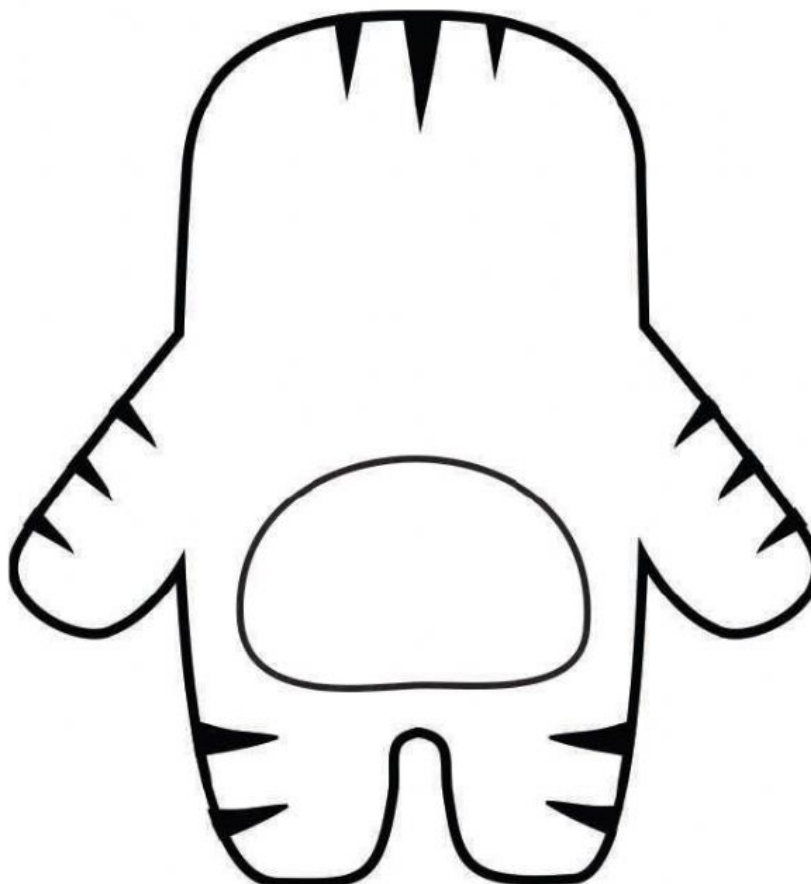
Example of Non-Mendelian Trait	Non-Mendelian Term												
													
<p>"red" "white" "pink"</p> 													
<table><tr><th>Type A (AA, AO)</th><th>Type B (BB, BO)</th><th>Type AB (AB)</th><th>Type O (OO)</th></tr><tr><td></td><td></td><td></td><td></td></tr></table>	Type A (AA, AO)	Type B (BB, BO)	Type AB (AB)	Type O (OO)									
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<table><tr><th colspan="4">Phenotype</th></tr><tr><th>BLACK</th><th>CHINCHILLA</th><th>HIMALAYAN</th><th>ALBINO</th></tr><tr><td></td><td></td><td></td><td></td></tr></table>	Phenotype				BLACK	CHINCHILLA	HIMALAYAN	ALBINO					
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Part 7 (1 points each= 6 points/ 4 points in the drawing= 10 points)

Instructions: Solve each Punnett square with each parent with an **heterozygous trait**. Highlight each trait your tiger will have with the result of every Punnett square. Complete the tiger with your chosen traits.

	Eyes: E e Dominant: open Recessive: closed		Ears: H h Dominant: pointy Recessive: rounded
	Whiskers: G g Dominant: 4 Recessive: 6		Teeth: B b Dominant: pointy Recessive: none
	Nose: Q q Dominant: black Recessive: red		Mouth: H h Dominant: happy Recessive: sad

Color your tiger at the end **if you have enough time**.



Part 8 (2 points each=16 points)

Instructions: Choose the one best answer for each of the questions below.

1. Any foreign material that can get inside your body and make you sick is called a
 - a. T cell
 - b. pathogen
 - c. phagocyte
 - d. non-specific response

2. Which of the following is not an example of a surface barrier that prevents pathogens from entering the body:
 - a. skin
 - b. mucous
 - c. tears
 - d. inflammation

3. Antibiotic resistance occurs quickly because:
 - a. Evolution occurs rapidly because a new generation of bacteria can be generated every 20 minutes.
 - b. Some people do not take the full course of antibiotics, promoting the growth of stronger bacteria.
 - c. Bacteria can swap bits of DNA with each other, meaning that dangerous bacteria can acquire resistant DNA from other strains of bacteria.
 - d. All of the above.

4. Which of the following offers long-term protection against a specific virus?
 - a. antibiotics
 - b. vaccination
 - c. pills
 - d. none of the above

5. An antigen is _____.
 - a. any molecule that the body recognizes as foreign
 - b. the DNA or RNA of an infective pathogen
 - c. an alternate term for an MHC complex
 - d. the collection of circulating proteins which kill or tag microbes

6. There are many types of immune system cells. The cell that produces antibodies is the _____.
 - a. macrophage
 - b. phagocyte
 - c. T lymphocyte
 - d. B lymphocyte

7. Which of the following provides long-term immunity?
 - a. memory cells
 - b. cytotoxic T cells
 - c. antigens
 - d. complement proteins

8. Which of the following develops after the primary immune response?
 - a. complement proteins
 - b. macrophages
 - c. memory cells
 - d. antigens

Part 9 (1 points each=9 points)

Instructions: Fill in the symbol that describes each type of allele.

Trait	Dominant	Symbol	Recessive	Symbol
Seed shape	Round		wrinkled	
Seed color	Yellow		green	
Pod shape	Smooth		constricted	
Pod color	Green		yellow	
Flower Position	Middle		End of the branch	
Plant Height	Tall		Short	

Use the above chart to answer the following answers.

Give the genotype for each gene.

1. Homozygous dominant seed shape
2. Homozygous dominant plant height
3. Homozygous recessive seed color
4. Homozygous recessive pod color
5. Heterozygous seed shape
6. Heterozygous pod color
7. Homozygous dominant pod shape