Monohybrids and Punnett Squares Video Handout Name:

These questions pertain to the Monohybrids and Punnett Square Guinea Pigs video by the Amoeba Sisters on YouTube. Complete the Before the Show section and try to guess the answers to the Showtime questions before starting the video.
You will find this video posted on our class website, Science 10 --> Biology
Full URL: https://www.youtube.com/watch?v=i-0rSv6oxSY&list=PLwL0Myd7Dk1Hj8WCDlDVBlkqT-ZVdj7Js

Before the Show! – Answer before you watch the video.

Do you have any of the following traits? – ability to roll your tongue; attached or free earlobes; a very curved hitchhiker's thumb, or dimples? Do any of your family members or friends also have one of these traits?

Did you know traits can be dominant or recessive? In this video lesson you will learn about traits and how some traits can be predicted in offspring.

Before the Show! – Answer before you watch the video.

1. What is a form of a gene that is often represented by one letter?
   a. Nucleotide
   b. Allele
   c. DNA segment
   d. Dominant gene

2. When will a recessive allele show up?
   a. When there is no dominant allele present
   b. When there is one dominant and one recessive allele
   c. When there are 3 recessive alleles

3. A dominant allele is represented by a lowercase letter and a recessive allele is represented by an uppercase letter.
   a. True
   b. False

4. What is the genetic makeup of an organism called?
   a. DNA sequence
   b. Phenotype
   c. Genotype

5. It only takes one dominant allele for a trait to show up.
   a. True
   b. False
   c. It depends

6. Which of the following genotypes are homozygous? Choose all that apply.
   a. Hh
   b. hh
   c. hH
   d. HH

7. Which genotype is heterozygous?
   a. hh
   b. HH
   c. Hh

8. What tool can be used to predict the genotypes of a monohybrid cross?
   a. Punnett Square
   b. Probability Square
   c. Genotype Square

9. What are the physical traits of an organism called?
   a. Characteristics
   b. Phenotype
   c. Genotype

10. Complete the Punnett Square. Then write the phenotype ratio under the square.

	H	**h**
H		
h		

Phenotype Ratio: _____

After Party! - Complete after the video.

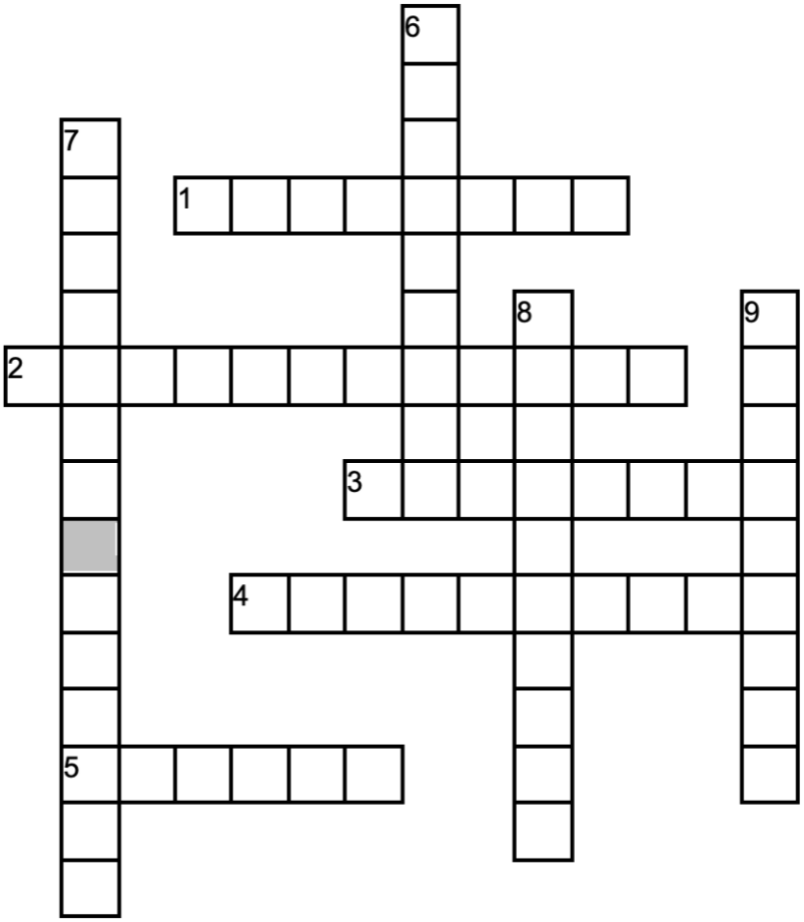
A. Complete the crossword puzzle.

Across

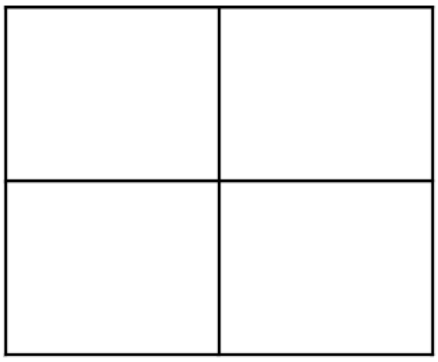
1. type of allele that is almost always expressed, even if only one copy is present
2. a genotype with a dominant and a recessive allele
3. the genetic makeup of an organism that is usually expressed in 2 letters
4. a genotype with either 2 dominant or 2 recessive alleles
5. form of a gene often represented by a letter

Down

6. the physical characteristics of an organism
7. a tool used to predict the genotype of the offspring of two parents
8. a type of cross that focuses on only one trait
9. type of allele will be expressed only if there are two identical copies of that allele



B. Create a Punnett square to cross a homozygous recessive guinea pig without hair and heterozygous guinea pig with hair.



10. What two genotypes are the result of this cross?

11. What are the phenotypes of each genotype that resulted from the cross?

12. What percent of offspring are homozygous recessive?

13. What percent of offspring are heterozygous?

Extension

Write step-by-step instructions for how to complete a monohybrid cross on a Punnett square.

* Need a hint? – Re-watch the video beginning at 3:48.

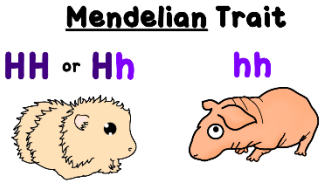
Amoeba Sisters | Video Recap

NAME: _____

Amoeba Sisters Video SELECT Recap: *Incomplete Dominance, Codominance, Polygenic Traits, and Epistasis (Non-Mendelian Inheritance)*

*In some guinea pigs, having hair is associated with the presence of a dominant allele "H." Hairless guinea pigs do not have the dominant allele "H." This is a **Mendelian** trait.*

1. Show a Punnett square with a **Mendelian** cross between two guinea pigs that are Hh x Hh.



2. According to your work, complete the following **phenotype** ratio: _____Have Hair: _____Hairless
3. According to your work, complete the following **genotype** ratio: _____HH: _____ Hh: _____hh

4. The traits covered in this video are **non-Mendelian** traits, unlike #1. What does it mean for a trait to be **non-Mendelian**?

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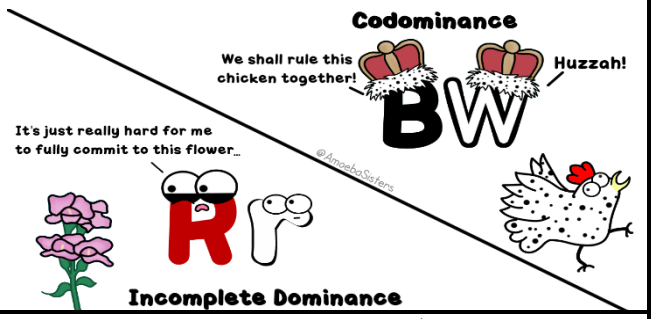
5. Describe how **incomplete dominance** and **codominance**, two **non-Mendelian** traits, are different from each other.



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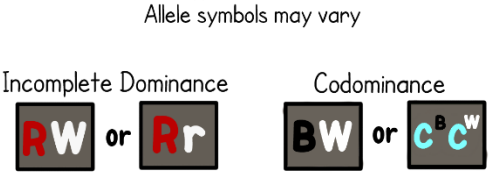
6. There are a variety of ways to represent the alleles for incomplete dominance, codominance, and other non-Mendelian traits. Many times, there are different pros and cons for how alleles are represented as well as different preferences. How do you plan to represent the alleles for incomplete dominance and codominance, and how are you planning to keep them separate in your mind?



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7. **Pleiotropy**, not discussed in the video, is when just one gene can affect several traits! How is this vocabulary term different from a **polygenic** trait, which is discussed in the video?

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Amoeba Sisters | Video Recap

NAME: _____

Amoeba Sisters Video SELECT Recap: *Incomplete Dominance, Codominance, Polygenic Traits, and Epistasis (Non-Mendelian Inheritance)*

Codominance *can be observed in some breeds of chicken. Black chickens can result from BB alleles. White chickens can result from WW alleles. A chicken with alleles BW can be speckled with black and white.*

8. Show a Punnett square with a **Mendelian** cross between two chickens that are BW x BW.

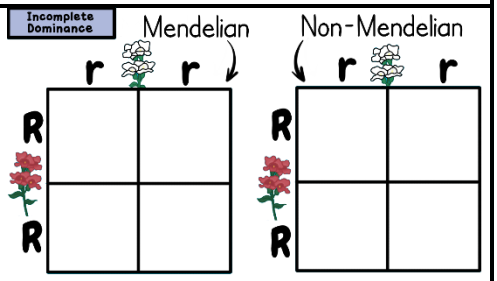
9. According to your work, complete the following **phenotype** ratio: _____Black: _____Speckled: _____White

10. According to your work, complete the following **genotype** ratio: _____BB: _____BW: _____WW

Incomplete dominance *can be observed in snapdragons. Snapdragon flowers that have two RR alleles have a red phenotype. Snapdragon flowers with a rr have a white phenotype. Snapdragon flowers that are Rr are pink.*

11. Fill in the two Punnett squares in diagram at right.

12. This is a **non-Mendelian** trait, but how could this be different if the trait was **Mendelian**?



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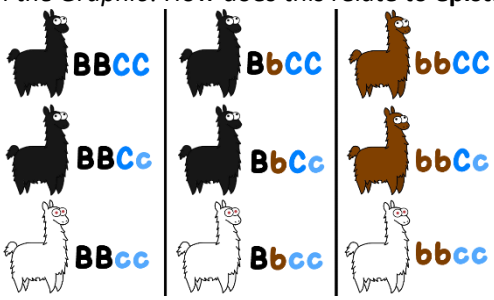
13. *Explain the Graphic*! How does this relate to **epistasis**?



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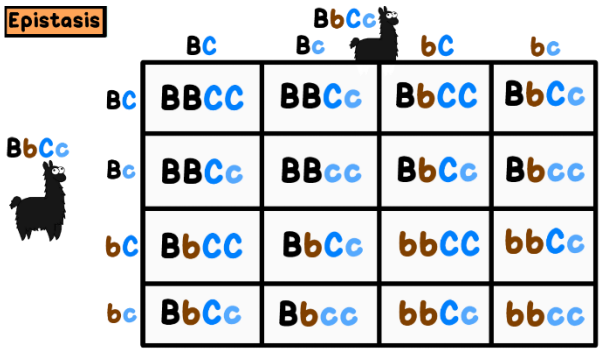
14. *Apply the Vocab!* The below graphic is a follow-up from the graphic in #13. Circle genotypes below that you would expect to result in white coloration and explain why.



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