

Goat Genetics Activity

The following are three student samples of the goat genetics activity. This activity was supplemented with class discussions about why particular traits were chosen and to discuss the rate of success in obtaining the desired offspring.

Sample 1:

Goat Mendelian Genetics Worksheet by C Kohn, WUHS

Group Names: _____
Hour: _____ Date: _____

Date Assignment is due: _____
Why late? _____
Score: + ✓ -

Day of Week
Date
If your project was late, describe why

Directions: Complete this lab in your assigned groups of 2. Use two pennies (*or Rock, Paper, Scissors*) to determine the genotype and phenotype of your goat. Each gene mentioned in this lab is a simply inherited trait, meaning every goat has only two alleles for that trait. For each trait, you will flip two coins. Each coin represents an allele. Heads on each coin represents an allele for the dominant trait and tails represents the recessive allele. For example, if you got heads on one coin and tails on the other, your goat would be heterozygous for that trait. If you got tails on both coin-flips, the goat would have the recessive phenotype for that trait. Perform two coin flips for each trait and record the genotype of your goat for each trait. Then record the phenotype created by the genotype. Finally, draw your goat created by its genotype and phenotype and answer the questions in back.

Traits:

- Horns: Dominant: no horns (polled); Recessive: horns
- Wattle (lobe found on the neck): Dominant: wattle; Recessive: no wattle
- Hair: Dominant: long hair; Recessive: short hair
- Ears: Dominant: long ears; Recessive: short ears
- Behavior: Dominant: Nervous; Recessive: Docile (tame)
- Markings: Dominant: Alpine; Recessive: Solid colored

1. **Horns:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: HH Hh hh Phenotype: no horns

2. **Wattle:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: WW Ww ww Phenotype: wattle

3. **Hair:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: LL Ll ll Phenotype: long hair

4. **Ears:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: EE Ee ee Phenotype: short ears

5. **Behavior:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: BB Bb bb Phenotype: Nervous

6. **Markings:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: MM Mm mm Phenotype: Alpine

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Agricultural Sciences
 Waterford Union High School

7. Describe your goat before based on the six traits you flipped for.

The goat has no horns and it has a wattle. The goat also has long hair and short ears. Also it has a nervous behavior and it has alpine markings.

8. Draw your goat below.



9. Next, identify three traits that you think are most valuable in your goats and list them below:

Trait Behavior: Our goat is nervous but we want tameness (R)

Trait Hair: Long hair for fabric (it has long hair) (D)

Trait Horns: Long horns to defend themselves (R)

NOTE: these can be any of the six traits; for example, if your goats are docile, this might help them to sell as pets. If your goats have long hair, they might sell well for making fabrics. Pick three traits that make your goats the most valuable for production traits or sale value.

10. After each trait above, state whether it is dominant or recessive.

11. Next, choose another person's goat to mate with. List the genotypes and phenotypes for your goat's mate below for all six traits:

Phenotype <u>horns</u>	Genotype <u>hh</u>
Phenotype <u>wattle</u>	Genotype <u>Ww</u>
Phenotype <u>long hair</u>	Genotype <u>Ll</u>
Phenotype <u>long ears</u>	Genotype <u>Ee</u>
Phenotype <u>Nervous</u>	Genotype <u>Bb</u>
Phenotype <u>Alpine</u>	Genotype <u>Mm</u>

12. In the space below, do a Punnett Square for the three traits you chose above. Use the genotype of your goat and the genotype of the mate of your goat (a goat from another group).

Behavior

	B	b
B	BB	Bb
B	BB	Bb

4:0 Nervous

	L	l
L	LL	Ll
L	LL	Ll

4:0 Longhair

	h	H
H	Hh	Hh
h	hh	hh

2:2 Horns

13. In the space below, describe what the offspring of your goat pair will most likely look like.

It will most likely be nervous and have long hair. The other traits are a 2:2 chance or a 3 to 1 chance.

Sample 2:

Goat Mendelian Genetics Worksheet

by C Kohn, WUHS



Group Names: _____ Hour _____ Date: _____

Date Assignment is due: _____ Why late? _____ Score: + ✓ -
Day of Week Date If your project was late, describe why

Directions: Complete this lab in your assigned groups of 2. Use two pennies (or Rock, Paper, Scissors) to determine the genotype and phenotype of your goat. Each gene mentioned in this lab is a simply inherited trait, meaning every goat has only two alleles for that trait. For each trait, you will flip two coins. Each coin represents an allele. Heads on each coin represents an allele for the dominant trait and tails represents the recessive allele. For example, if you got heads on one coin and tails on the other, your goat would be heterozygous for that trait. If you got tails on both coin-flips, the goat would have the recessive phenotype for that trait. Perform two coin flips for each trait and record the genotype of your goat for each trait. Then record the phenotype created by the genotype. Finally, draw your goat created by its genotype and phenotype and answer the questions in back.

Traits:

- Horns: Dominant: no horns (polled); Recessive: horns
- Wattle (lobe found on the neck): Dominant: wattle; Recessive: no wattle
- Hair: Dominant: long hair; Recessive: short hair
- Ears: Dominant: long ears; Recessive: short ears
- Behavior: Dominant: Nervous; Recessive: Docile (tame)
- Markings: Dominant: Alpine; Recessive: Solid colored

Alleles: Different forms of a gene.

Ex- If the gene is pod color, then the alleles or forms of the gene would be green and yellow.

Heterozygous: The two alleles are different, one dominant, one recessive; HYBRID.

Homozygous: Two of the same alleles; either two dominant OR two recessive.

- Horns:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: HH Hh hh Phenotype: No Horns (Polled)
- Wattle:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: WW Ww ww Phenotype: Wattle
- Hair:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: LL Ll ll Phenotype: Long Hair
- Ears:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: EE Ee ee Phenotype: Short ears
- Behavior:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: BB Bb bb Phenotype: Nervous
- Markings:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: MM Mm mm Phenotype: Alpine

Goat Mendelian Genetics Worksheet

by C Kohn, WUHS



Group Names: _____ Hour _____ Date: _____

Date Assignment is due: _____ Why late? _____ Score: + ✓ -
Day of Week Date If your project was late, describe why

Directions: Complete this lab in your assigned groups of 2. Use two pennies (or Rock, Paper, Scissors) to determine the genotype and phenotype of your goat. Each gene mentioned in this lab is a simply inherited trait, meaning every goat has only two alleles for that trait. For each trait, you will flip two coins. Each coin represents an allele. Heads on each coin represents an allele for the dominant trait and tails represents the recessive allele. For example, if you got heads on one coin and tails on the other, your goat would be heterozygous for that trait. If you got tails on both coin-flips, the goat would have the recessive phenotype for that trait. Perform two coin flips for each trait and record the genotype of your goat for each trait. Then record the phenotype created by the genotype. Finally, draw your goat created by its genotype and phenotype and answer the questions in back.

Traits:

- Horns: Dominant: no horns (polled); Recessive: horns
- Wattle (lobe found on the neck): Dominant: wattle; Recessive: no wattle
- Hair: Dominant: long hair; Recessive: short hair
- Ears: Dominant: long ears; Recessive: short ears
- Behavior: Dominant: Nervous; Recessive: Docile (tame)
- Markings: Dominant: Alpine; Recessive: Solid colored

Alleles: Different forms of a gene.

Ex- If the gene is pod color, then the alleles or forms of the gene would be green and yellow.

Heterozygous: The two alleles are different, one dominant, one recessive; HYBRID.

Homozygous: Two of the same alleles; either two dominant OR two recessive.

- Horns:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: HH Hh hh Phenotype: No Horns (Polled)
- Wattle:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: WW Ww ww Phenotype: Wattle
- Hair:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: LL Ll ll Phenotype: Long Hair
- Ears:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: EE Ee ee Phenotype: Short ears
- Behavior:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: BB Bb bb Phenotype: Nervous
- Markings:** Coin 1: Heads Tails Coin 2: Heads Tails

Genotype: MM Mm mm Phenotype: Alpine

7. Describe your goat before based on the six traits you flipped for.

Our goat is Cheddar, he has no horns, otherwise known to be polled. Cheddar has a small wattle, and is covered in long hair with distinct black Alpine markings covering his browned hair body. Cheddar's short ears top off his nervous personality.

8. Draw your goat below.



9. Next, identify three traits that you think are most valuable in your goats and list them below:

Dominant Trait His Long hair, it will be good for making fabrics.

Dominant Trait He won't be aggressive without his horns.

Dominant Trait He would be a good guard goat (Always on alert).

NOTE: these can be any of the six traits; for example, if your goats are docile, this might help them to sell as pets. If your goats have long hair, they might sell well for making fabrics. Pick three traits that make your goats the most valuable for production traits or sale value.

10. After each trait above, state whether it is dominant or recessive.

11. Next, choose another person's goat to mate with. List the genotypes and phenotypes for your goat's mate below for all six traits:

Phenotype alpine Genotype MM

Phenotype short ears Genotype ee

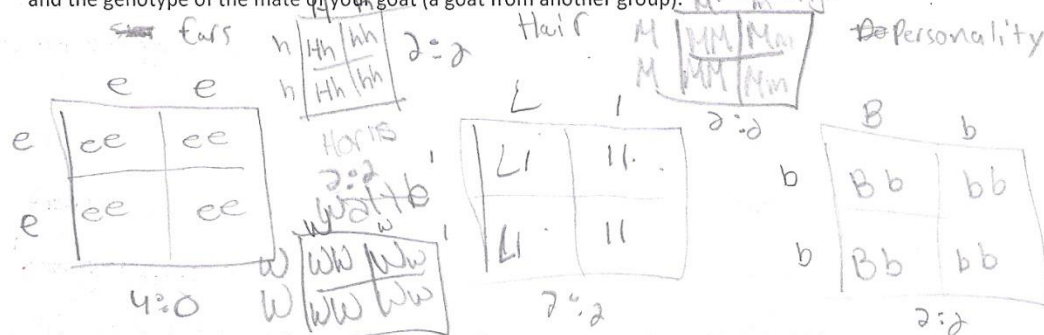
Phenotype docile Genotype bb

Phenotype horns Genotype hh

Phenotype wattle Genotype ww

Phenotype short hair Genotype ll

12. In the space below, do a Punnett Square for the three traits you chose above. Use the genotype of your goat and the genotype of the mate of your goat (a goat from another group).



13. In the space below, describe what the offspring of your goat pair will most likely look like.

The offspring will have short ears, wattle, + alpine markings, will likely have short hair, horns, + a docile personality.

Sample 3:

Goat Mendelian Genetics Worksheet

by C Kohn, WUHS



Group Names: _____ Hour _____ Date: 1/20/15

Date Assignment is due: _____ Why late? _____ Score: + ✓ -
Day of Week Date If your project was late, describe why

Directions: Complete this lab in your assigned groups of 2. Use two pennies (*or Rock, Paper, Scissors*) to determine the genotype and phenotype of your goat. Each gene mentioned in this lab is a simply inherited trait, meaning every goat has only two alleles for that trait. For each trait, you will flip two coins. Each coin represents an allele. Heads on each coin represents an allele for the dominant trait and tails represents the recessive allele. For example, if you got heads on one coin and tails on the other, your goat would be heterozygous for that trait. If you got tails on both coin-flips, the goat would have the recessive phenotype for that trait. Perform two coin flips for each trait and record the genotype of your goat for each trait. Then record the phenotype created by the genotype. Finally, draw your goat created by its genotype and phenotype and answer the questions in back.

Traits:

- Horns: Dominant: no horns (polled); Recessive: horns
- Wattle (lobe found on the neck): Dominant: wattle; Recessive: no wattle
- Hair: Dominant: long hair; Recessive: short hair
- Ears: Dominant: long ears; Recessive: short ears
- Behavior: Dominant: Nervous; Recessive: Docile (tame)
- Markings: Dominant: Alpine; Recessive: Solid colored

1. Horns:	Coin 1: Heads <u>Tails</u>	Coin 2: Heads <u>Tails</u>
Genotype: HH Hh <u>hh</u>	Phenotype: <u>Horns</u>	
2. Wattle:	Coin 1: Heads <u>Tails</u>	Coin 2: <u>Heads</u> Tails
Genotype: WW <u>Ww</u> ww	Phenotype: <u>Wattle</u>	
3. Hair:	Coin 1: Heads <u>Tails</u>	Coin 2: <u>Heads</u> Tails
Genotype: LL <u>Ll</u> ll	Phenotype: <u>Long</u>	
4. Ears:	Coin 1: <u>Heads</u> Tails	Coin 2: Heads <u>Tails</u>
Genotype: EE <u>Ee</u> ee	Phenotype: <u>Long</u>	
5. Behavior:	Coin 1: Heads <u>Tails</u>	Coin 2: <u>Heads</u> Tails
Genotype: BB <u>Bb</u> bb	Phenotype: <u>Nervous</u>	
6. Markings:	Coin 1: <u>Heads</u> Tails	Coin 2: Heads <u>Tails</u>
Genotype: MM <u>Mm</u> mm	Phenotype: <u>Markings</u>	

7. Describe your goat before based on the six traits you flipped for.

Our goat will have horns, wattle, long hair, long ears, nervous behavior, and marking. Our goat will have all of the dominant genes except for the horns. Before we flipped for the traits the goat didn't have any of these characteristics. This is what our goat will have for his traits.

8. Draw your goat below.



9. Next, identify three traits that you think are most valuable in your goats and list them below:

Trait Horns - to defend themselves

Trait Hair - long for fabric

Trait Behavior - It's funny if its nervous

NOTE: these can be any of the six traits; for example, if your goats are docile, this might help them to sell as pets. If your goats have long hair, they might sell well for making fabrics. Pick three traits that make your goats the most valuable for production traits or sale value.

10. After each trait above, state whether it is dominant or recessive.

11. Next, choose another person's goat to mate with. List the genotypes and phenotypes for your goat's mate below for all six traits:

Phenotype No horns Genotype Hh

Phenotype Wattle Genotype Ww

Phenotype Long hair Genotype ll

Phenotype Short ears Genotype ee

Phenotype Nervous Genotype BB

Phenotype Alpine Genotype Mm

12. In the space below, do a Punnett Square for the three traits you chose above. Use the genotype of your goat and the genotype of the mate of your goat (a goat from another group).

Horns

	H	h
H	Hh	hh
h	Hh	hh

2:2

Hair

	L	l
L	LL	Ll
l	Ll	ll

2:2

Behavior

	B	b
B	BB	Bb
B	BB	Bb

2:2

13. In the space below, describe what the offspring of your goat pair will most likely look like.

Our goat will most likely have horns, long hair, nervous behavior, wattle, short ears, and the alpine markings