

# ACTIVITY: MYTHICAL GENETICS

## PART I:

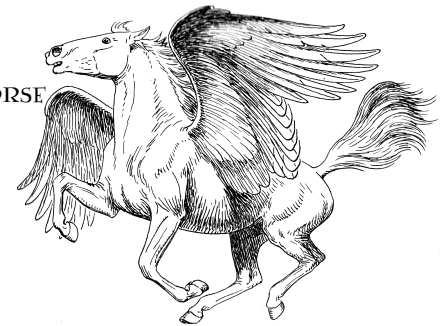
**Instructions:** Scientists have been investigating the genetic makeup of the mythical organisms in their community. Use the information provided and your knowledge of genetics to answer each question.

1. For each genotype below, indicate whether it is a heterozygous (He) OR homozygous (Ho) and whether it would be considered Purebred (Pure) or Hybrid.

| Genotype | HO/HE | Pure/Hybrid | Genotype | HO/HE | Pure/Hybrid |
|----------|-------|-------------|----------|-------|-------------|
| TT       |       |             | Dd       |       |             |
| Bb       |       |             | ff       |       |             |
| DD       |       |             | Tt       |       |             |
| Ff       |       |             | bb       |       |             |
| Tt       |       |             | BB       |       |             |
| dd       |       |             | FF       |       |             |

2. Determine the phenotype for each genotype using the information provided about a Pegasus.

**PEGASUS**, A DIVINE WINGED HORSE



Black hair is dominant to white hair.

HH \_\_\_\_\_ Hh \_\_\_\_\_ hh \_\_\_\_\_

Feathered wings are dominant to fur wings.

FF \_\_\_\_\_ Ff \_\_\_\_\_ ff \_\_\_\_\_



3. For each phenotype, give the genotypes that are possible for a Phoenix.

**PHOENIX**, A GOLDEN RED BIRD WHICH EMERGES FROM ITS OWN ASHES

Red feathers (F) are dominant to gold feathers (f).

Red = \_\_\_\_\_ Gold = \_\_\_\_\_

Spiked crown (head) feathers (R) is no crown feathers (r).

Crowned = \_\_\_\_\_ Not Crowned = \_\_\_\_\_

4. Two Cerberuses recently mated and are expecting a litter of new pups. The father is heterozygous for his three heads (H), but the mother only has 2 heads. Complete a Punnett square to show the possibilities of what their pups might look like.

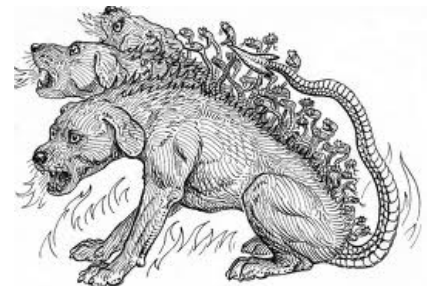
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A. List the possible genotypes and phenotypes for the offspring.

B. What are the chances that a pup will have three heads? \_\_\_\_ out of \_\_\_\_ or \_\_\_\_%

C. What are the chances that a pup will have two heads? \_\_\_\_ out of \_\_\_\_ or \_\_\_\_%

**CERBERUS**, THE TWO OR THREE HEADED, GIANT HOUND



**ACROMANTULA**, A GIANT,  
MAN EATING SPIDER



5. An Acromantula recently laid eggs. Both the mother and father are heterozygous for being poisonous (G), which is dominant over being non-poisonous. Complete a Punnett square to show the possibilities of the offspring being poisonous.

A. List the possible genotypes and phenotypes for the offspring.

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B. What are the chances of poisonous offspring?  
\_\_\_\_ out of \_\_\_\_ or \_\_\_\_%

C. What are the chances of non-poisonous offspring?  
\_\_\_\_ out of \_\_\_\_ or \_\_\_\_%

6. A purebred line of Cyclopes all have a single horn to match their single eye (E), both of which are dominant traits. One of those Cyclopes recently mated with a Cyclopes without a horn. Complete a Punnett square to show the possibilities of the offspring having one horn.

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A. List the possible genotypes and phenotypes for the offspring.

B. What are the chances of an offspring with a horn? \_\_\_\_%

C. What are the chances of an offspring without a horn? \_\_\_\_%

D. Would these Cyclopes offspring be considered purebreds? Explain.



**CYCLOPES**, ONE-EYED  
CANNIBALISTIC GIANTS

7. Assume that one of male Cyclopes offspring from above, mated with female Cyclopes who is also heterozygous for her horn. Complete a Punnett square to show the possibilities of the offspring having one horn.

A. List the possible genotypes and phenotypes for the offspring.

B. What are the chances of an offspring with a horn? \_\_\_\_%

C. What are the chances of an offspring without a horn? \_\_\_\_%

D. Would these Cyclopes offspring be considered purebreds? Explain.

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**BASILISK**, A MONSTROUS  
SNAKE WITH A DEADLY GAZE

8. You have found an orphaned Basilisk in a swamp, and you want to find its parents. You have located two Basilisks, a male that is homozygous dominant for the lethal gaze trait (L), and a female that is heterozygous. Complete a Punnett square to determine if the orphaned Basilisk, which does not have the lethal gaze trait, is their offspring.

Are the adult Basilisks the parents? Explain your answer.

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## PART II:

1. Use the information for Merpeople traits to write the phenotype for each item.

| Trait      | Dominant       | Recessive    |
|------------|----------------|--------------|
| Dorsal Fin | Fin (F)        | No Fin (f)   |
| Body Color | Green (G)      | Silver (g)   |
| Eye Shape  | Human (E)      | Fish (e)     |
| Tail       | Horizontal (T) | Vertical (t) |

- (a) FF \_\_\_\_\_ (e) Ee \_\_\_\_\_  
 (b) gg \_\_\_\_\_ (f) ff \_\_\_\_\_  
 (c) Tt \_\_\_\_\_ (g) tt \_\_\_\_\_  
 (d) EE \_\_\_\_\_ (h) Gg \_\_\_\_\_

**MERPEOPLE, AQUATIC  
 CREATURES WITH  
 HUMAN FEATURES AND  
 FISH TAILS**



2. Use the information in the chart above to write the genotype (or genotypes) for each trait below.

- (a) Green body \_\_\_\_\_ (e) Vertical Tail \_\_\_\_\_  
 (b) No Fin \_\_\_\_\_ (f) Human Eye \_\_\_\_\_  
 (c) Fish Eye \_\_\_\_\_ (g) Fin \_\_\_\_\_  
 (d) Horizontal Tail \_\_\_\_\_ (h) Silver Body \_\_\_\_\_

3. A murder of Harpies swarm around you and you notice that some Harpies have bird-like legs while others have human-like legs.

A. You study a family group of Harpies in which the male is heterozygous for his bird-legs (L) and the mother has human-like legs. One of their female offspring has bird-like legs. Complete a Punnett Square to determine the female offspring's genotype.

What is the offspring genotype? \_\_\_\_\_

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**HARPIES, WINGED MONSTERS  
 WITH HUMAN HEADS**

B. Complete the Punnett square to show the possibilities that would result if the female offspring (from A) were to mate with another Harpie that is heterozygous for its legs.

i List the possible genotypes and phenotypes for the offspring.

ii What is the probability of offspring with bird-legs? \_\_\_\_\_ %

iii. What is the probability of offspring with human-legs? \_\_\_\_\_ %

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4. Most Manticores have the body of a lion (B), but the recessive body type is that of a leopard. Complete a Punnett Square to determine the likelihood of two leopard Manticores mating to produce a lion-like Manticore.

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**MANTICORE**, A CREATURE WITH THE FACE OF A HUMAN, THE BODY OF A LION, AND THE TAIL OF A SCORPION.

5. A local pride of Griffins have some of the largest wings (A) you have ever seen. The single male in the pride is believed to be purebred. His mate is heterozygous for her large wings. Complete the Punnett square to show the possibilities of their offspring.



**GRIFFIN**, A PART LION, PART EAGLE CREATURE

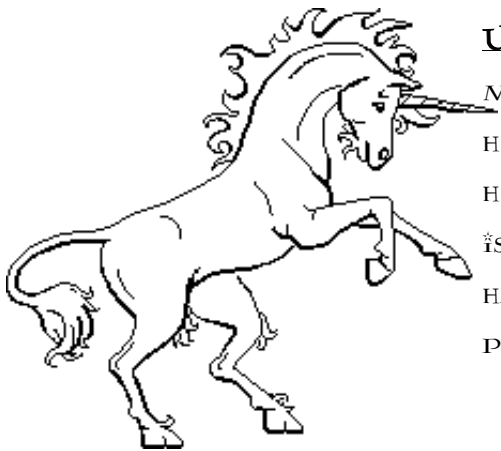
A. Give the genotype for each Griffin. Father - \_\_\_\_\_ Mother - \_\_\_\_\_

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B. List the possible genotypes and phenotypes for the offspring.

C. What is the probability that the offspring will have large wings? \_\_\_\_ %

D. What is the probability that the offspring will have small wings? \_\_\_\_ %



**UNICORN**, A MYSTICAL HORNED HORSE WHOSE HORN AND BLOOD IS BELIEVED TO HAVE HEALING POWERS.

6. A herd of horses periodically produces a unicorn, which is believed to be a recessive trait.

A. If the sire (male) is a heterozygous horse (H) and the dam (female) was a purebred unicorn, what are the chances that the pony will be a unicorn? Create a Punnett square to help you answer this question.

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B. If the Unicorn offspring from the mating couple above were to mate with another unicorn, would it be possible for them to have a horse (non-unicorn) offspring? Why or why not?

# PART III: INCOMPLETE DOMINANCE & CODOMINANCE

GORGONS, CURSED  
 DEMONS WITH SERPENTS  
 FOR HAIR



The most famous Gorgon is Medusa. The story speaks of her having 8 green snakes in place of her hair. In Gorgons, both Gold snakes and Blue snakes are dominant traits. Medusa is an example of incomplete dominance.

1. Write the correct genotype for each color if G represents the Gold gene and B represents a blue gene.

Gold - \_\_\_\_\_ Blue - \_\_\_\_\_ Green - \_\_\_\_\_

2. What would likely happen if a gold-snaked Gorgon mated with a blue-snaked Gorgon. Complete the Punnett Square to help you determine the probability for each type of offspring.

A. Give the genotypes and phenotypes for the offspring.

B. How many of the offspring would have gold snakes? \_\_\_\_\_%

C. How many of the offspring would have blue snakes? \_\_\_\_\_%

D. How many of the offspring would have green snakes? \_\_\_\_\_%

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3. What would likely happen if Medusa mated with another green-snaked Gorgon. Complete the Punnett Square to help you determine the probability for each type of offspring.

A. Give the genotypes and phenotypes for the offspring.

B. How many of the offspring would have gold snakes? \_\_\_\_\_%

C. How many of the offspring would have blue snakes? \_\_\_\_\_%

D. How many of the offspring would have green snakes? \_\_\_\_\_%

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4. What would likely happen if Medusa mated with a gold-snaked Gorgon. Complete the Punnett Square to help you determine the probability for each type of offspring.

A. Give the genotypes and phenotypes for the offspring.

B. If 25 Gorgons were produced from this cross, how many of each phenotype would you expect?

Gold Snakes - \_\_\_\_\_ Blue Snakes - \_\_\_\_\_ Gold Snakes - \_\_\_\_\_

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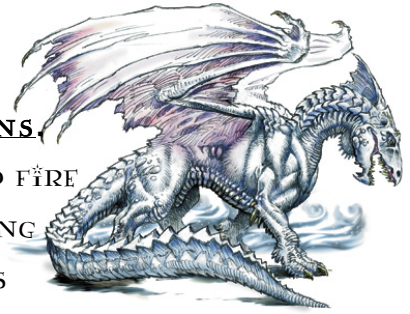
Dragons are giant mythical creatures. One in particular is the Spotted Fireball, which have both the dominant trait of the Onyx Fireball (BB), which has black scales and the dominant trait of the Emerald Fireball (EE), which has bright green scales. The Spotted Fireball (EB) has dark black scales with patches, or spots of bright green scales resulting from the codominance of the Onyx and Emerald alleles. Use this information it solve the problems below.

DRAGONS

WINGED FIRE

BREATHING

REPTILES



5. What would likely happen if two Spotted Fireballs were to mate? Complete the Punnett Square to help you determine the probability for each type of offspring.

(a) Give the possible genotypes and phenotypes for the offspring.

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(b) What percentage of the offspring would be Emerald Fireballs? \_\_\_\_\_%

(c) What percentage would be Onyx Fireballs? \_\_\_\_\_%

(d) What percentage would be Spotted Fireballs? \_\_\_\_\_%

6. What would likely happen if an Emerald Fireball mated with a Spotted Fireball? Complete the Punnett Square to help you determine the probability for each type of offspring.

(a) Give the possible genotypes and phenotypes for the offspring.

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(b) What percentage of the offspring would be Emerald Fireballs? \_\_\_\_\_%

(c) What percentage would be Onyx Fireballs? \_\_\_\_\_%

(d) What percentage would be Spotted Fireballs? \_\_\_\_\_%

7. What would likely happen if an Emerald Fireball mated with an Onyx Fireball? Complete the Punnett Square to help you determine the probability for each type of offspring.

(a) Give the possible genotypes and phenotypes for the offspring.

(b) If 30 dragons were produced from this cross, how many would you expect for each?

Emerald - \_\_\_\_\_ Onyx - \_\_\_\_\_ Spotted - \_\_\_\_\_

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8. What would likely happen if an Onyx Fireball mated with a Spotted Fireball? Complete the Punnett Square to help you determine the probability for each type of offspring

(a) Give the possible genotypes and phenotypes for the offspring.

(b) If 50 dragons were produced from this cross, how many would you expect for each?

Emerald - \_\_\_\_\_ Onyx - \_\_\_\_\_ Spotted - \_\_\_\_\_

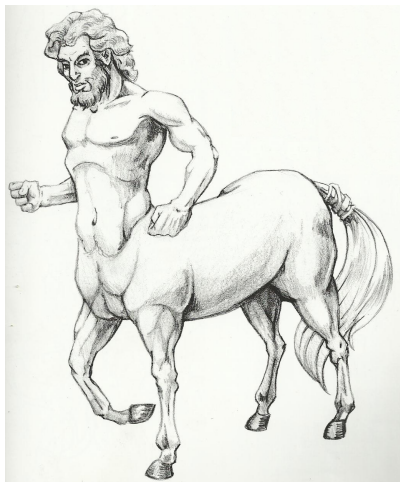
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## PART IV: DIHYBRID CROSSES

**Instructions:** Mythical geneticists have been investigating the genetic makeup of the organisms in in the mystical realm. Use the information provided and your knowledge of genetics to answer each question.

1. **Centaurs are striking creatures that are as unique as they are impressive. Some centaurs have 2 horns like that of a ram, which is a recessive trait, but the dominant trait is hornless. While most centaurs have a horse's tail, there is a recessive trait that gives some centaurs are serpentine tail, like that of a snake or dragon. Complete a Punnett Square that would show the possible offspring if two centaurs mated who were heterozygous for both the horn and tail traits.**

- A. What are the genotypes and phenotypes for the parent centaurs?



CENTAUR, A HEAD AND TORSO  
OF A MAN WITH THE LEGS  
LOWER BODY OF A HORSE

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- B. Give the possible genotypes and phenotypes for the offspring.
- C. Using the information above, what is the ratio of each type of potential offspring?
- D. What percentage of offspring would be considered “purebred” for both dominant traits?
- E. What percentage of the offspring would have serpentine tails?

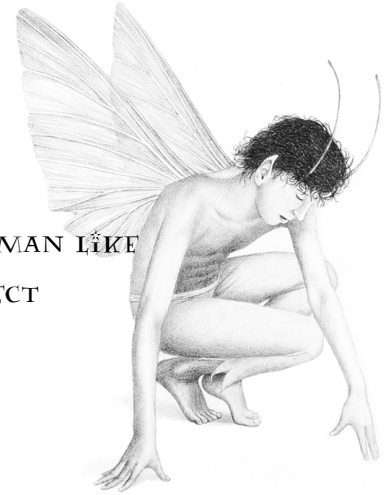
2. Fairies are tiny creatures, but are incredibly complex. Most fairies have simple moth-like wings, which is the dominant trait, but a select few possess wings that are large and beautiful like those of a butterfly. A few fairies also have antennae, which is understood to be a recessive trait, but most lack this feature. Use this information to answer the questions below.

A. Based on the picture to the right, what are the possible genotypes for the female?



**F**AIRY, A SMALL HUMAN LIKE CREATURE WITH INSECT WINGS.

B. Based on the picture to the right, what are the possible genotypes for the male?



C. Complete a dihybrid cross assuming that the male is heterozygous for his wings and the female is heterozygous for antennae.

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D. Give the possible genotypes and phenotypes for the offspring.

E. Using the information above, what is the ratio of each type of potential offspring?