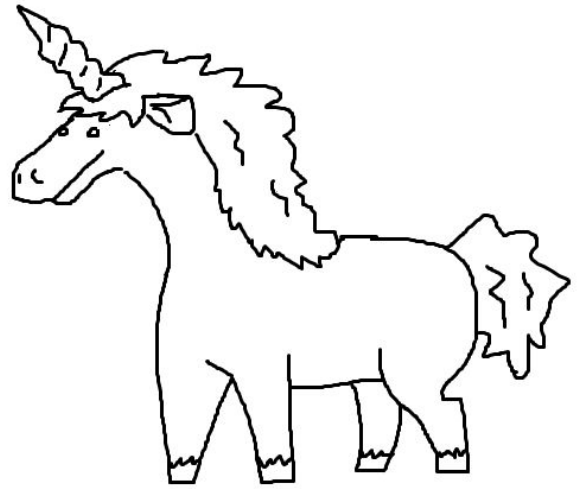


SO YOU WANT TO BE A UNICORN BREEDER?



Instructions: Hello and welcome to unicorn breeder education school. Today, you're going to learn about unicorn genetics.

We'll start with a bit of genetics background. So, unicorn traits are controlled by genes. For example, there is a gene in unicorns that determines mane color. Unicorns can have manes that are black, brown, gray, or red; each of these colors are caused by a different version of the gene. These versions are called **alleles** by scientists.

Every animal will have two alleles for each genes (one on each of its paired chromosomes). For example, a unicorn could have a brown allele and a gray allele for its mane gene. Or, it could have two red alleles.

Some versions of the trait are **dominant** to other versions. This means that, when a unicorn has both versions (the dominant and the not dominant, AKA **recessive**) they will express/show the dominant trait.

1. A unicorn named Broccoli has an allele for a black mane and an allele for a brown mane. However, Broccoli's mane is black in color. Which color is dominant - black or brown? Explain.
2. There are two types of tale length of unicorns - long, and short. A breeder takes two unicorns, one who has a long tail and one with a short tail, who are both purebred (have two identical alleles) for their tail length. He breeds them together. All of the children have a short tail. Which trait is dominant, the long or the short? Explain.
3. A breeder has two normal horses, named Snowflake and Rainbow. The breeder breeds the two together and is very surprised when 25% of the offspring have unicorn horns. Should the breeder conclude that unicorn horns is a dominant or recessive trait? Explain.
4. A particular breeder knows that red manes are recessive to all other colors of manes. He takes two brown-maned unicorns and breeds them together. 25% of the offspring have the red mane. What can he conclude about the alleles that the parents carry?
5. Silver hooves in unicorns is recessive to all other colors of hooves. If two silver hoofed horses breed together, what are the possible hoof colors of their offspring?





ORDER OF DOMINANCE!

For the next couple of questions, use the table to the right showing the order of dominance of several mane colors and hoof colors.

(hint: a horse with a purple and green hoof allele will only express the purple one. A horse with a green and silver allele will only express green. Etc.)

MANE COLORS	
	BLACK
	BROWN
	GRAY
	RED

most dominant
↑
most recessive

HOOF COLORS	
	PURPLE
	RED
	GREEN
	SILVER

- Can two brown maned parent horses ever produce a black maned horse? Explain.
- Can two green hoofed horses ever produce a silver hoofed horse? Explain.
- One parent horse has a black mane allele and a brown mane allele. The other parent horse has a brown mane allele and a gray mane allele. If they breed, will any of the offspring have brown manes? Will any of them have gray manes?
- A breeder is curious to see if their red-hoofed horse carries any recessive alleles. The breeder breeds the red-hoofed horse with a silver hoofed horse. One half of the offspring have red hoofs and the other half have green hoofs. Where did the green hoof trait come from? Explain.
- Two purple hoofed horses pair together and have a love so strong it lasts for a century. Over that century, the two horses have 384 children together. Every single one of the children have purple hoofs. Is it likely that the parents carry any of the recessive alleles for hoofs? Explain.