



# KNOW YOUR HORSE'S BREED & HEREDITY

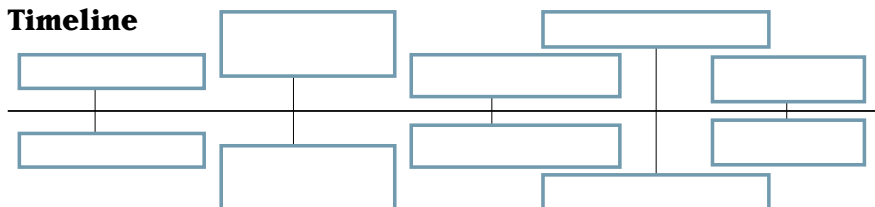
## Explore horse origins & genetics

### Apply

Developing a better understanding of origins and breeds of horses can help you better understand your own horse's characteristics, strengths and limitations. Complete the learning tasks that follow to build your understandings.

- Where did all horses come from? How were they domesticated? Select **five** key events that you think were most important in the history and domestication of horses. Use these events to create a timeline summary. Identify the events on the top of the timeline. Use point form descriptions, illustrations or sketches for each event on the bottom half of the timeline. A blank Timeline template is provided on the *Virtual Apprentice 2070* website in this inquiry topic.

### Timeline



### DO YOU KNOW

enough about horse origins and breeds to complete this learning task?

Find information you may need in **The difference between draft & light horses, About breeding & genetic inheritance** and **Horse origins** in this inquiry topic.

- Analyze how genetics affect a horse, using the guiding questions and tasks that follow.

How do you know where your breed's characteristics come from? One of the most prevalent characteristics is coat colour. Your horse's coat colour is determined by the genetic profile of its parents. Complete the following questions to identify a horse's genetic influences.



Use the weblinks in this inquiry topic to find examples and tools that can help you identify the genetic profile of your horse. Review the Punnett Square examples in **About breeding & genetic inheritance**.

- Start with the Punnett Squares example below. The stallion has a black coat, but carries the recessive allele for a red coat. The mare has a red coat, which means she carries both recessive alleles.

- Dominant allele is represented by the letter E.
- Recessive allele is represented by the letter e.
- Genotypes of offspring: 4 Ee
- Phenotype of offspring: 2 black and 2 red

	Black coat	
Red coat	E	e
e	Ee	ee
e	Ee	ee

In this situation, there is a 50 percent chance that the foals will have a black coat colour and a 50 percent chance they will have a red coat colour.

Need To Do: *Explore horse origins & genetics*

► This Punnett Square shows the genetic profile of a mare and stallion that both have a black coat and the gene combinations that may result in their offspring.

	Black coat	
Black coat	E	e
E	EE	Ee
E	EE	Ee

Identify the genotype and phenotype of these four possible offspring.

Two of these four foals could breed with another black horse and produce a chestnut coloured colt. How is this possible?

► **Homozygous** parents have two identical alleles, as shown in the Punnett square below. When the offspring of two homozygous parents show an intermediate phenotype, this is called **intermediate dominance**. This means that an intermediate trait, such as a cremello coloured coat, can show up in the coat colour of offspring. For example, if a chestnut horse is bred with a cremello horse, all offspring will be palomino. The Punnett square below illustrates this.

- Genotype: 4 CC'
- Phenotype: 4 palomino horses

	Chestnut coat	
Cremello coat	C	C
C'	CC'	CC'
C'	CC'	CC'

Why would two cremello horses always produce cremello foals?

▶ Try this **optional** challenge! Create a Punnett Square that represents what you think your horse's genetic heredity could be. Use the top row to identify your horse's sire and the first column to identify your horse's dam.


3. How do you think different breeding systems influence the likelihood of dominant traits being passed on from generation to generation?

Use a Triple T-Chart, with the headings in the example below, to compare how these three breeding systems could have an impact on a horse's coat colour. A blank Triple T-Chart template is provided on the *Virtual Apprentice 2070* website.

Inbreeding	Line breeding	Crossbreeding