YEAR 7 | STUDENT FACT SHEET

LEARNING AREA: SCIENCE

Evolution and Classification of the Thoroughbred Horse

File: Mesohippus.jpg - Wikimedia Commons, 2022

Primary Industries Education Foundation Australia

TBA Thoroughbred Breeders Australia

Evolution and Classification of the Thoroughbred Horse

Evolution of the horse

The history of the horse is one of the best studied in the field of paleontology, which is the study of ancient life through fossils. It all began around 56 million years ago during a time called the Eocene Epoch. During this time, the first ancestor of today's horses appeared, known as *Eohippus*, or sometimes *Hyracotherium*.

People often call it the 'dawn horse' because it was the first known horse. Fossils of *Eohippus* have been found in both North America and Europe, showing that it lived in many different places during this time. It was a small, dog-sized creature with multiple toes (four toes on the front feet and three on the back) adapted to running on soft, forested ground.

The evolution from *Eohippus* to modern horses involved several major changes:

- **Increase in size:** Species of horses grew larger over time, which provided advantages in open grassland environments, such as greater speed and stamina.
- **Reduction in the number of toes:** Early horses like *Eohippus* had multiple toes, but over time, these were reduced to a single hoof, which improved efficiency in running on hard ground.
- **Lengthening of legs:** The legs of horses became longer and more slender, enhancing their ability to run swiftly.
- **Changes in dentition:** Early horses had teeth suitable for browsing on leaves. Over time, horses developed high-crowned, crested teeth adapted to grazing on tougher grasses.

Major evolutionary milestones

There were many stages of change in the evolution of the horse from ***Eohippus***. Some of the key stages in the evolution were:

***Mesohippus* approx** 40 million years ago

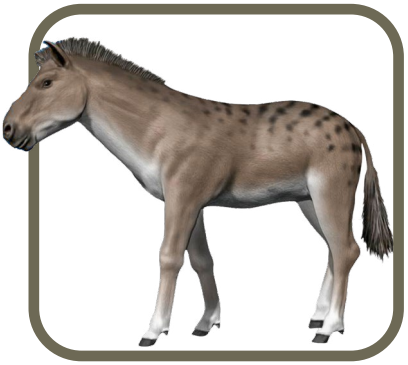
Mesohippus was bigger than earlier horses like *Eohippus* and stood about 6 hands high, which is around 61 cm tall. It looked more like a modern horse because it had a longer nose (or muzzle) and a bigger brain. Unlike its ancestors, *Mesohippus* had three main toes on each foot, with a tiny, unused fourth toe. Most fossils of *Mesohippus* have been found in North America.

***Miohippus* approx** 36 million years ago

Miohippus evolved from *Mesohippus*. *Miohippus* was a bit larger than *Mesohippus* and still had three toes on each foot. Over time, this type of horse evolved into different groups, including a successful group called the *Anchitheres*. These horses spread from North America into Eurasia.

Merychippus approx 17 million years ago

Merychippus evolved from *Miohippus* and was about 10 hands high, which is around 101.6 cm tall. It had more advanced features, like fused lower leg bones and a stronger main hoof, which helped it run faster. *Merychippus* is a direct ancestor of today's horses and had a skull similar to modern horses.



Pliohippus approx 15 million years ago

Pliohippus was the first true one-toed horse. It had high-crowned teeth that were perfect for eating grass and a body shape much like modern horses. *Pliohippus* led to the evolution of the *Equus* group, which includes all modern horses we see today.

Image credits 1. (File: Mesohippus.jpg - Wikimedia Commons, 2022) 2. (Turtle Cove Member Mural from the Thomas Condon Paleontology Center, Painted by Roger Witter, Depicting Mesocyon Pack Chasing Miohippus, 2010) 3. (Wikipedia Contributors, 2024) 4. (Pliohippus pernix Wikipedia Juandertal.jpg, 2022)

Modern horses (*Equus*)

Equus includes modern horses, zebras, and donkeys that evolved about 4 to 4.5 million years ago. The *Equus* species are characterised by a single hoof on each foot, long legs, and highly developed teeth for grazing. *Equus ferus caballus* (the modern domestic horse) became widespread from central Asia to Europe. These horses adapted to various climates and environments, leading to the development of different breeds.

Classification of modern horses

The scientific classification system categorises living organisms based on shared characteristics. Classification helps scientists organise and understand the natural world by grouping animals and plants based on their similarities and differences. It allows scientists to interpret information about species, identify relationships and pathways of evolution, understand how species change over time and communicate using scientific names. This makes it easier for scientists to share their knowledge and learn more about how living things are connected.

For horses, this system is as follows:

- **Kingdom:** Animalia
- **Phylum:** Chordata
- **Class:** Mammalia
- **Order:** Perissodactyla (odd-toed ungulates)
- **Family:** Equidae
- **Genus:** *Equus*
- **Species:** *Equus ferus*
- **Subspecies:** *Equus ferus caballus* (domestic horse)

The modern horse – Genus and species

The binomial naming system, also known as binomial nomenclature, is the formal system of naming species. It was developed by Carl Linnaeus in the 18th century and is still used today. In this system:

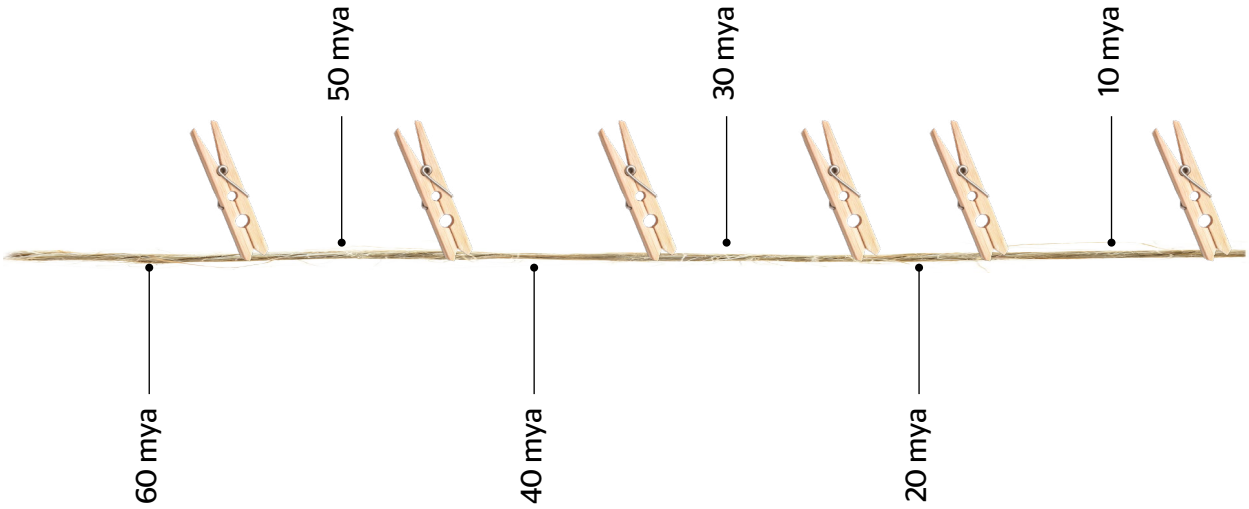
- Each species is given a two-part Latin name.
- The first part is the **genus** name (e.g., *Equus*), which is always capitalised.
- The second part is the **species** name (e.g., *ferus*), which is not capitalised.
- Both names are italicised (e.g., *Equus ferus*).

The domestic horse is classified as *Equus ferus caballus*, indicating that it is a subspecies of the wild horse (*Equus ferus*).

Horse evolution timeline

- Using a 60 cm length of string, mark intervals every 10 cm along it and label these with the units of millions of years ago (mya) to create a scaled timeline.
- Use six pegs and create six template cards showing the evolution of the horse from *Eohippus* to the modern horse.
- Add images or drawings of each evolutionary stage and annotate each template with one or two characteristics (e.g., size increase, toe reduction, changes in teeth).
- Display your evolutionary timeline.

Timeline sample set up



Template card sample

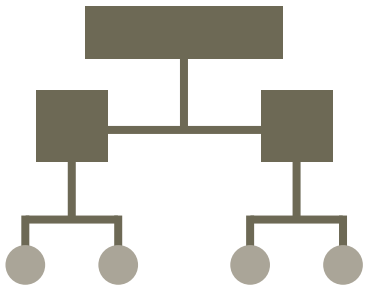
Time period: **Image**

Name of animal:

Main features:

The use of keys

Dichotomous keys are used to identify and classify organisms based on observable characteristics. A dichotomous key is a step-by-step tool that presents a series of questions or statements with two distinct choices at each step, leading the user to a specific identification or conclusion. Each choice directs the user to the next set of questions or the identification of the organism.



Each step in a dichotomous key focuses on a specific characteristic, such as the number of toes, size, or shape of leaves, guiding users through a logical sequence to accurately identify species.

Create a dichotomous key

- Create a dichotomous key (nested, linked, or branching) in the space below using Table 1: *Equus* animals and their characteristics.
- Cut out the images below the table to include in your dichotomous key.

Table 1. Equus animal characteristics

Type of *Equus*	Size	Coat Colour/ Pattern	Body shape	Mane and tail	Ears
Thoroughbred Horse	Large (1.5-1.7 m tall at the shoulder)	Solid colours (brown, bay, black, grey)	Slim, muscular, long legs	Short mane, long tail	Medium, upright
Zebra	Medium (1.2-1.5 m tall at the shoulder)	Solid colours (Black and white stripes)	Stocky body, shorter legs	Short, stiff mane, tufted tail	Medium, upright
Donkey	Medium (1.0-1.4 m tall at the shoulder)	Grey or brown, sometimes with a dorsal stripe	Stocky body, short legs	Short mane, thin tail with tuft	Large, pointed
Clydesale	Very large (1.6-1.8 m tall at the shoulder)	Typically brown with white markings on legs and face	Heavy muscular body, feathered legs	Long mane, thick long tail	Medium, upright
Shetland Pony	Small (0.7-1.0 m tall at the shoulder)	Various solid colours (black, brown, chestnut, grey)	Compact sturdy body, short legs	Thick mane, short bushy tail	Small, upright





Learning Area | Australian Curriculum Content:

Science
Investigate the role of classification in ordering and organising the diversity of life on Earth and use and develop classification tools including dichotomous keys (AC9S7U01)