

## The washing line of time

**Topic addressed:** The fossil record shows us how life has evolved on Earth over 3500 million years.

**Student practical or teacher demonstration:** Student practical.

**Activity time:** 20 minutes

**Activity in brief:** This is a practical activity which involves sorting and hanging pictures representing important evolutionary events on 'the washing line of time'

**Student learning outcomes:** Students will:

- be introduced to the history of life on Earth;
- appreciate the enormity of the timescale in which evolution operates;
- know that humans appear only very recently in geological terms.

**Resource list:**

- Twelve laminated pictures of organisms, each representing an important event in the history of life (suitable pictures can be found at the end of this file):
  - First bacteria (cells without a nucleus)
  - First eukaryotes (cells with a nucleus)
  - First multicellular organisms
  - First animals with hard parts (e.g. a trilobite)
  - First plants and animals on land (e.g. early arthropods and land plants from Rhynie Chert)
  - First amphibians (e.g. *Ichthyostega*)
  - First reptiles (e.g. *Hylonomus*)
  - First dinosaurs (e.g. *Thecodontosaurus*)
  - First mammals (e.g. *Morganucodon*)
  - First birds (e.g. *Archaeopteryx*)
  - First flowering plants (e.g. *Archaeofructus*)
  - First human (genus *Homo*)
- A laminated card labelled "Origin of the Earth"
- 5 metre length of string (allows 0.4m for fixing at each end)
- Metre ruler or tape measure
- 13 clothes pegs to attach cards to washing line
- Drawing pins/clips to attach string to the wall

**Preparation and set-up time:** 5-10 minutes to set up the 4.6 metre long 'washing line'.

**Activity:**

- Students are told that the washing line represents the 4600 million years since the Earth was formed, and are told which end represents present day.

- Ask students to first put the events in the order they think they occurred.
- Next, students peg the events on the line in the position of the time that they think the events happened, and record their answers.
- Students are shown a correct, completed washing line – and are asked, 'How does it compare to yours?'

The table below provides dates and distances for a 4.6 metre washing line (1 million years = 1 mm).

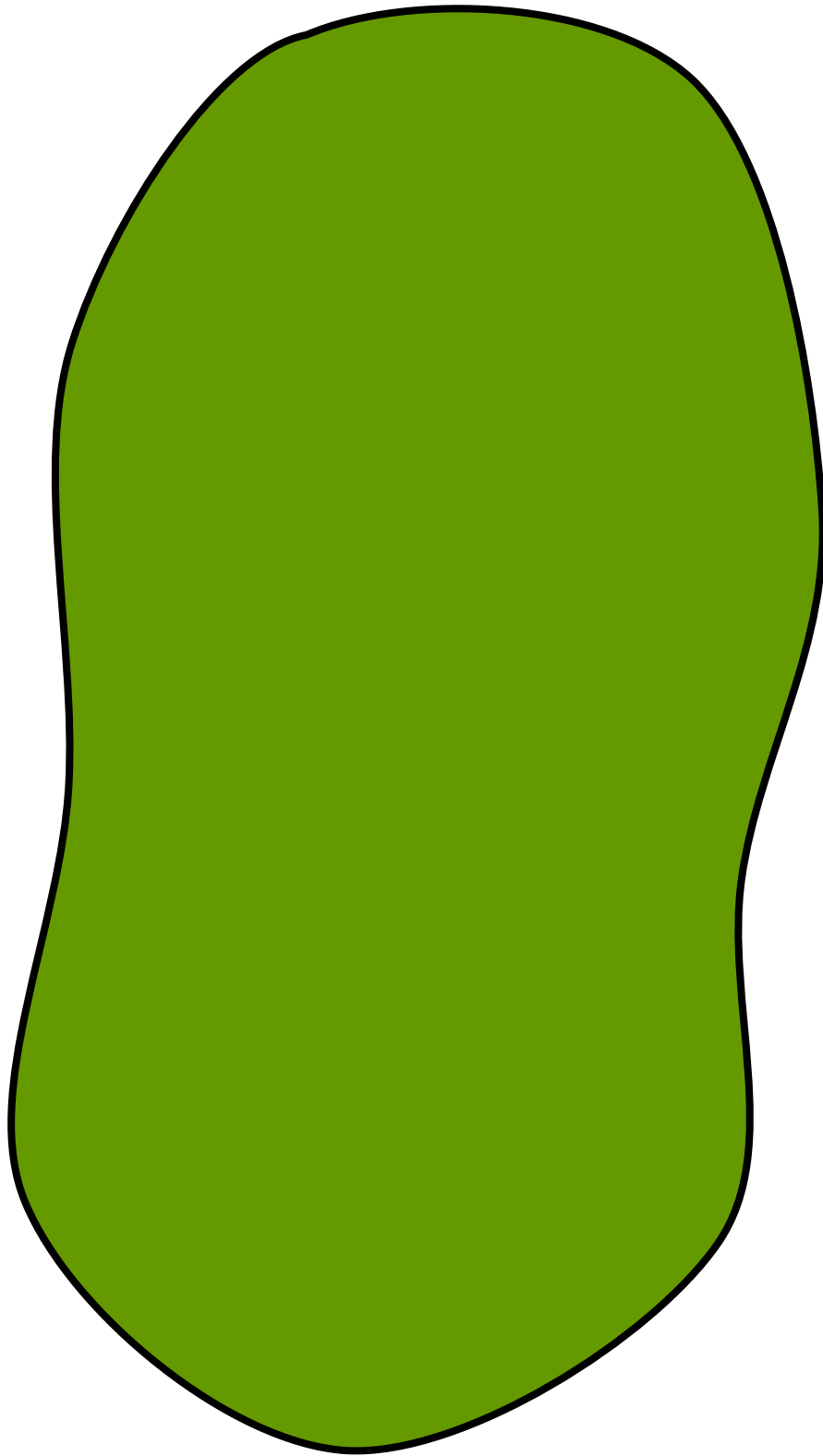
Event	Millions of years ago (Ma)	Distance from 'present day' (cm)
First humans (genus <i>Homo</i> )	2	0.2
First flowering plants	130	13
First birds	150	15
First mammals	220	22
First dinosaurs	225	22.5
First reptiles	325	32.5
First amphibians	360	36
First plants and animals on land	420	42
First animals with hard parts	545	54.5
First multicellular organisms	1200	120
First eukaryotes	2000	200
First bacteria	3500	350

**Leading into the activity:** There are lots of ways of introducing the concept of 'deep time' (the geological timescale), for example, using marked up rolls of wallpaper, the 24 hours of the day, or even a toilet roll.

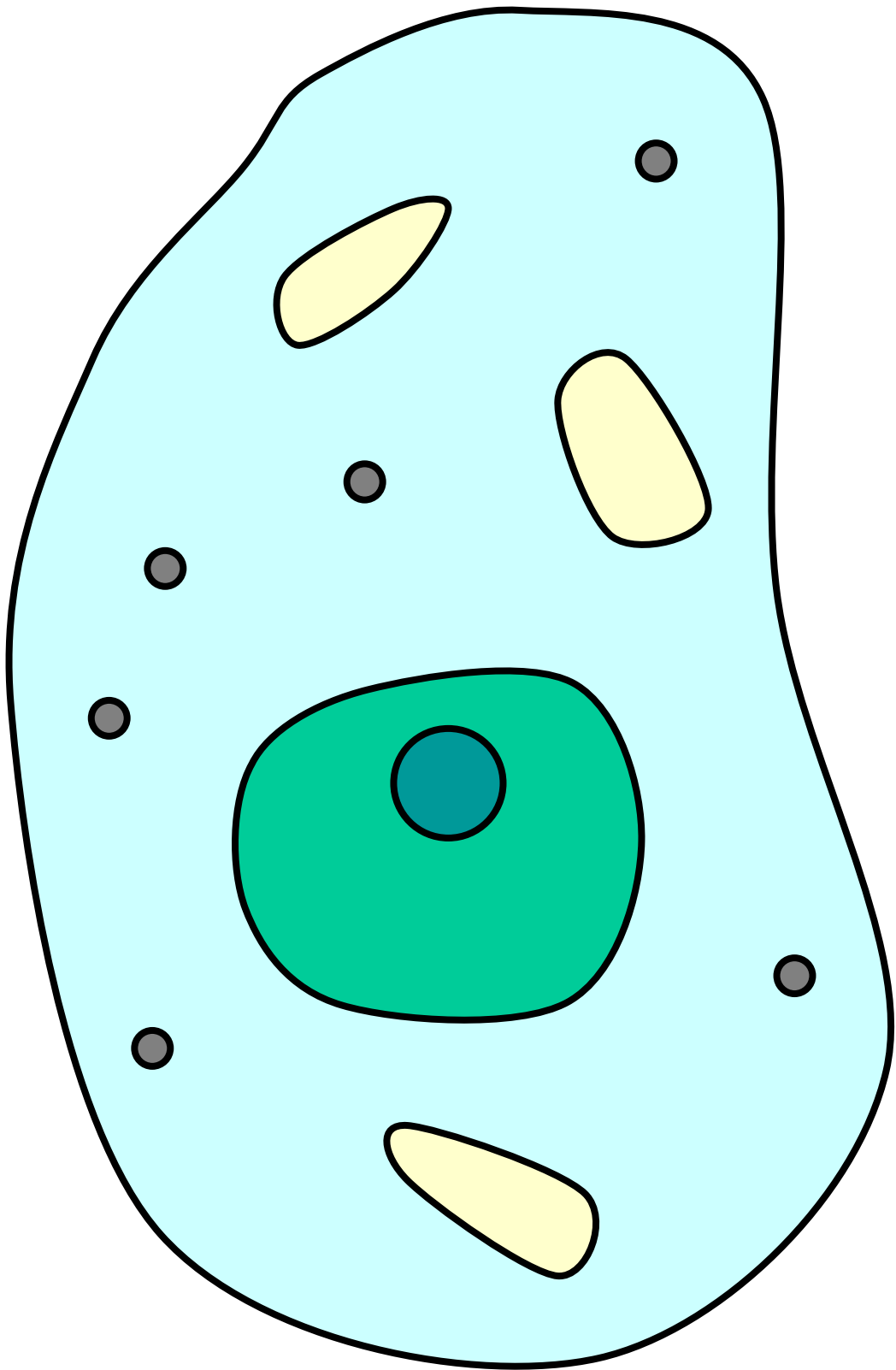
**Following up the activity:** Ask students to consider:

- Which events were difficult to place on the timeline?
- What can they say about the order in which the events occurred? Is it surprising?
- Humans have existed for 2 million years, while bacteria have been around for 3500 million years. Will either still be around 3500 million years from now?

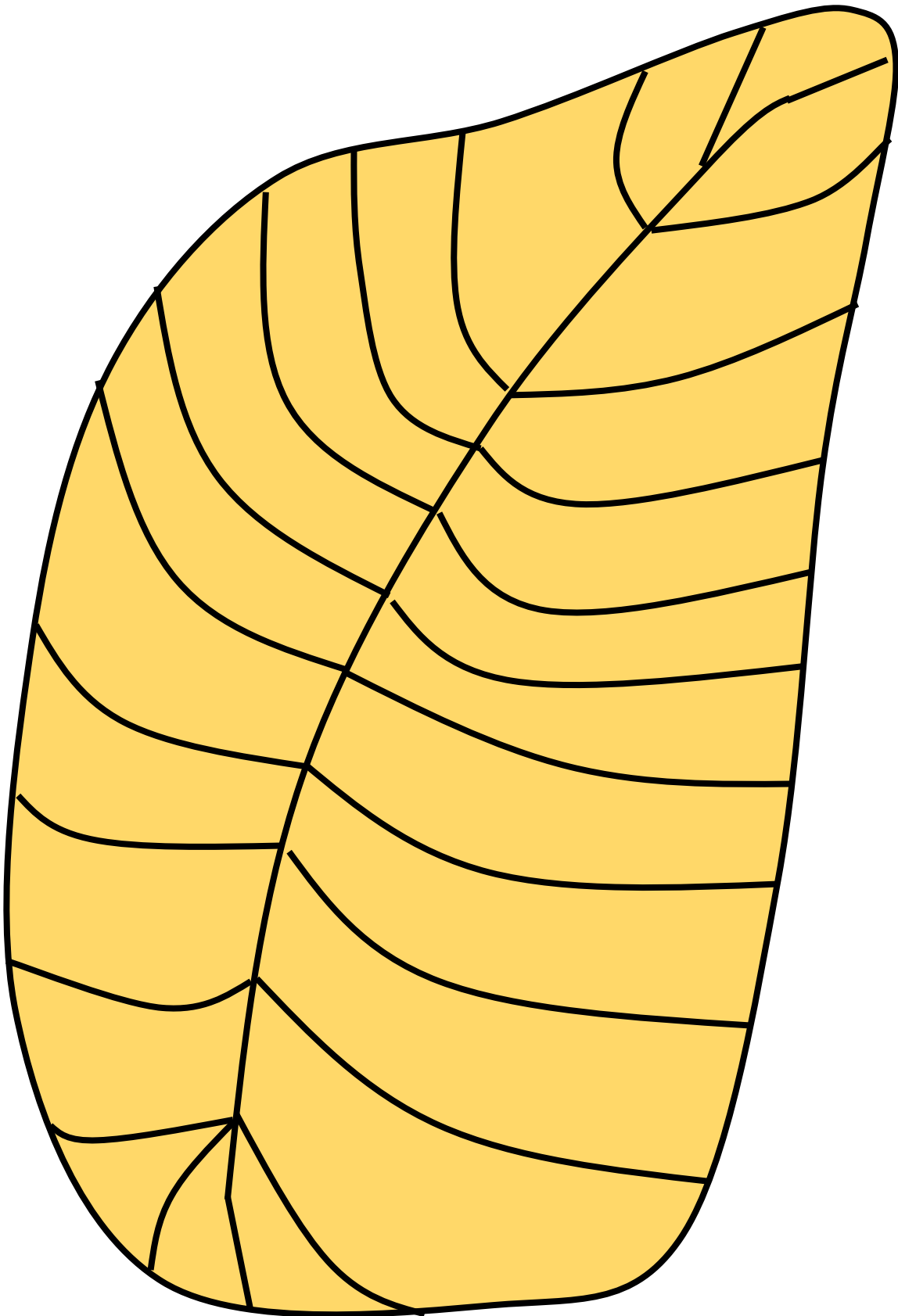
**Extension ideas:** The evidence from the fossil record used in this activity can be compared to the dating for events provided by 'molecular clocks' when DNA sequences are compared. Why might the date for the first eukaryote in the fossil record be much later than the date calculated using DNA sequences? *The fossil record is incomplete – and small organisms without hard parts are the least likely to be preserved – so it extremely unlikely that we will ever find the very first fossil of anything. Alternatively, the molecular clock used may be wrong.*



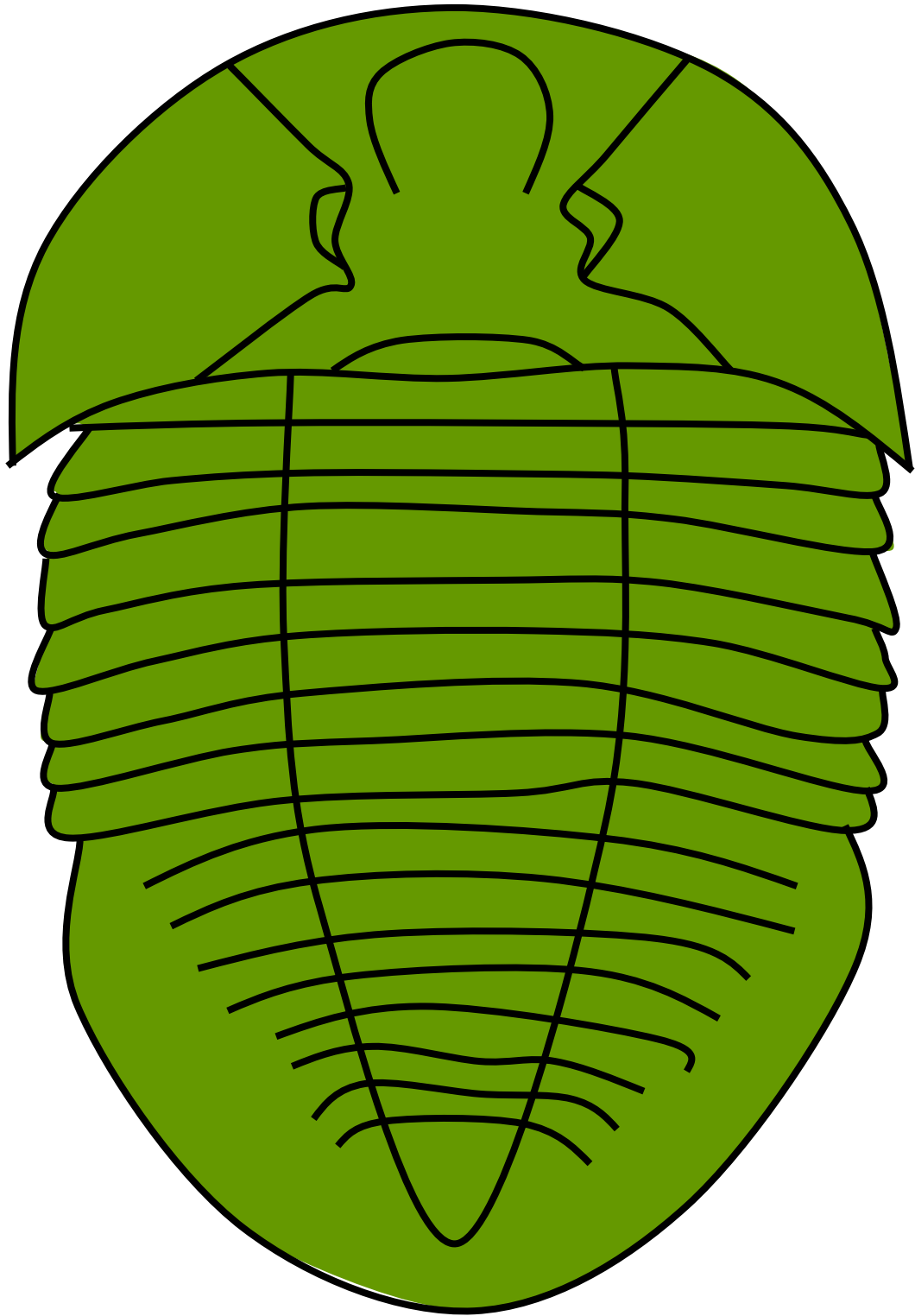
First bacteria



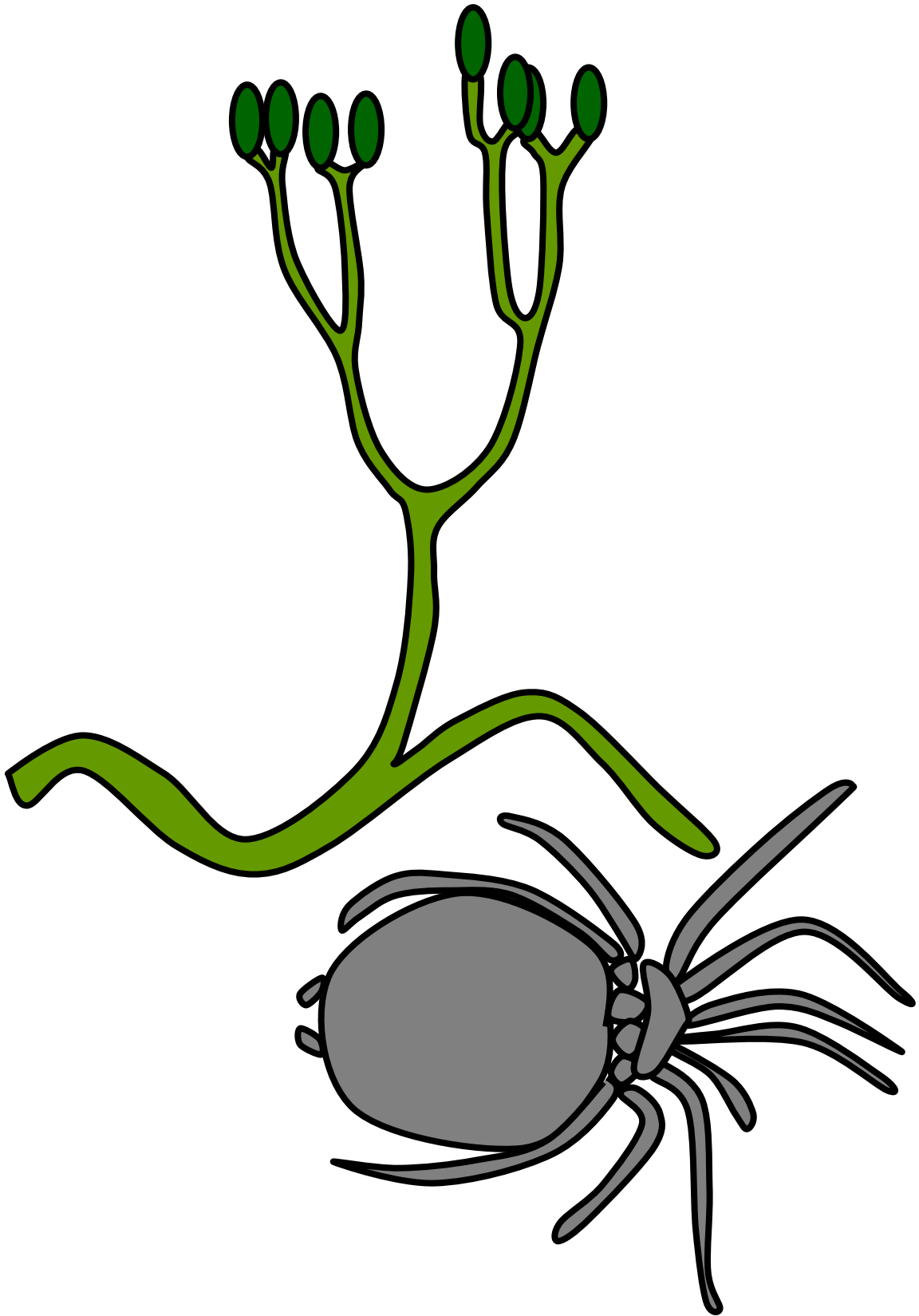
First eukaryotes



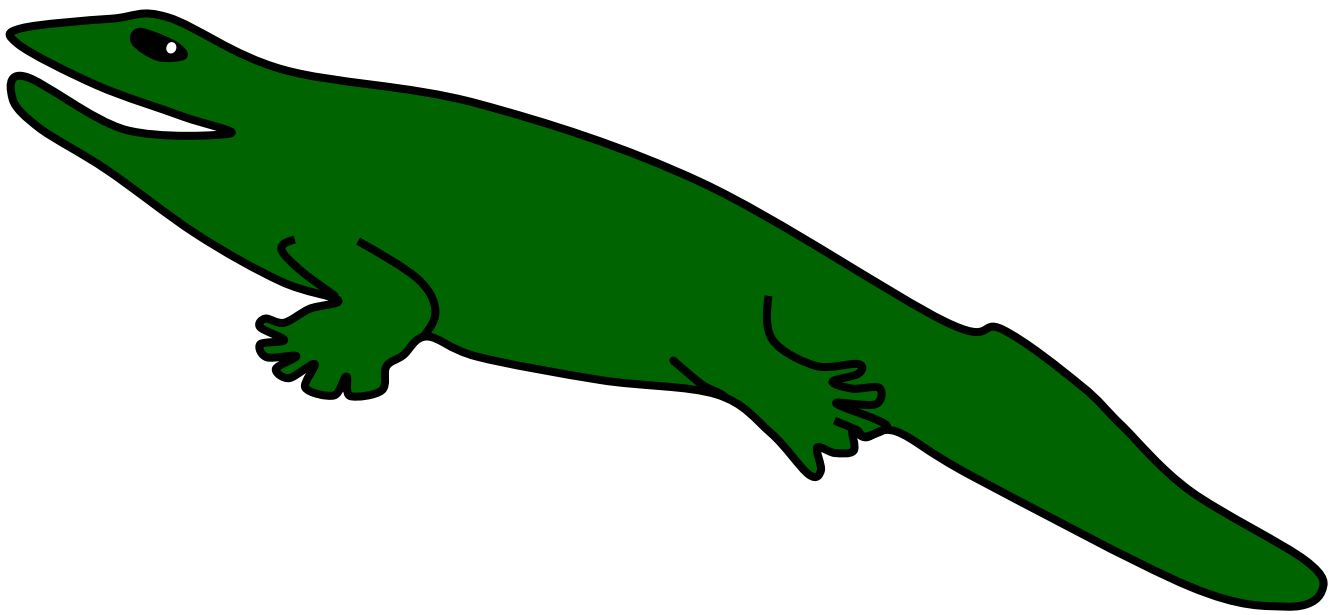
First multicellular organisms



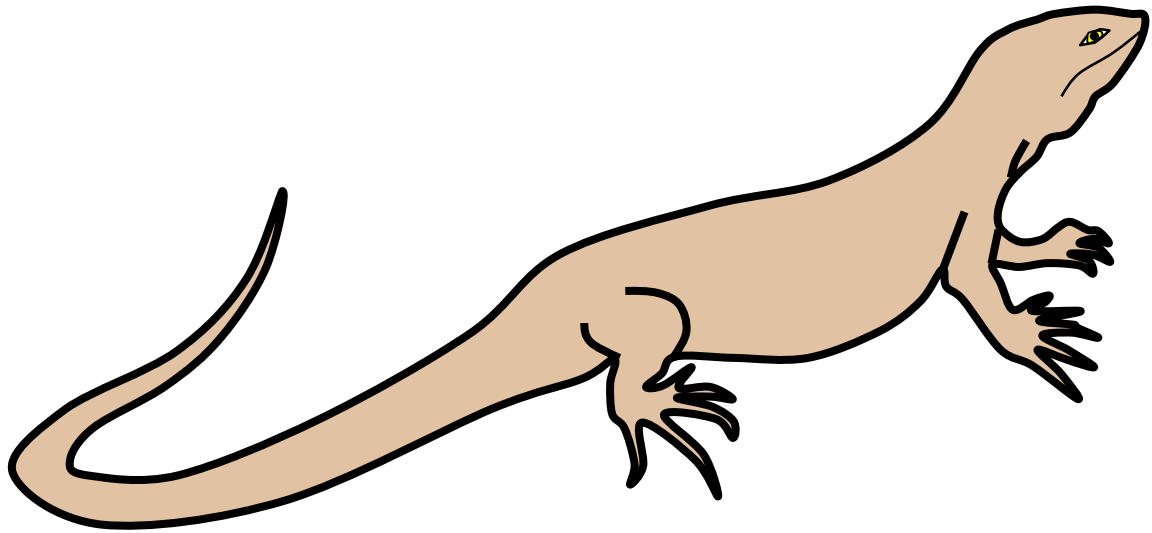
First animals with hard parts



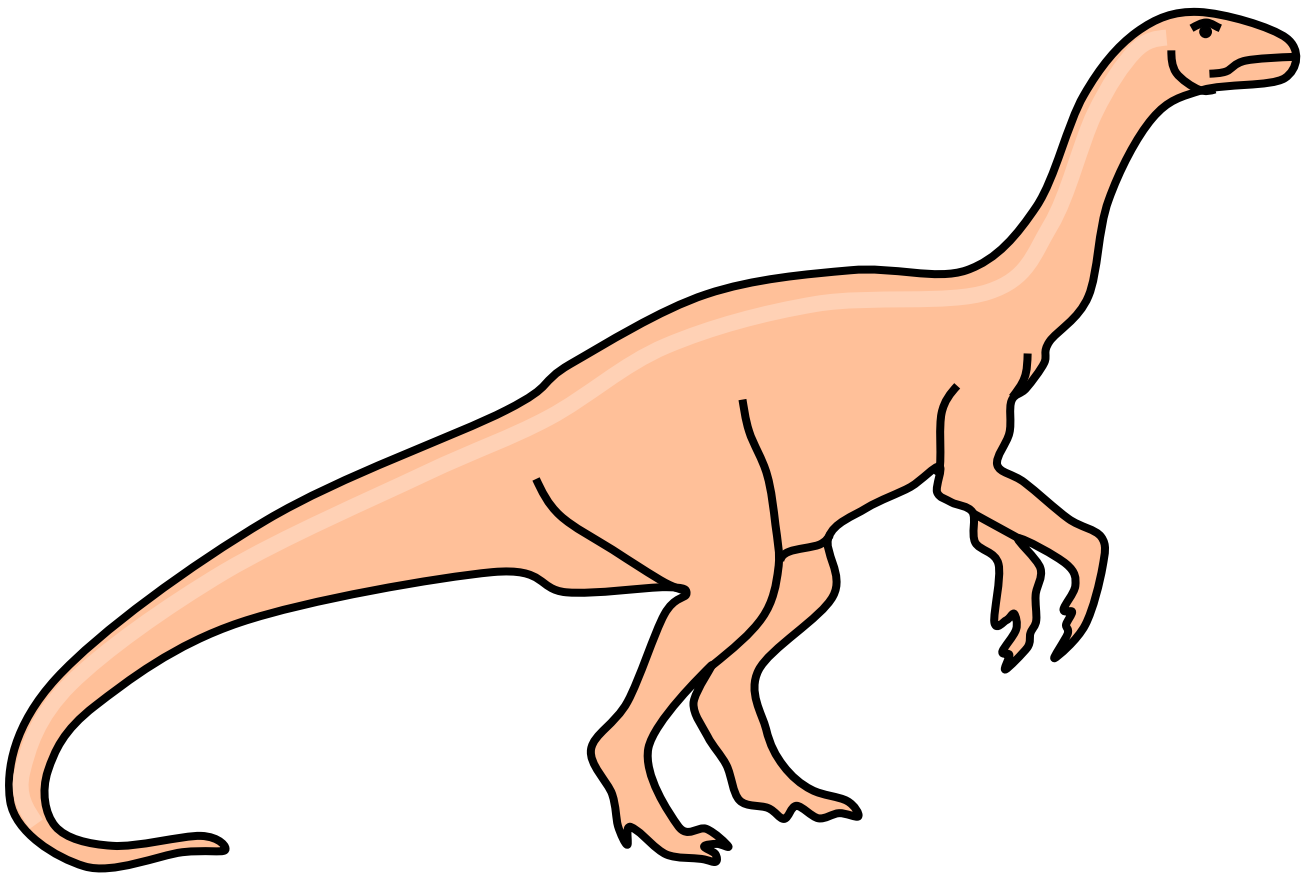
First plants and animals on land



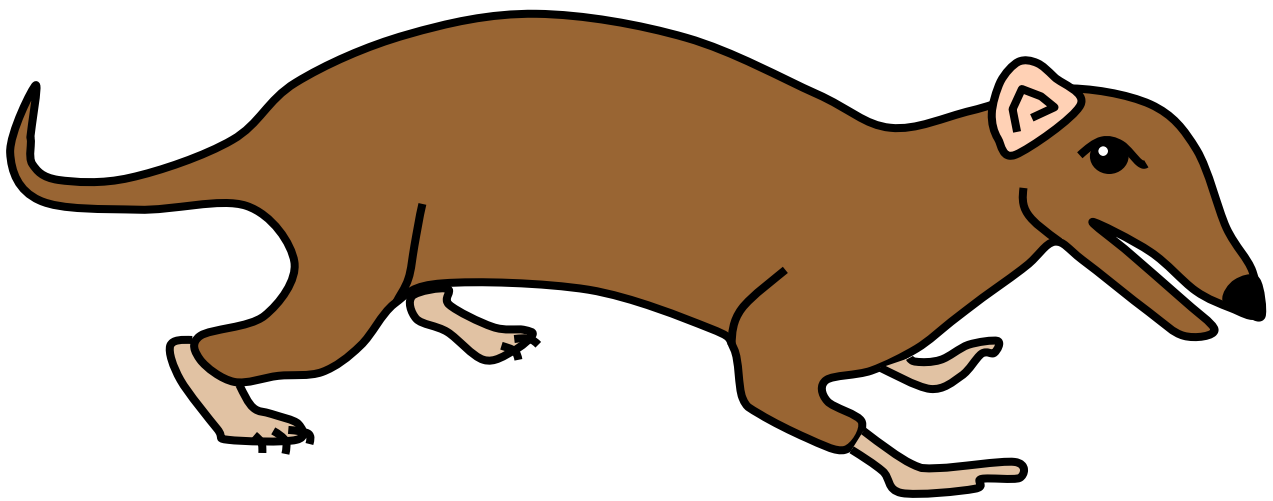
First amphibians



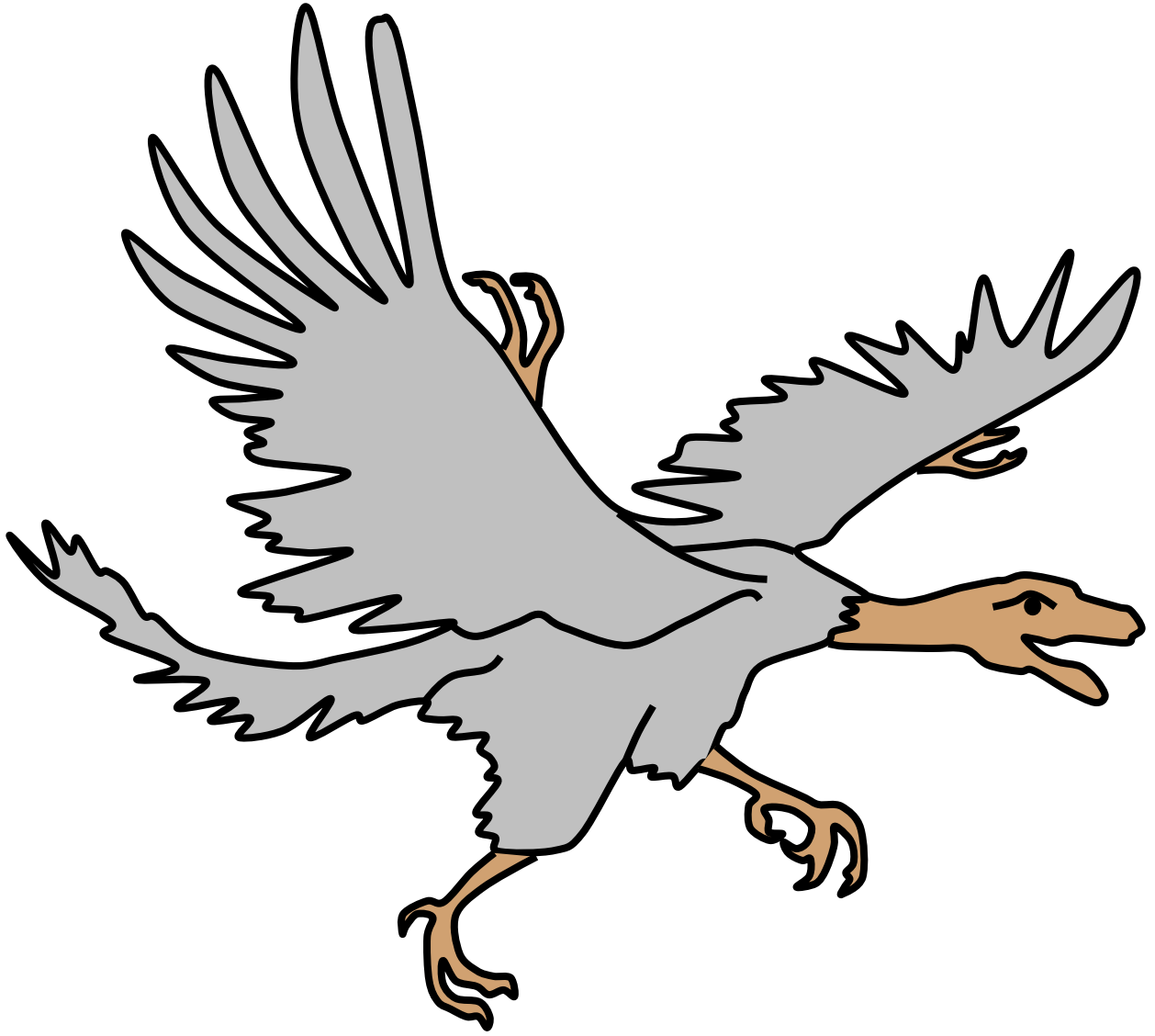
First reptiles



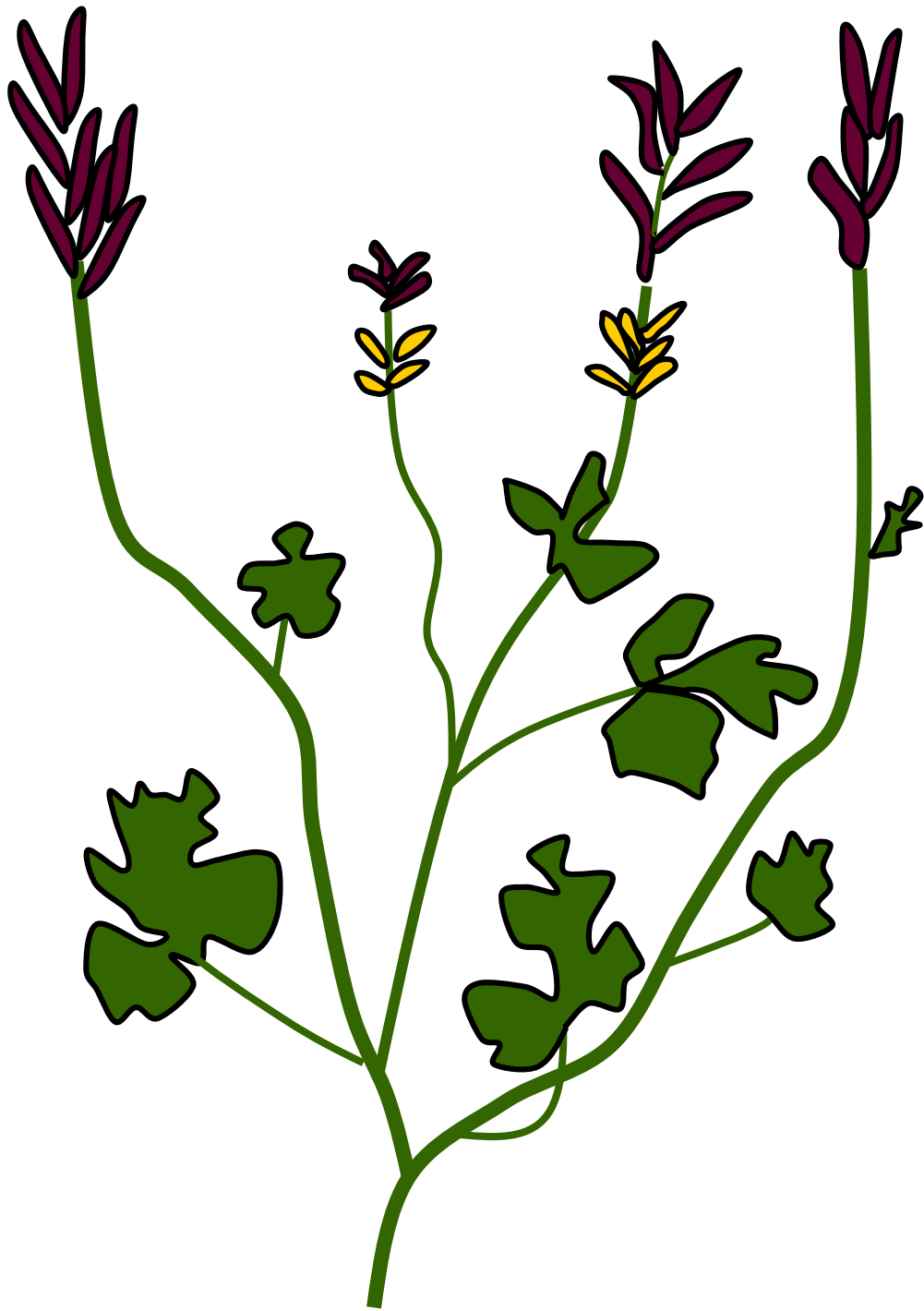
First dinosaurs



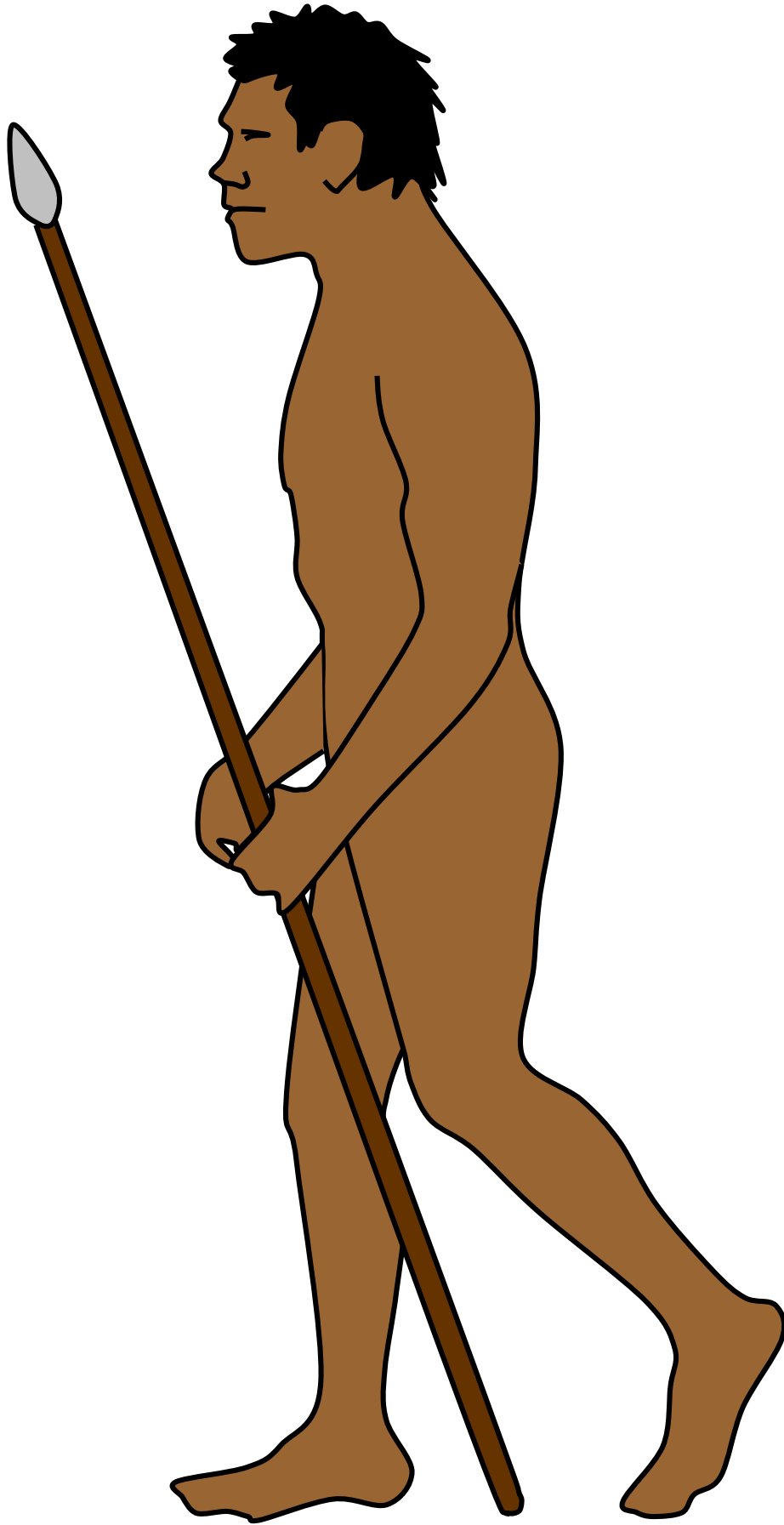
First mammals



First birds



First flowering plants



First human