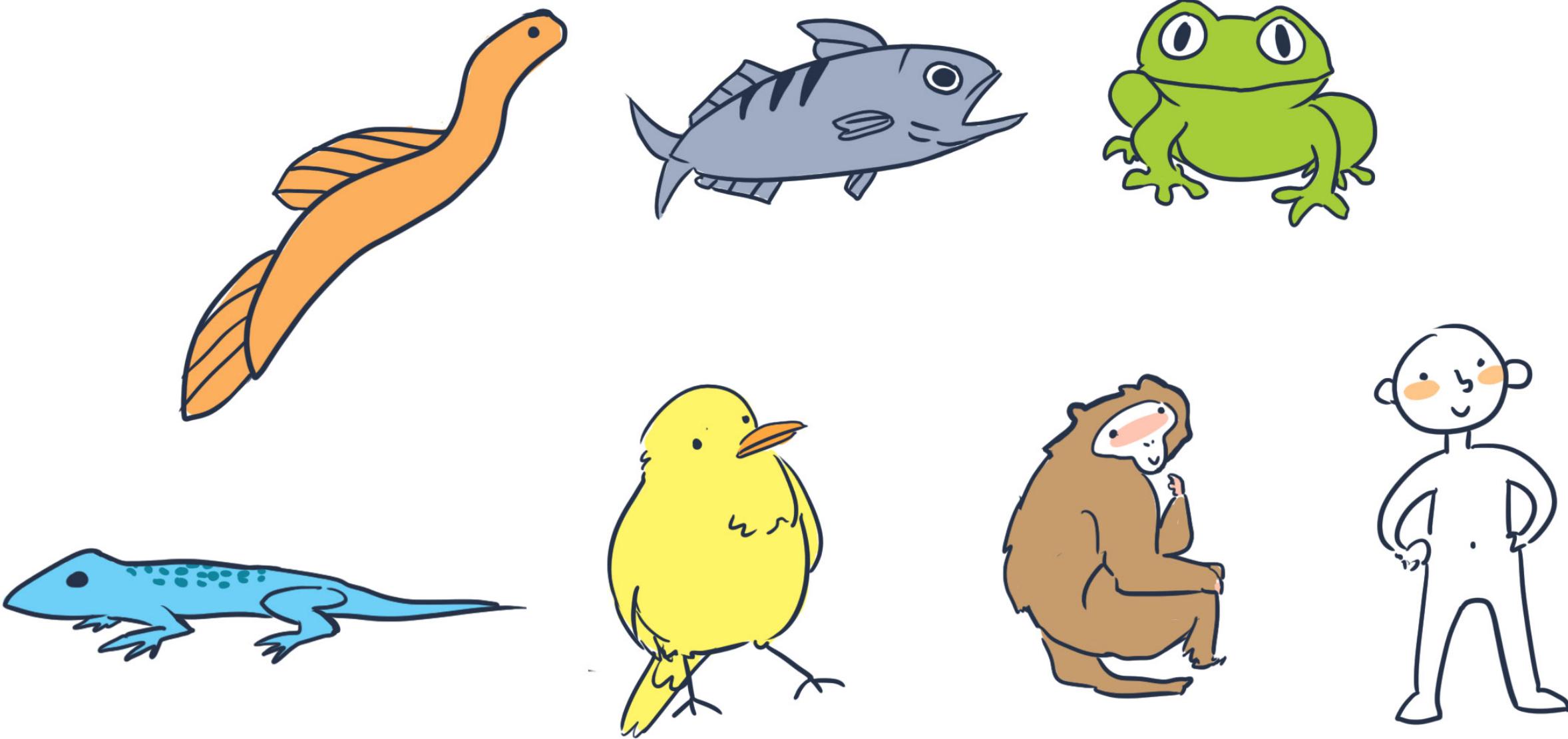


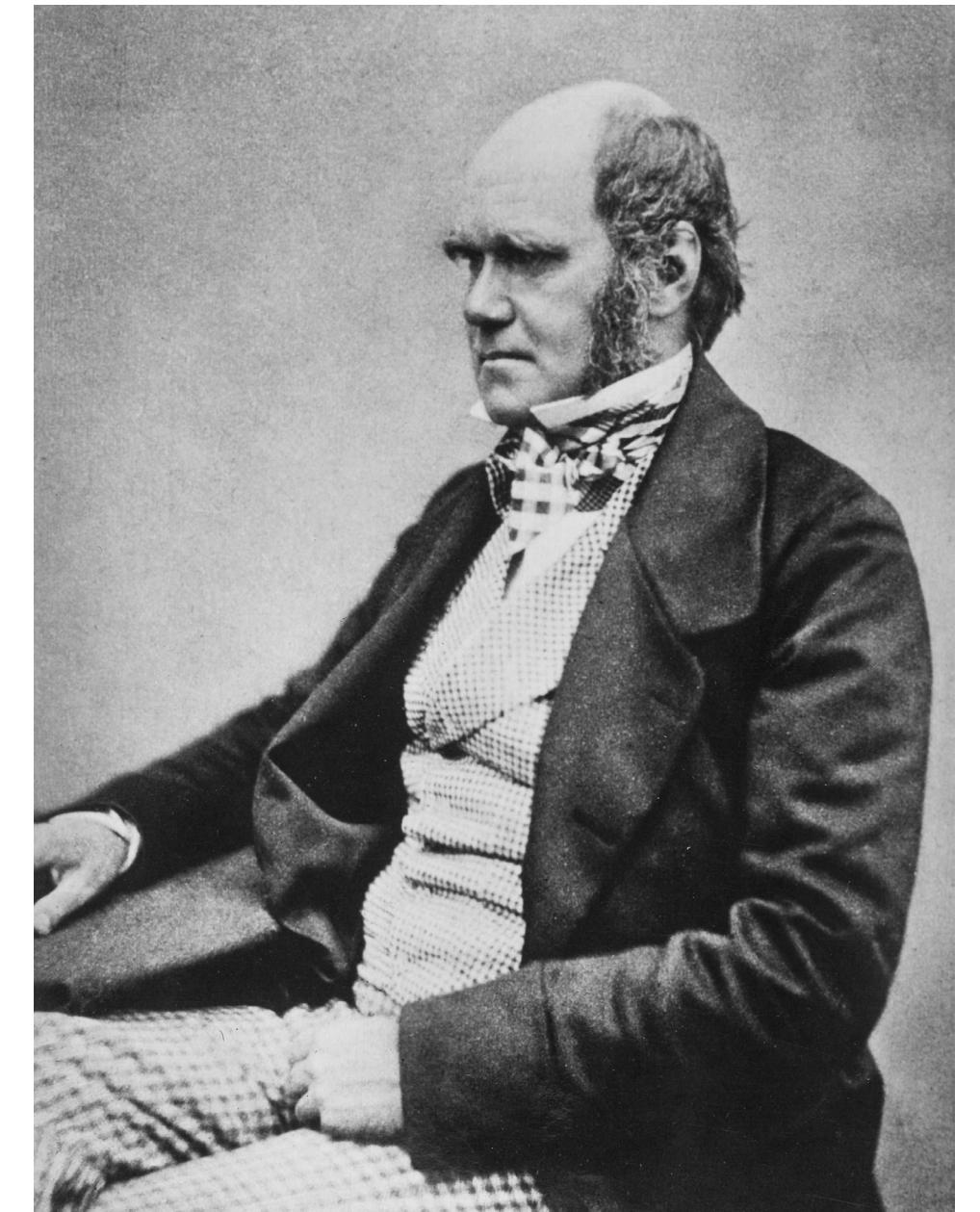
Thinking About Evolution



- Explain Darwin's theory of evolution.
- Explain the process of natural selection.
- Describe 7 often misunderstood points about human evolution.

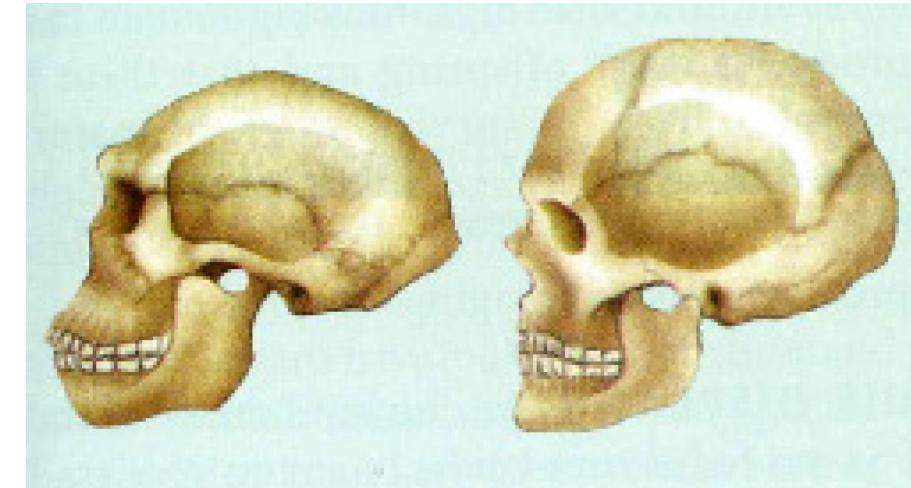
Learning Goals

Charles Darwin (1809 - 1882) wasn't the first person to suggest that species evolve (undergo gradual orderly change) from preexisting species. He was, however, the first to amass a large amount of supporting evidence and the first to suggest how it occurs.



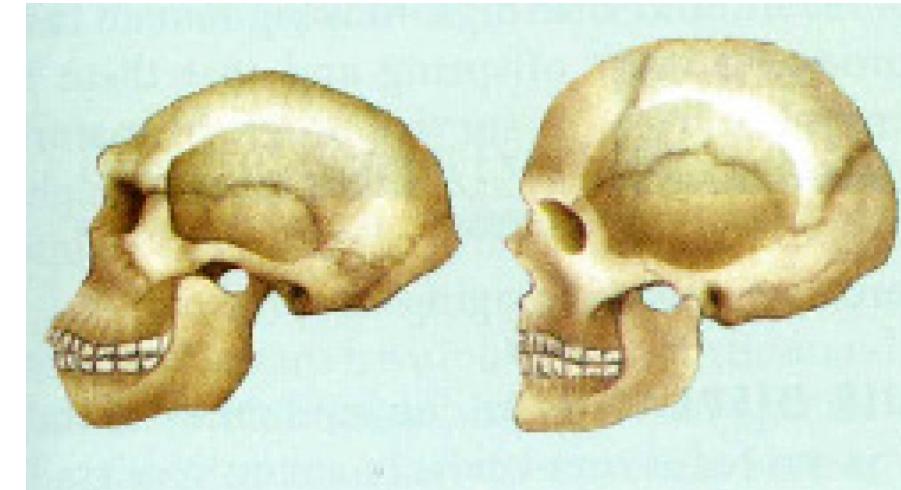
Evolution

Darwin had three primary sorts of evidence to support his assertion that species evolve:



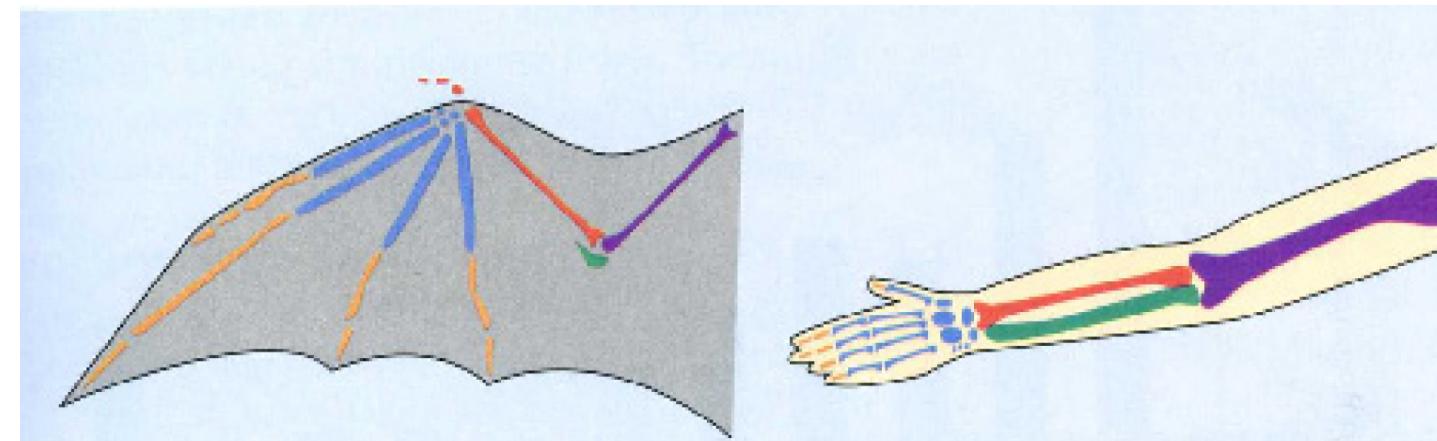
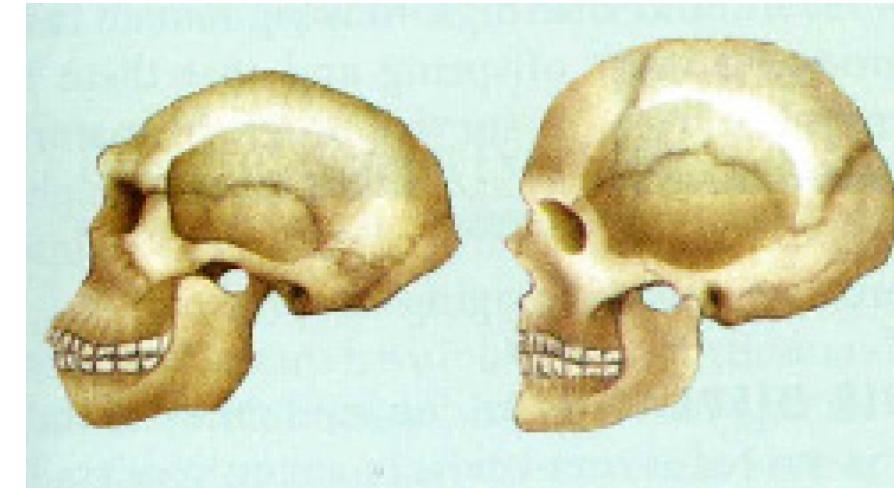
Evolution

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Evolution

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Evolution

Darwin argued that evolution occurs through the process of natural selection: Traits that are associated with high rates of survival and reproduction are the most likely ones to be passed on to future generations.

Natural Selection

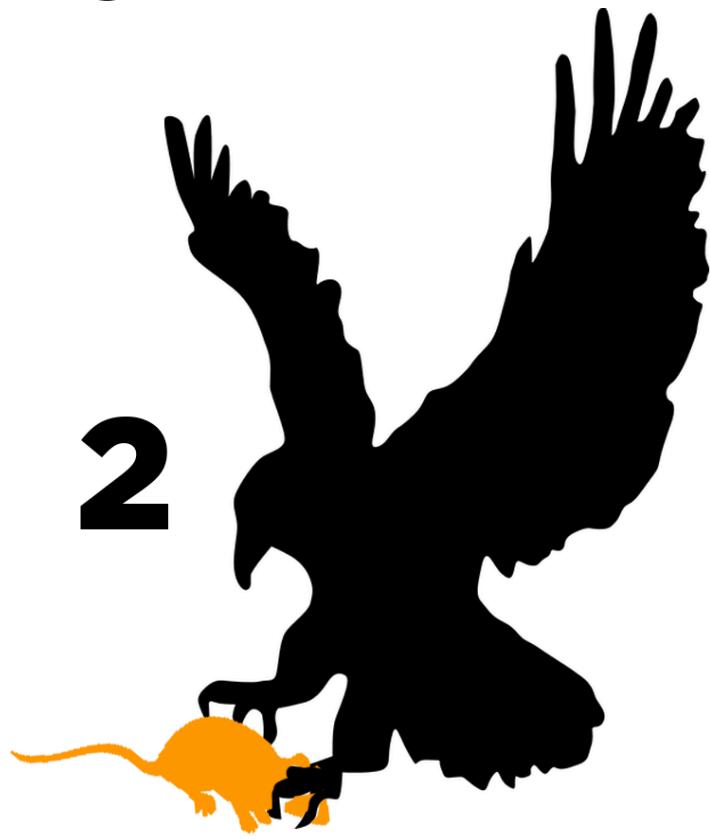
Darwin argued that evolution occurs through the process of natural selection: Traits that are associated with high rates of survival and reproduction are the most likely ones to be passed on to future generations.

When repeated over many generations, natural selection leads to the evolution of species that are better adapted to surviving in their particular environment.

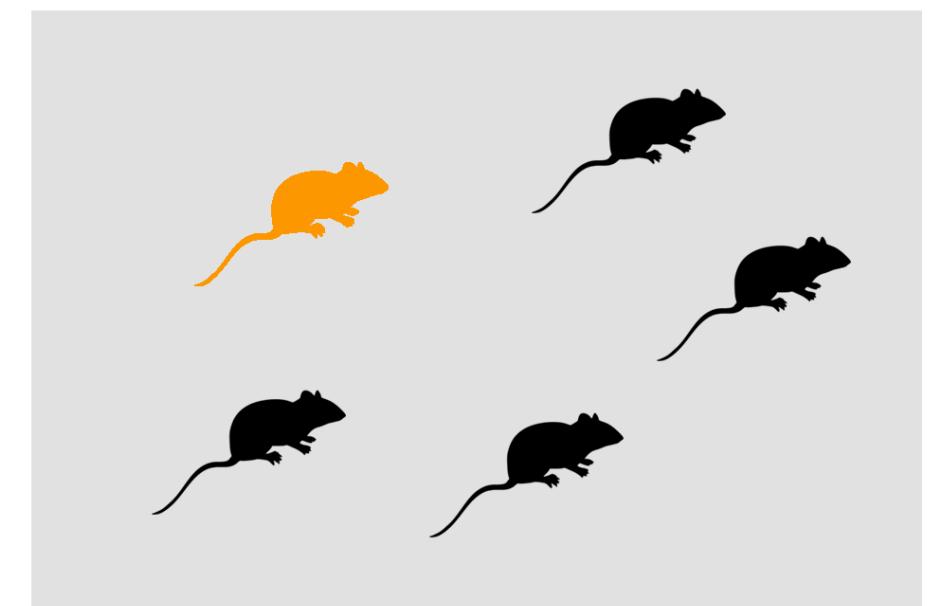
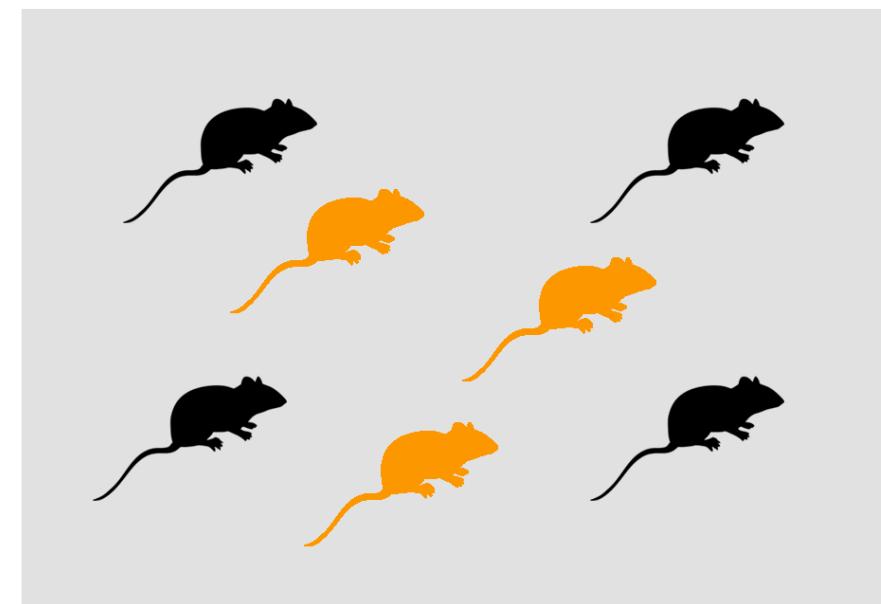
Natural Selection

Through the process of natural selection, some traits get passed on to subsequent generations and some traits do not.

1



3



Natural Selection

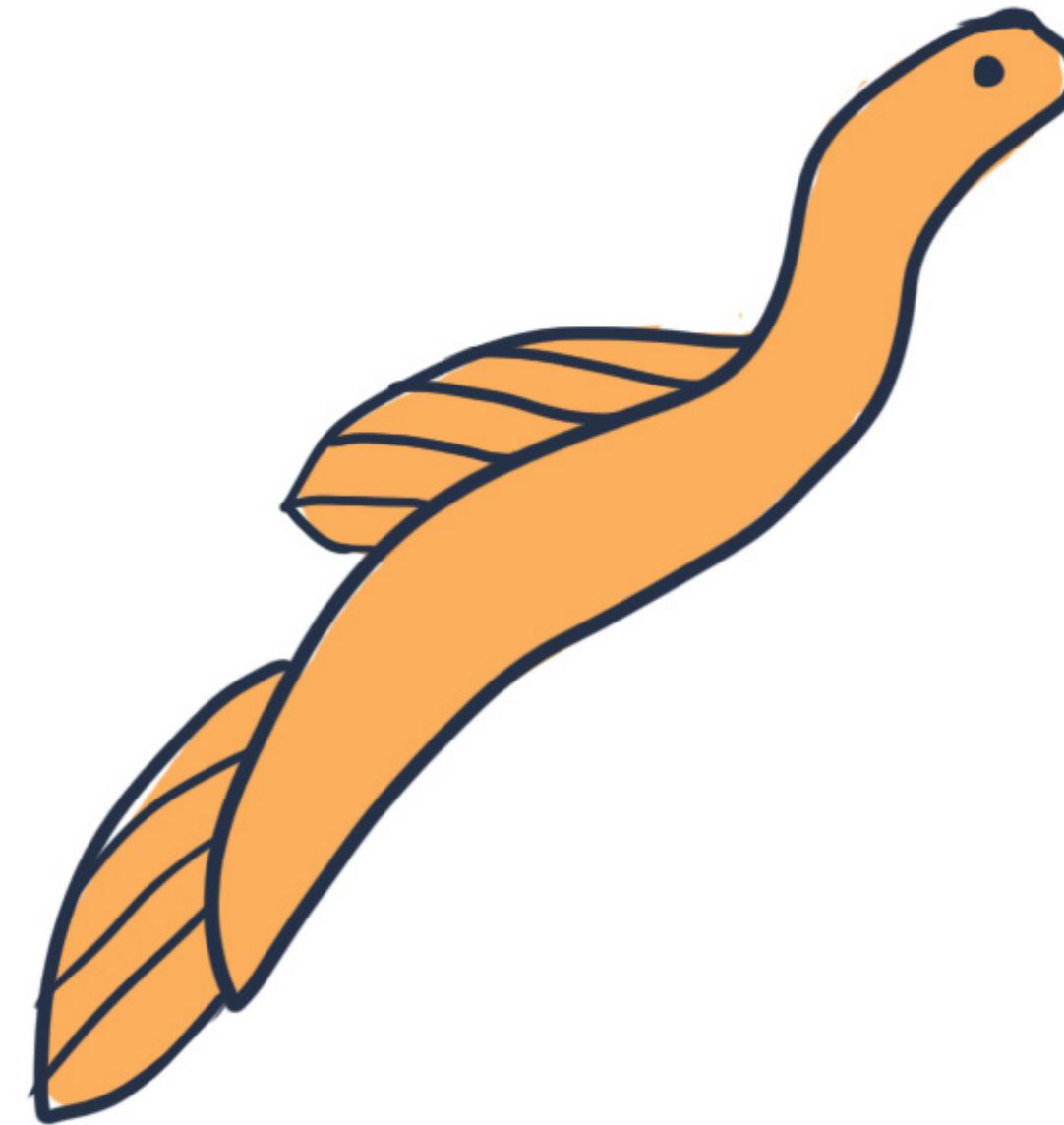
Fundamentals of Natural Selection

1. “Survival of the fittest.”
2. “Fitness” refers to the reproductive success of an organism in its specific environment.



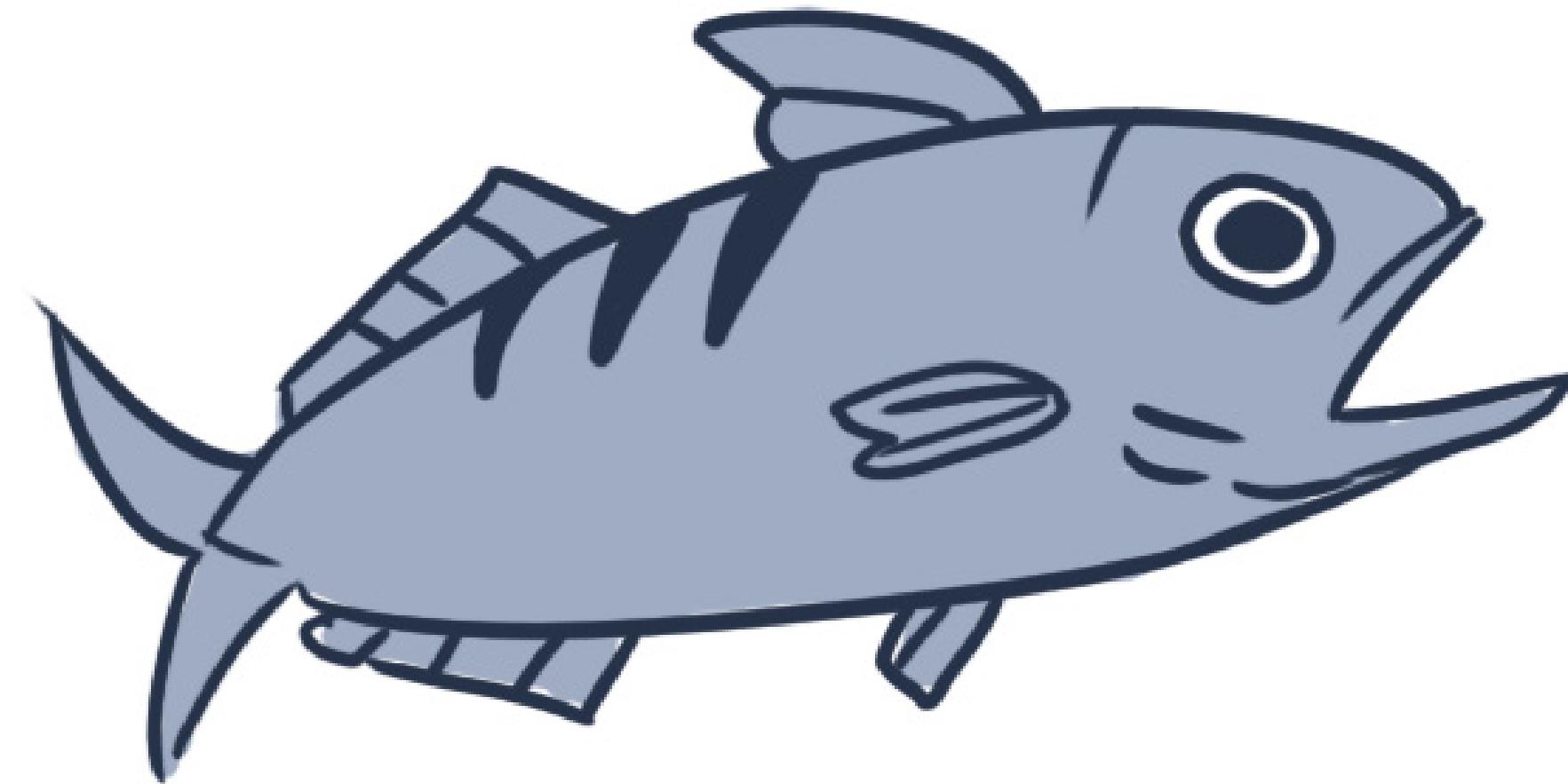
Natural Selection

The first **chordates** (animals with nerve cords running along the center of their back, or dorsum) evolved about 450 million years ago.



Course of Human Evolution

The first **vertebrates** (animals with spinal bones that protect their dorsal nerve cords) evolved about 425 million years ago: These were primitive bony fishes.



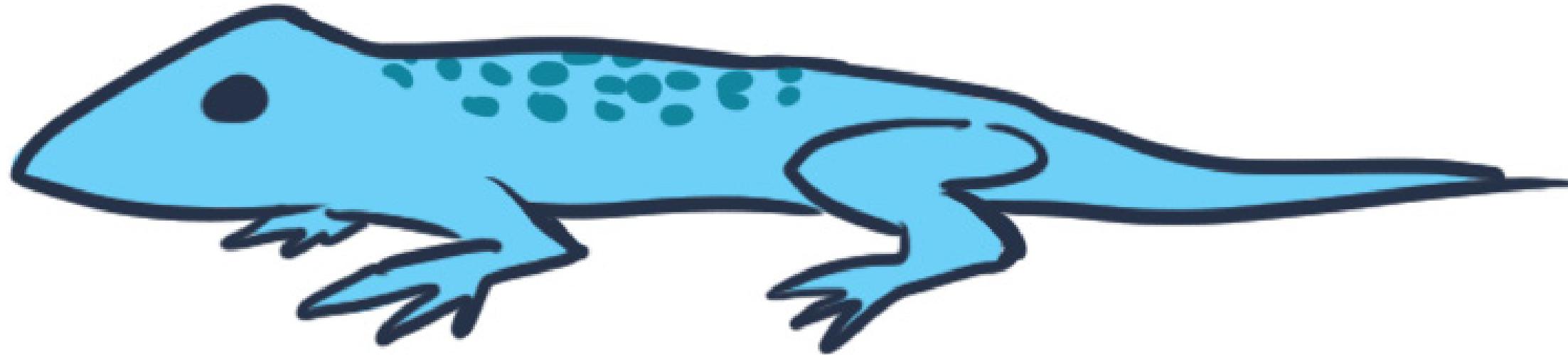
Course of Human Evolution

The first **amphibians** evolved about 400 million years ago.



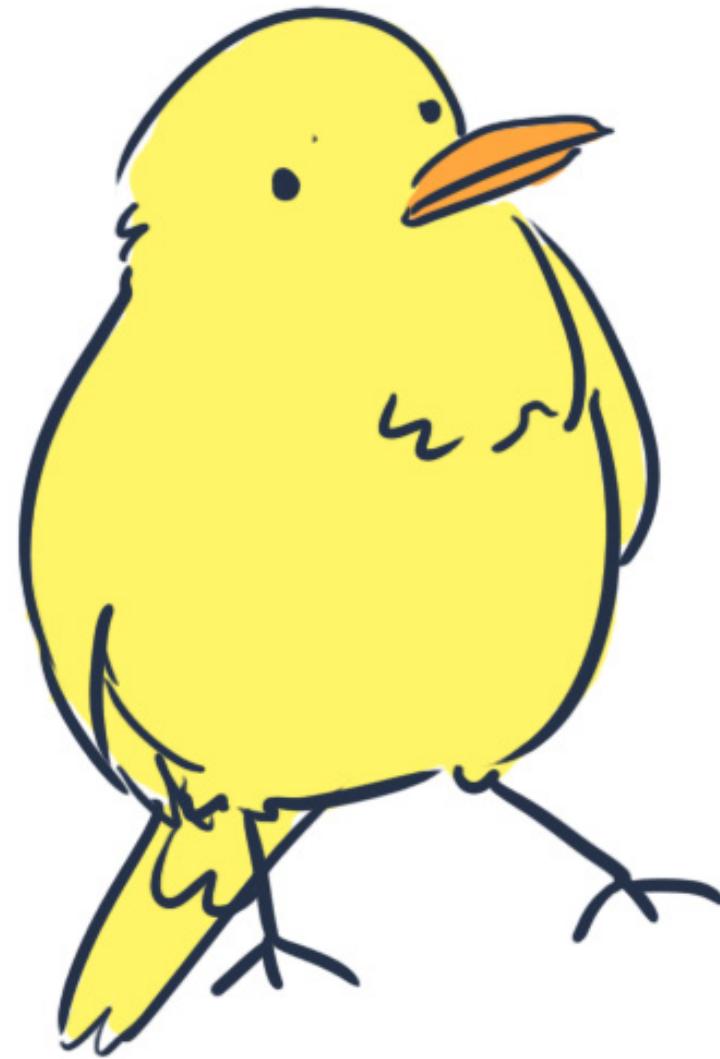
Course of Human Evolution

The first **reptiles** evolved about 300 million years ago.



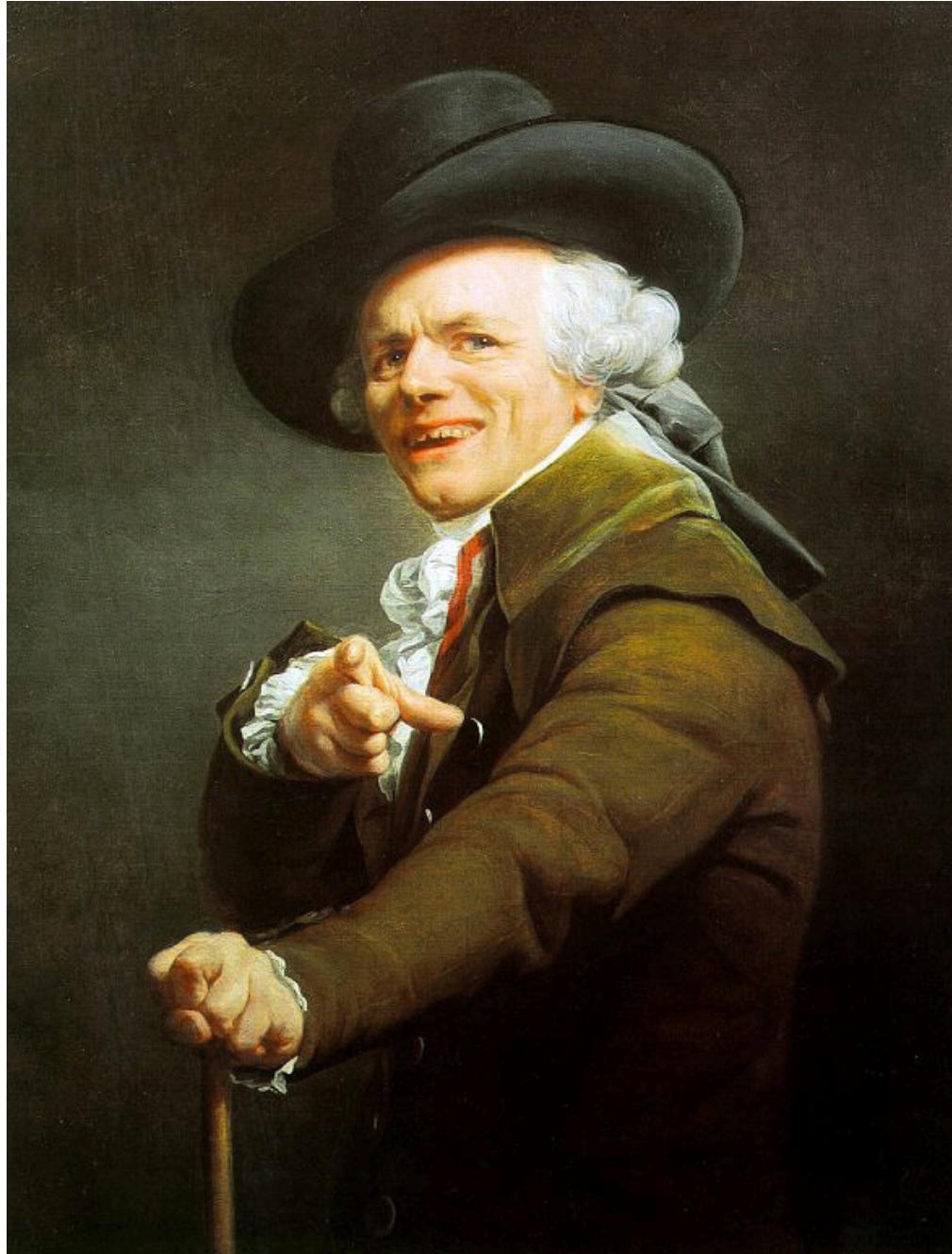
Course of Human Evolution

Mammals and birds evolved about 180 and 150 million years ago, respectively.



Course of Human Evolution

Hominids appeared 6 million years ago, and the first Homo Sapiens appeared about 200,000 years ago.



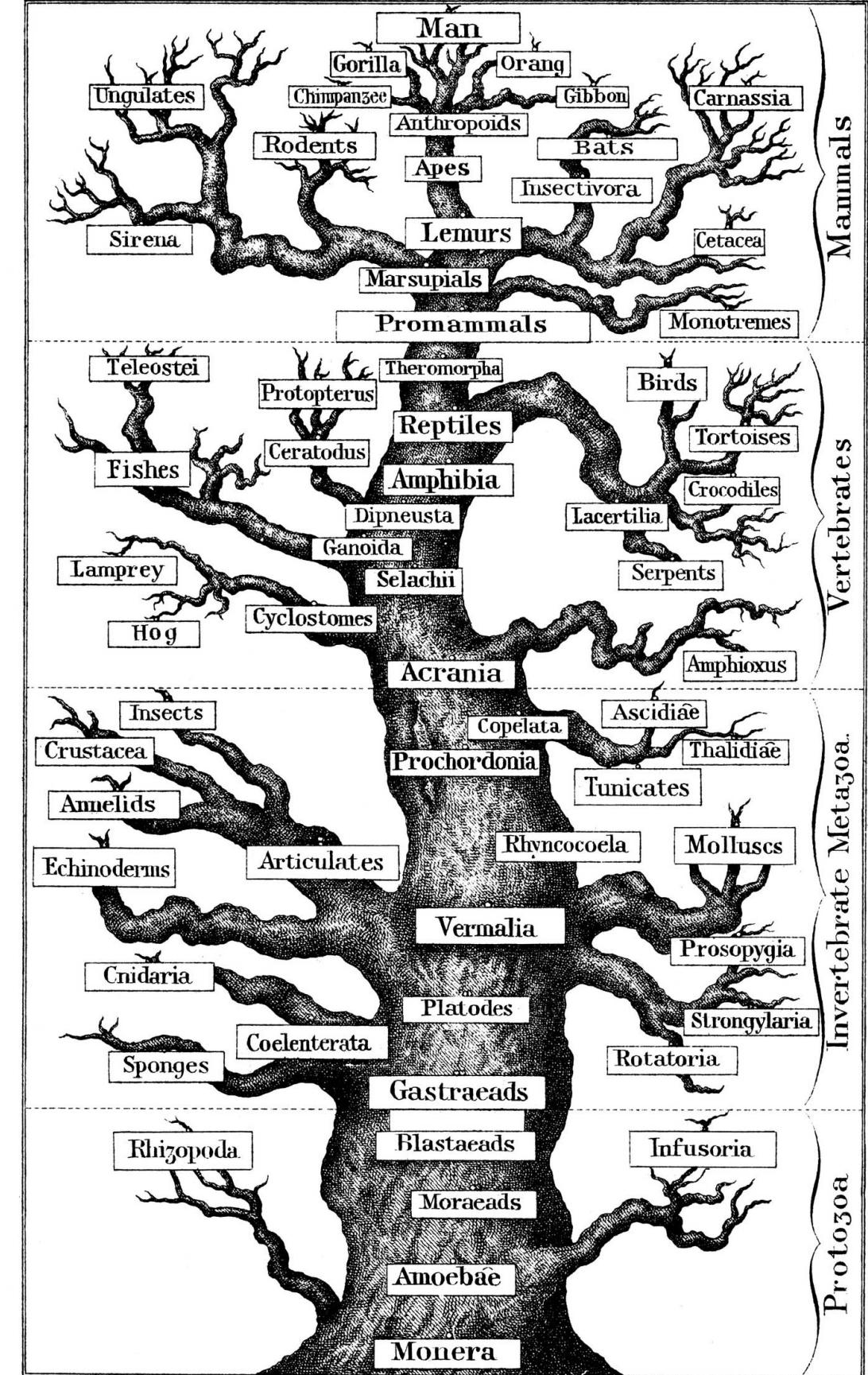
Course of Human Evolution

Here are 7 often misunderstood points about evolution:

Thinking About Evolution

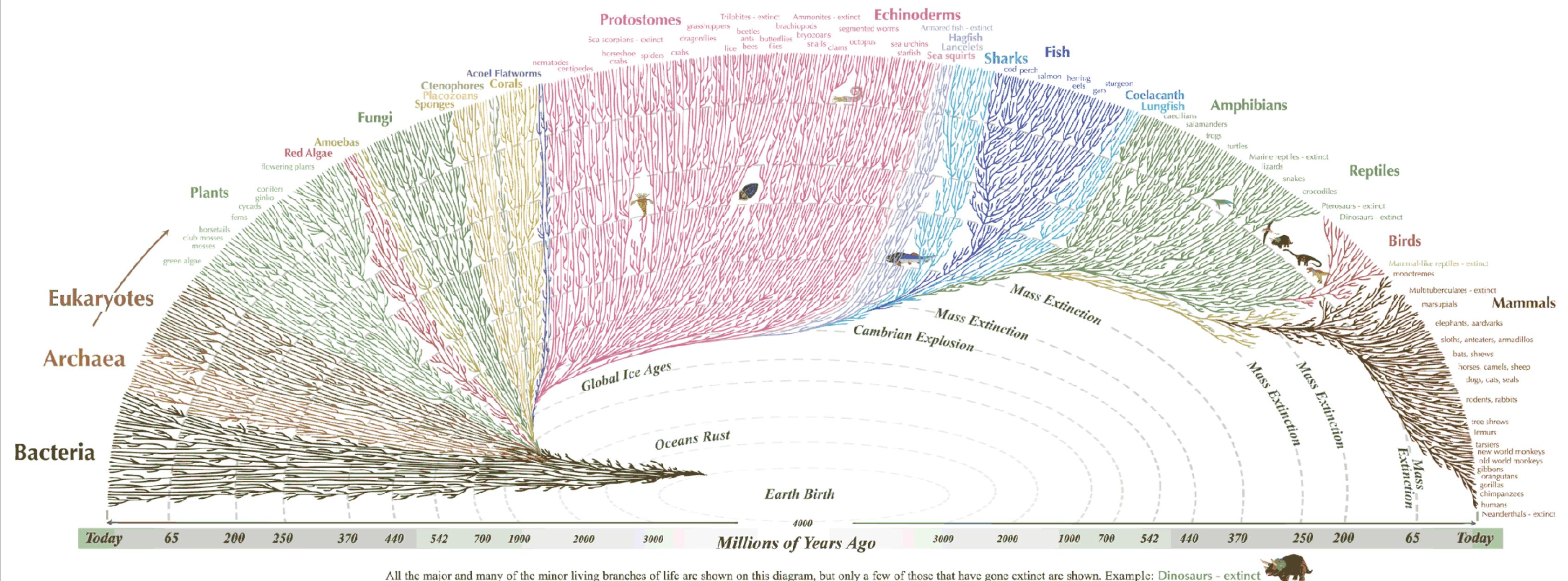
Here are 7 often misunderstood points about evolution:

1. Humans are not higher up on the evolutionary “bush”. We are the last surviving species of a family (i.e., hominids) that has existed for a very short period of time.

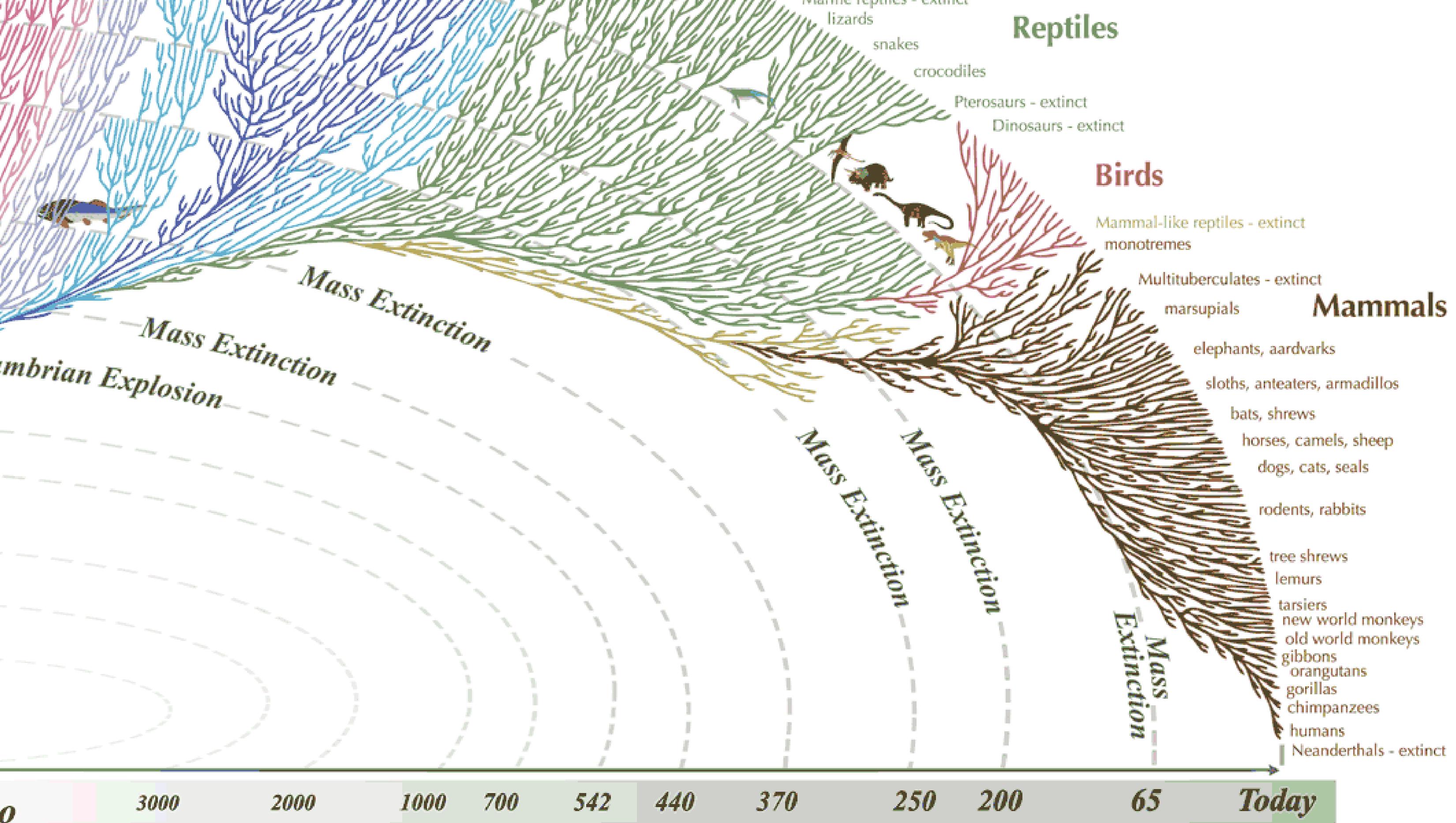


Thinking About Evolution

Here are 7 often misunderstood points about evolution:



Thinking About Evolution



Thinking About Evolution

Here are 8 often misunderstood points about evolution:

2. Fewer than 1% of the products (i.e., species) of evolution still exist.

Thinking About Evolution

Here are 7 often misunderstood points about evolution:

3. Evolution is not necessarily a slow, gradual process; rapid evolutionary changes can be triggered by sudden changes in the environment.

Thinking About Evolution

Here are 7 often misunderstood points about evolution:

4. Evolution does not progress to perfection. The designs are never perfect.



Thinking About Evolution

Here are 7 often misunderstood points about evolution:

5. Not all existing behaviours or structures are adaptive. Sometimes structures or behaviours appear as the by-product of other adaptive structures or behaviours. Such by-products have been termed **spandrels**.



Thinking About Evolution

Here are 7 often misunderstood points about evolution:

5. Not all existing behaviours or structures are adaptive.

Sometimes structures or behaviours appear as the by-product of other adaptive structures or behaviours. Such by-products have been termed **spandrels**.

The belly-button is a good example of a spandrel.



Thinking About Evolution

Here are 7 often misunderstood points about evolution:

6. Not all existing adaptive characteristics evolved to perform their current function. Some, called **exaptations**, evolved to perform one function and were later co-opted to perform another.

Feathers are considered to be exaptations because they are believed to have first evolved for heat regulation and were later co-opted for flight.

Thinking About Evolution

Here are 7 often misunderstood points about evolution:

7. Similarities between species do not necessarily mean that the species have common evolutionary origins.

Structures that are similar because they have a common evolutionary origin are termed **homologous** (e.g., bats wing and human arm).

Thinking About Evolution

Here are 7 often misunderstood points about evolution:

7. Similarities between species do not necessarily mean that the species have common evolutionary origins.

Structures that are similar but do not have a common evolutionary origin are termed **analogous** (e.g., birds wing and bees wing).

Thinking About Evolution