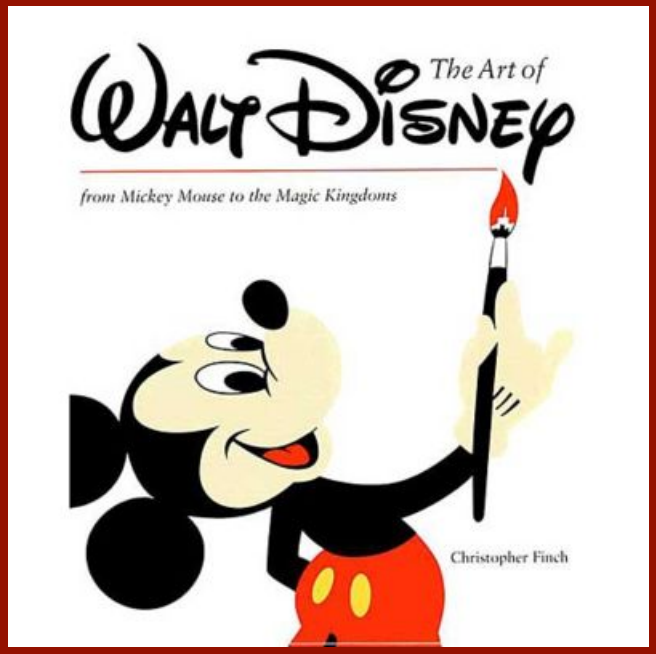
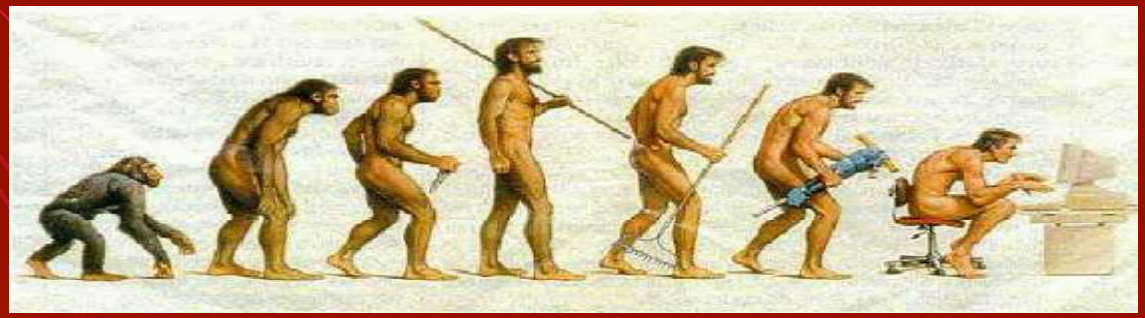
The Evolution of Mickey Mouse: How did you become you?

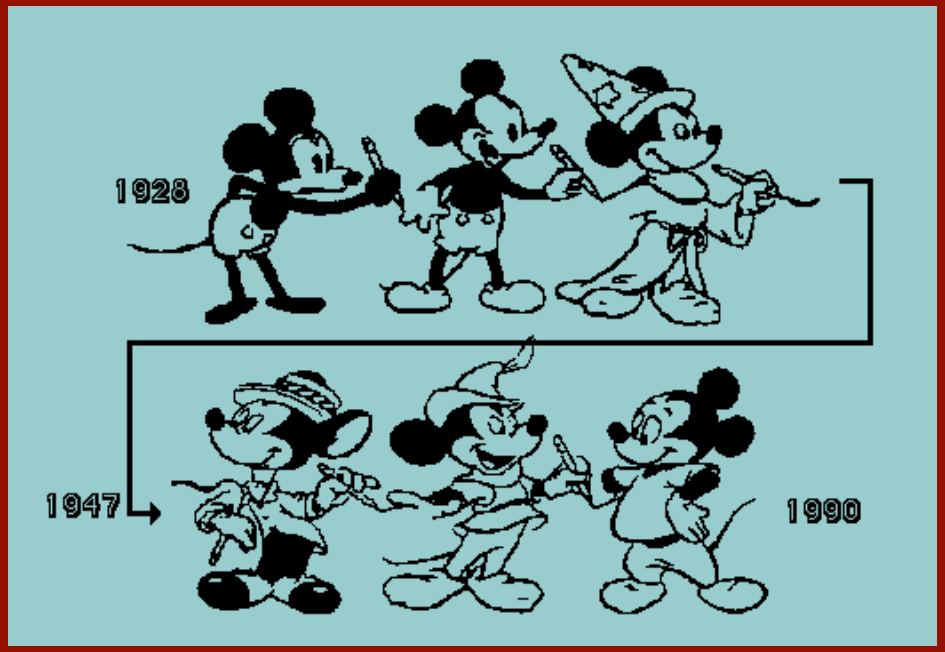




An Evolved Mickey Down Through the Ages

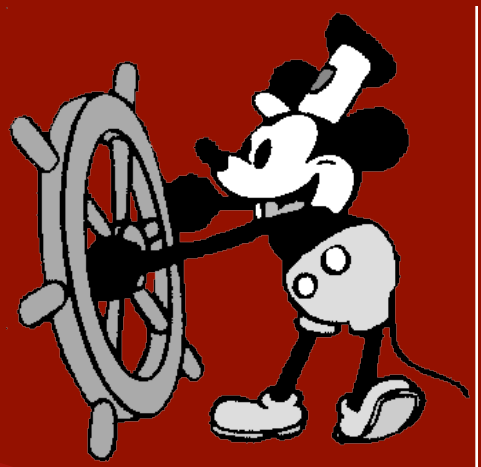
Mickey's Transition from Rat to Mouse Baby

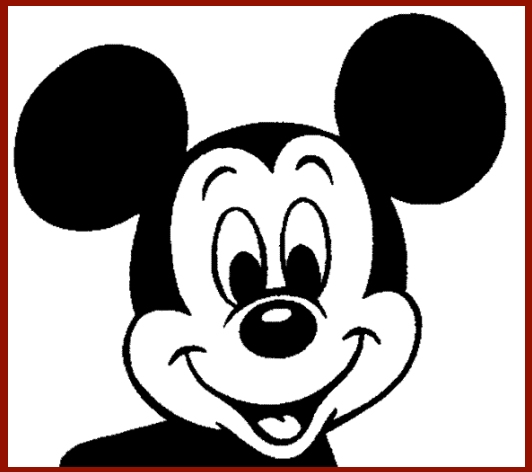
- His ears and head became much larger over time
- His nose became less sharp and pointy
- His eyes widened from two black dots to large, white, oval circles



Mickey- then and now!

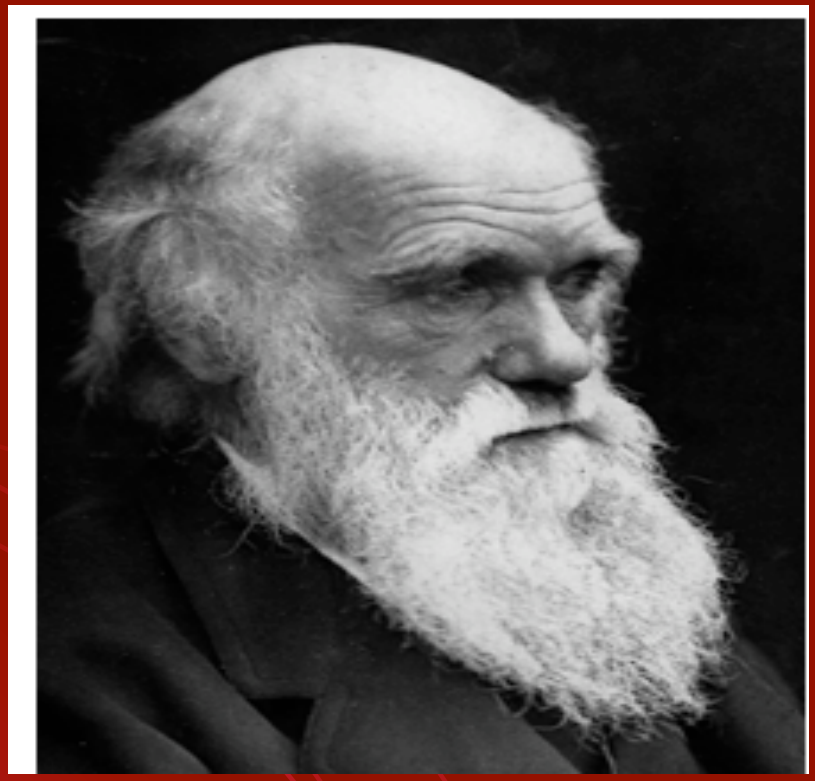
- Over the years Mickey “evolved” into an infant





A Brief History of Evolution

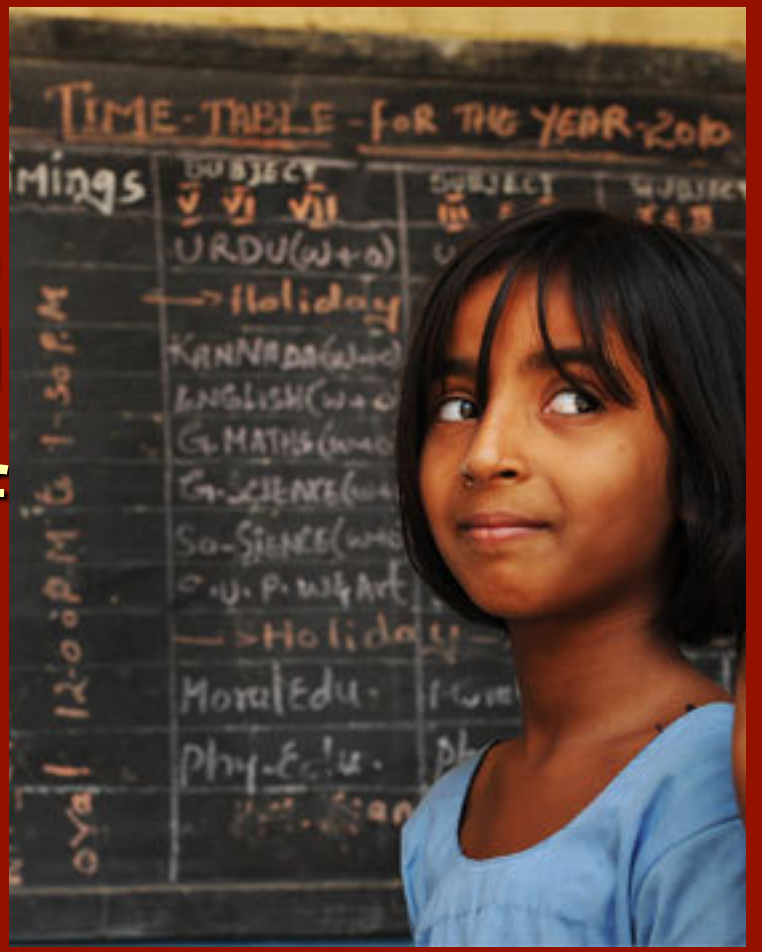
Charles Darwin (1802-1882)



Questions for Thought

- Earth has millions of different kinds of organisms of every imaginable shape, size, and habitat. This variety of living things is called biological diversity.
- How did all these different organisms arise?
- How are they related?

In your own words, describe what YOU think the theory of evolution means…



Darwin's Theory of Evolution

- **Evolution**, or change over time, is the process by which modern organisms have descended from ancient organisms.

- We all evolve through common descent
- The process of evolution is by natural selection and results in survival of the fittest

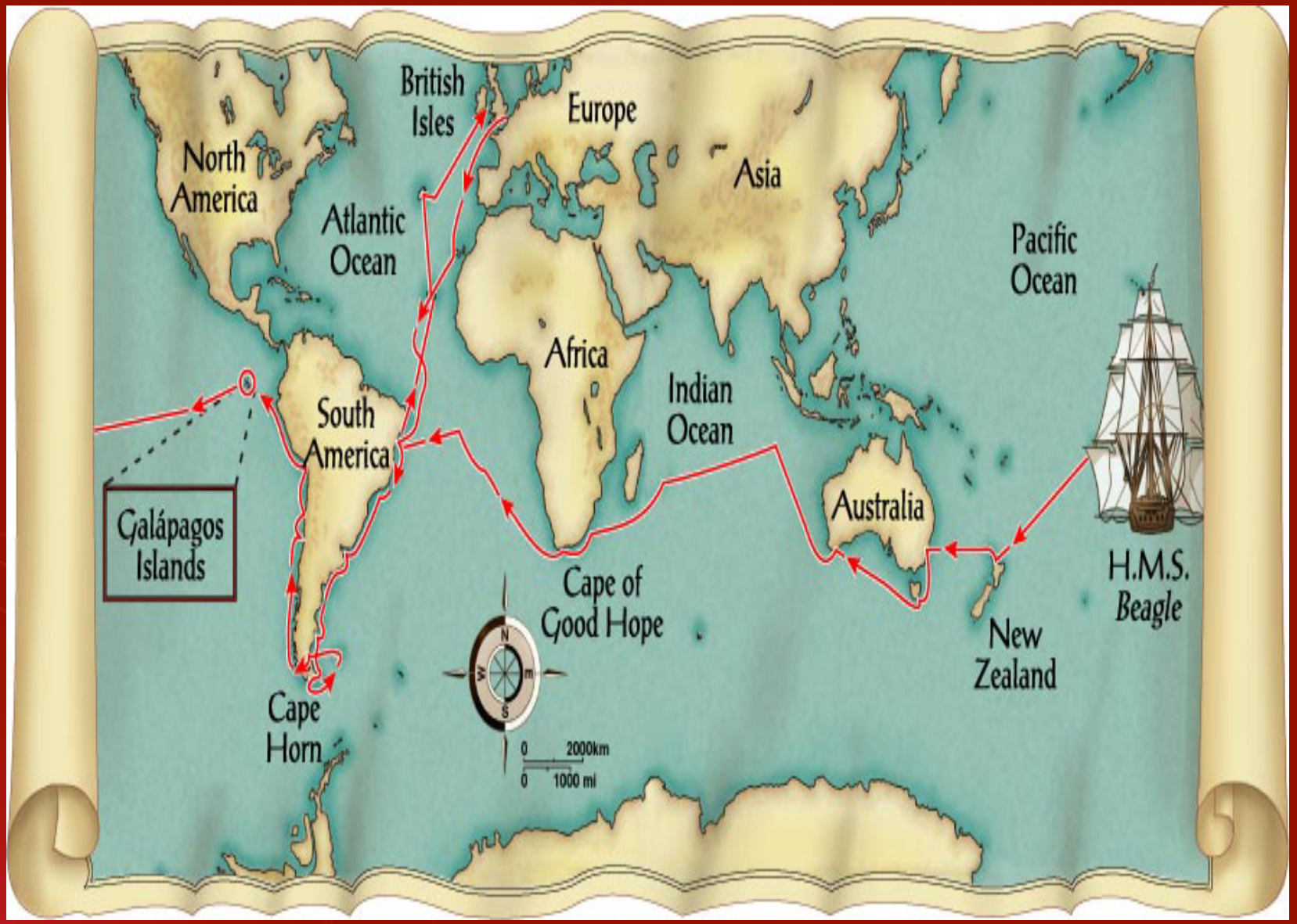
How do you think Darwin came up with his theory?

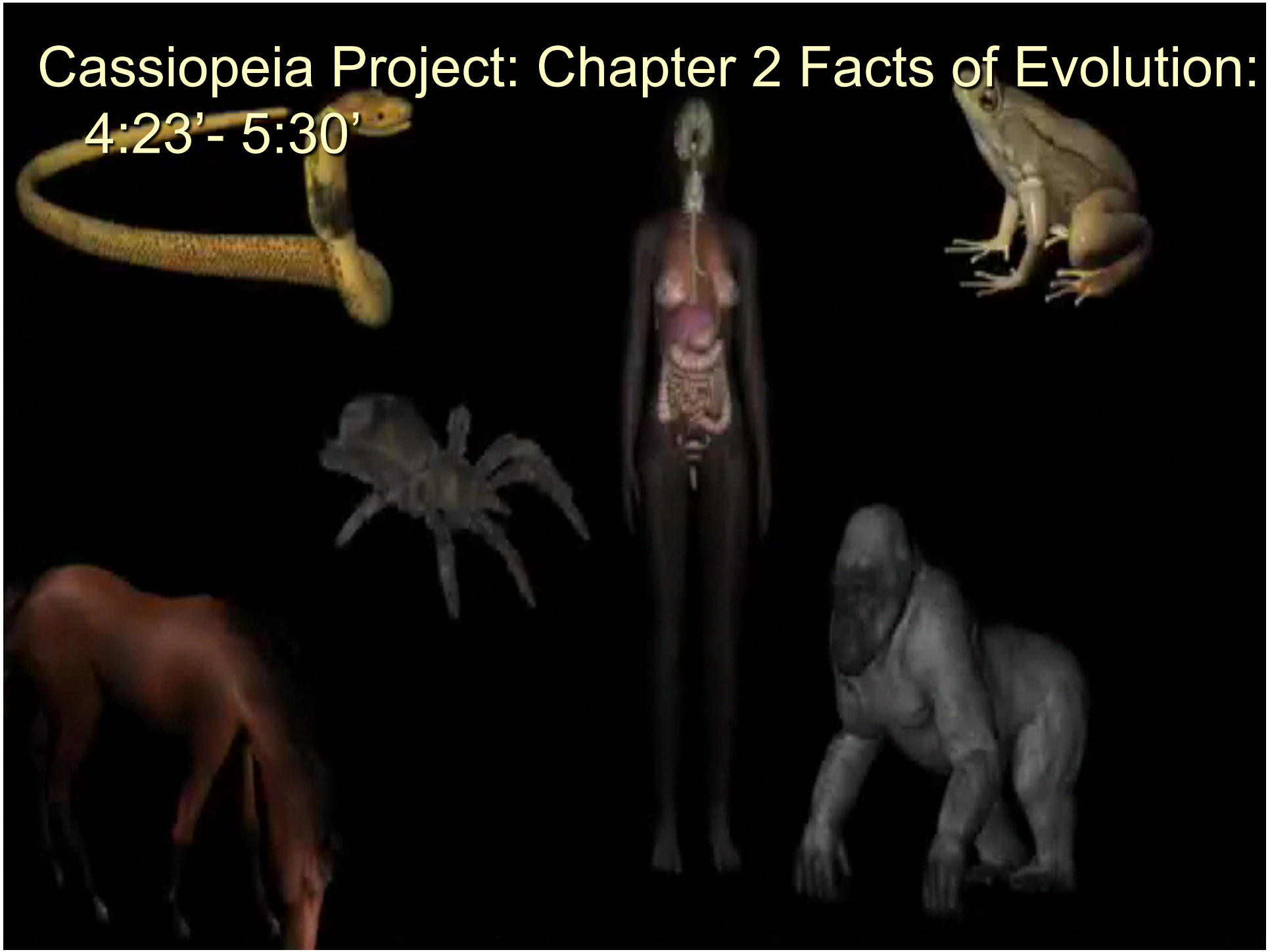
Voyage of the Beagle

Voyage of Beagle

- **Dates:** February 12th, 1831
- **Captain:** Charles Darwin
- **Ship**: H.M.S. Beagle
- **Destination:** Voyage around the world.
- **Findings:** evidence to propose a revolutionary hypothesis about how life changes over time

Route around world: why?




Cassiopeia Project: Chapter 2 Facts of Evolution:
4:23’- 5:30’

Patterns of Diversity

- Darwin visited Argentina and Australia which had similar grassland ecosystems.
  - those grasslands were inhabited by very different animals.
  - neither Argentina nor Australia was home to the sorts of animals that lived in European grasslands.

Patterns of Diversity

- Darwin posed challenging questions.
  - Why were there no rabbits in Australia, despite the presence of habitats that seemed perfect for them?
  - Why were there no kangaroos in England?

Living Organisms and Fossils

- Darwin collected the preserved remains of ancient organisms, called **fossils**.
- Some of those fossils resembled organisms that were still alive today.

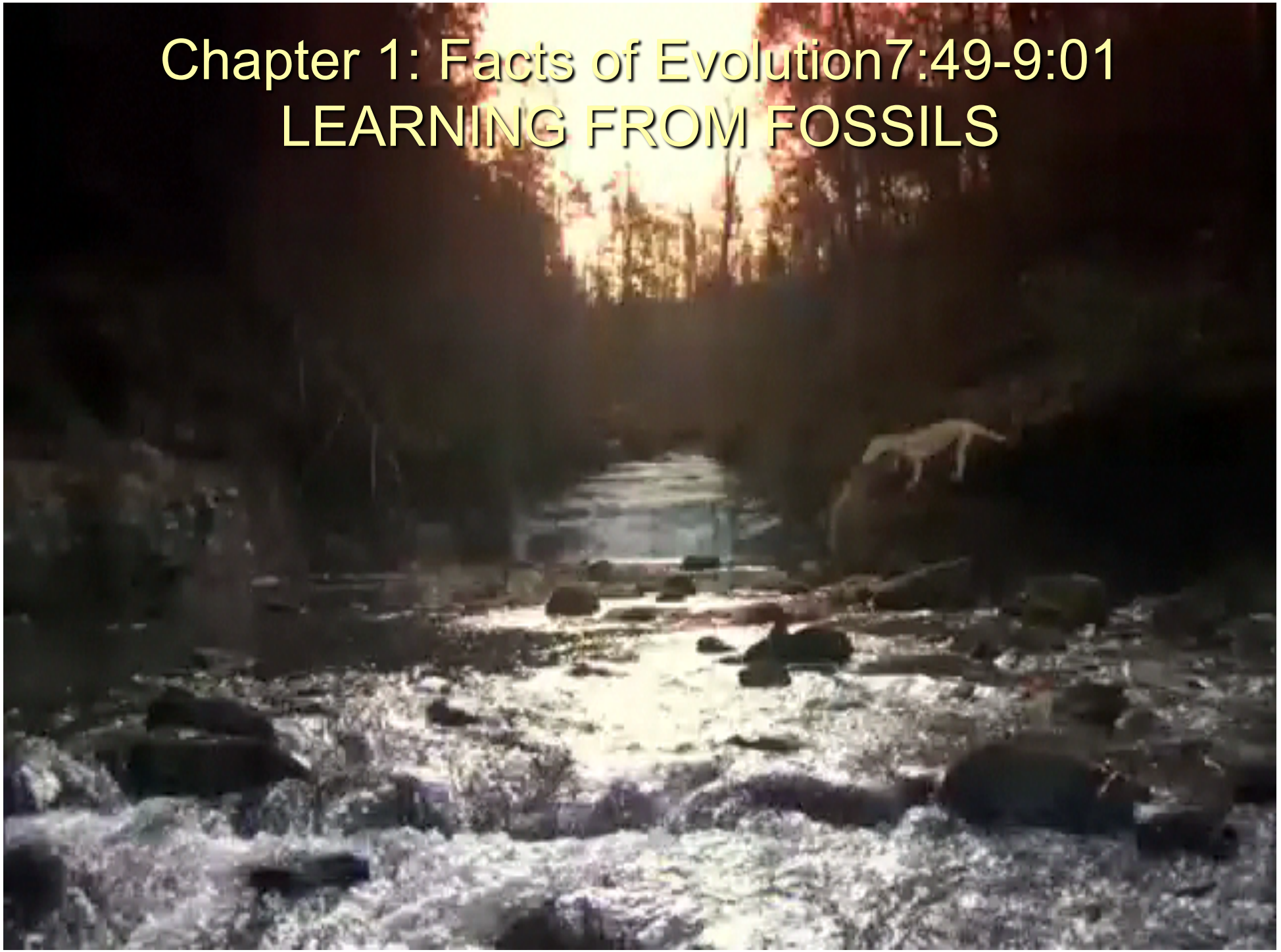
Living Organisms and Fossils

- Others looked completely unlike any creature he had ever seen.

- As Darwin studied fossils, new questions arose.
  - Why had so many of these species disappeared?

  - How were they related to living species?

Fossils


Chapter 1: Facts of Evolution7:49-9:01
LEARNING FROM FOSSILS

The Galapagos Island

- The smallest, lowest islands were hot, dry, and barren
- Hood Island (espanola)- sparse vegetation
- The higher islands had greater rainfall and a different assortment of plants and animals
- Isabela Island- had rich vegetation.

The Galapagos Island

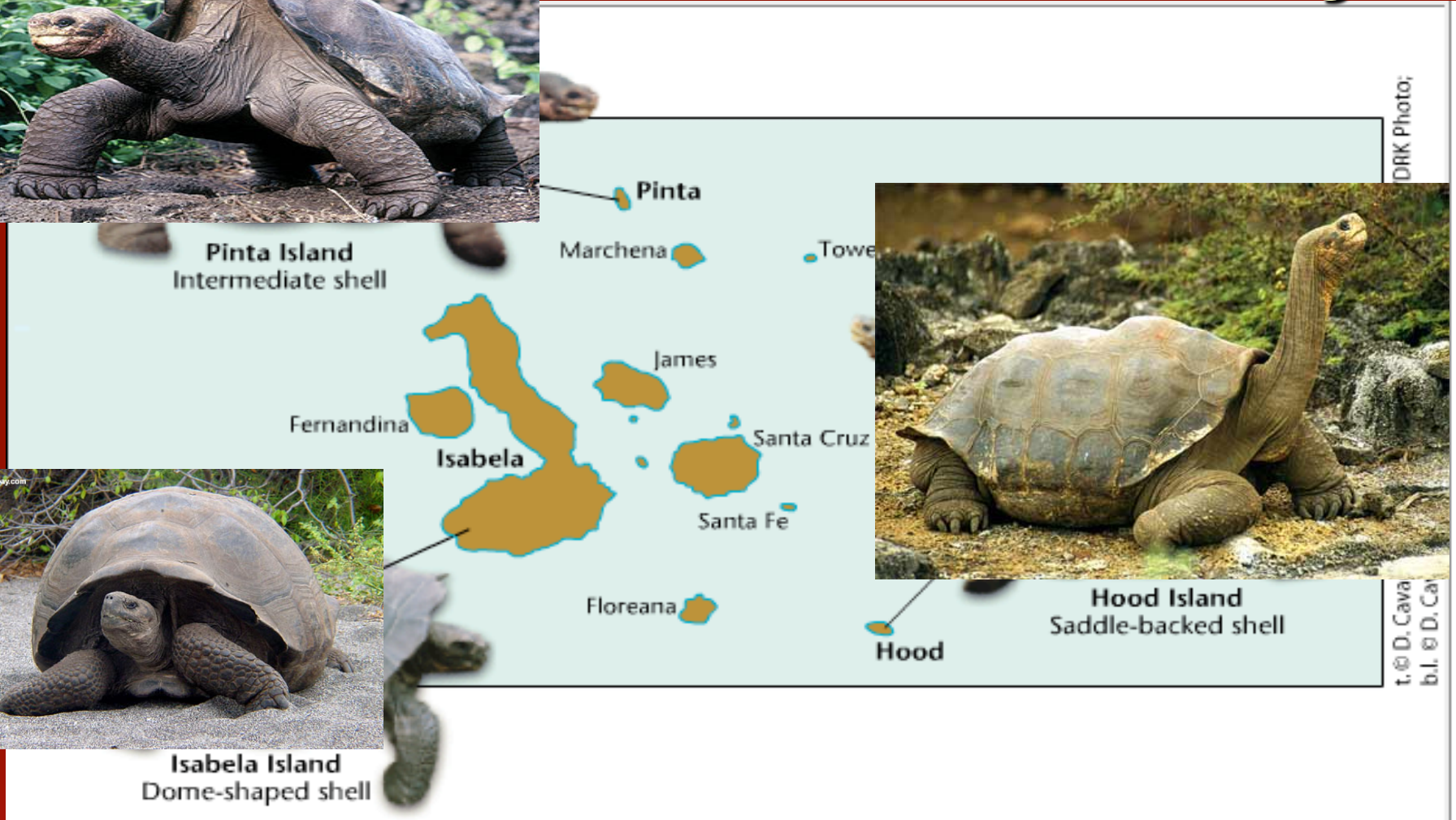
- Darwin was fascinated in particular by the land tortoises and marine iguanas in the Galápagos.
- Giant tortoises varied in predictable ways from one island to another.
- The shape of a tortoise's shell could be used to identify which island a particular tortoise inhabited.
- Darwin Observed that characteristics of many plants and animals vary greatly among the islands

Tortoise Diversity

Pinta Island
Intermediate shell

Isabela Island
Dome-shaped shell

Hood Island
Saddle-backed shell



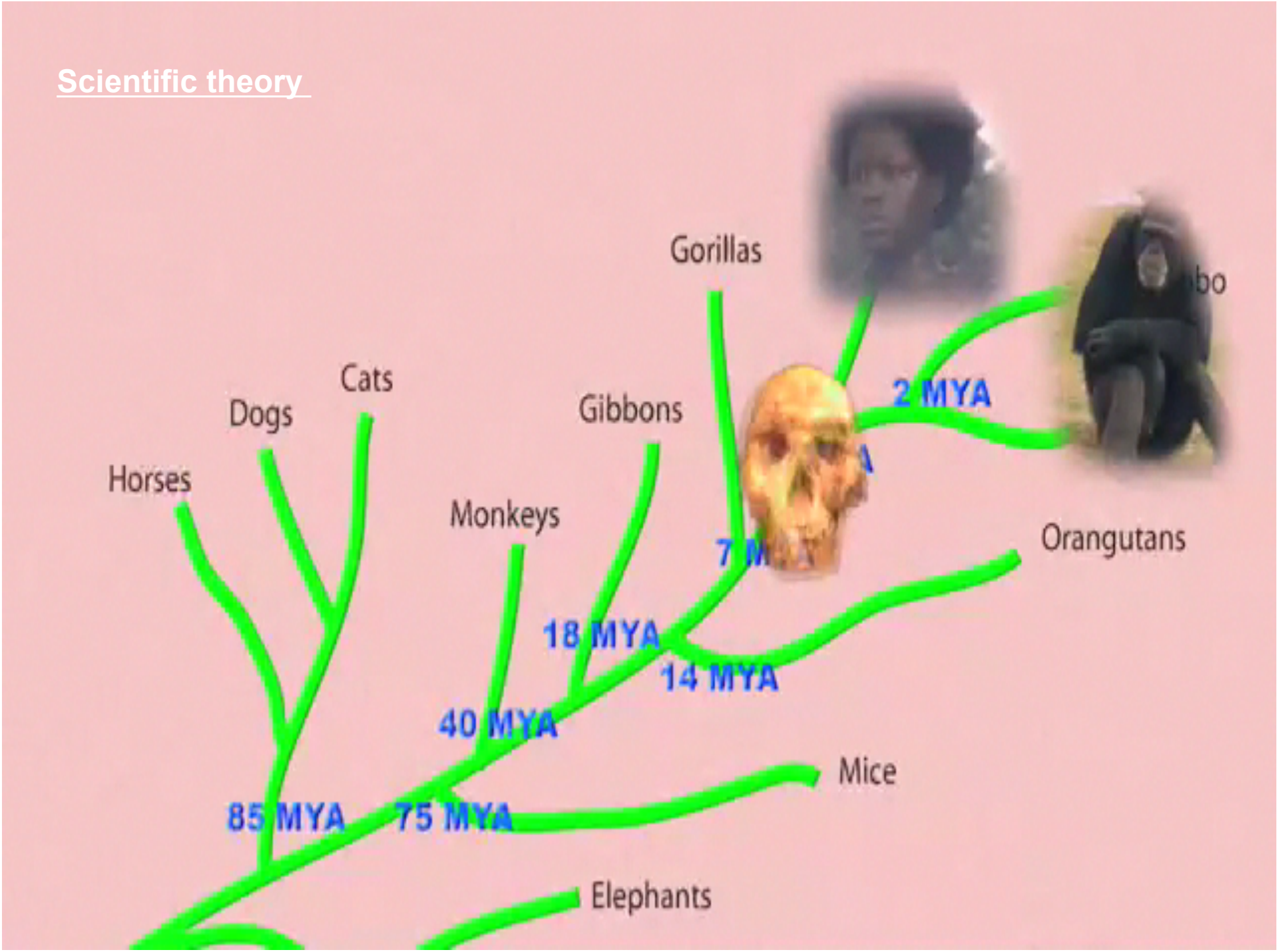
Variation Among Tortoises Darwin observed that the characteristics of many animals and plants varied noticeably among the different Galápagos Islands. Among the tortoises, the shape of the shell corresponds to different habitats. The Hood Island tortoise (right) has a long neck and a shell that is curved and open around the neck and legs, allowing the tortoise to reach the sparse vegetation on Hood Island. The tortoise from Isabela Island (lower left) has a dome-shaped shell and a shorter neck. Vegetation on this island is more abundant and closer to the ground. The tortoise from Pinta Island has a shell that is intermediate between these two forms.

5 years later:
The Journey Home

Hypothesis: Separate species may have arose from an original ancestor- common descent

A scientific **theory** is a well-supported testable explanation of phenomena that have occurred in the natural world.

Scientific theory

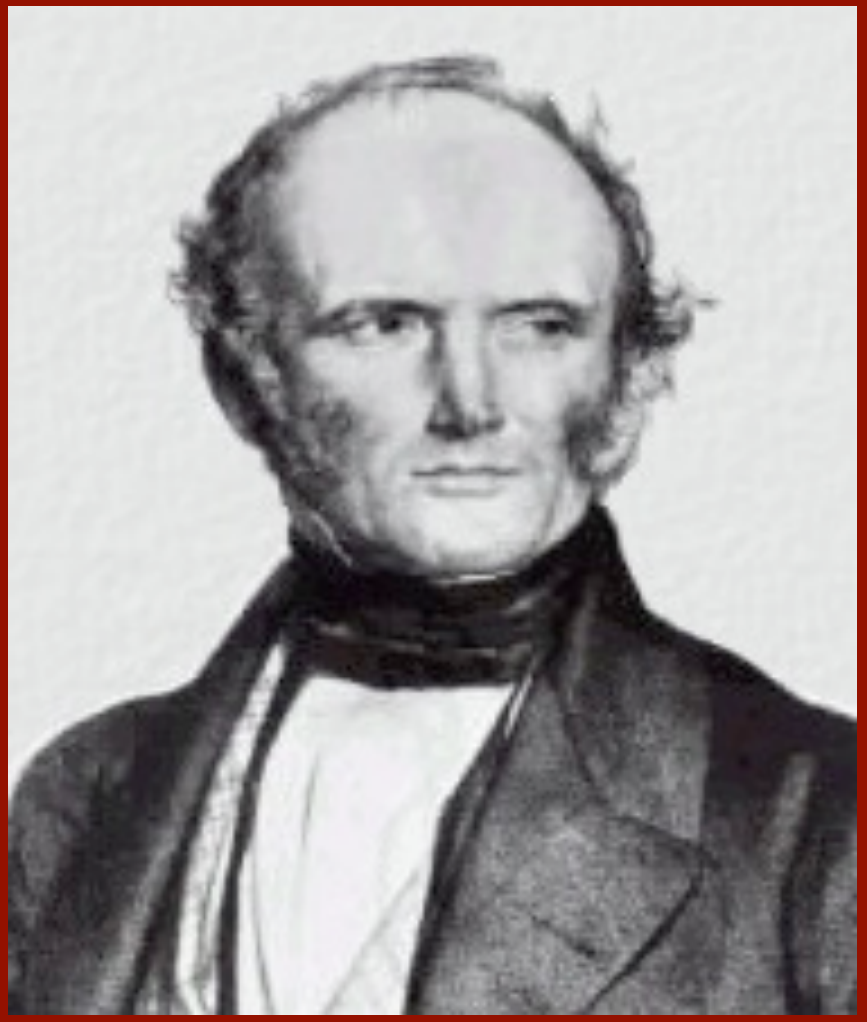


Ideas that shaped Darwin's Thinking

- **James Hutton:**
- 1795 Theory of Geological change
  - Forces change earth's surface shape
  - Changes are slow
  - Earth much older than thousands of years

Ideas that Shaped Darwin's Thinking

- **Charles Lyell**
- Book: *Principles of Geography*
- Geographical features can be built up or torn down
- Darwin thought if earth changed over time, what about life?



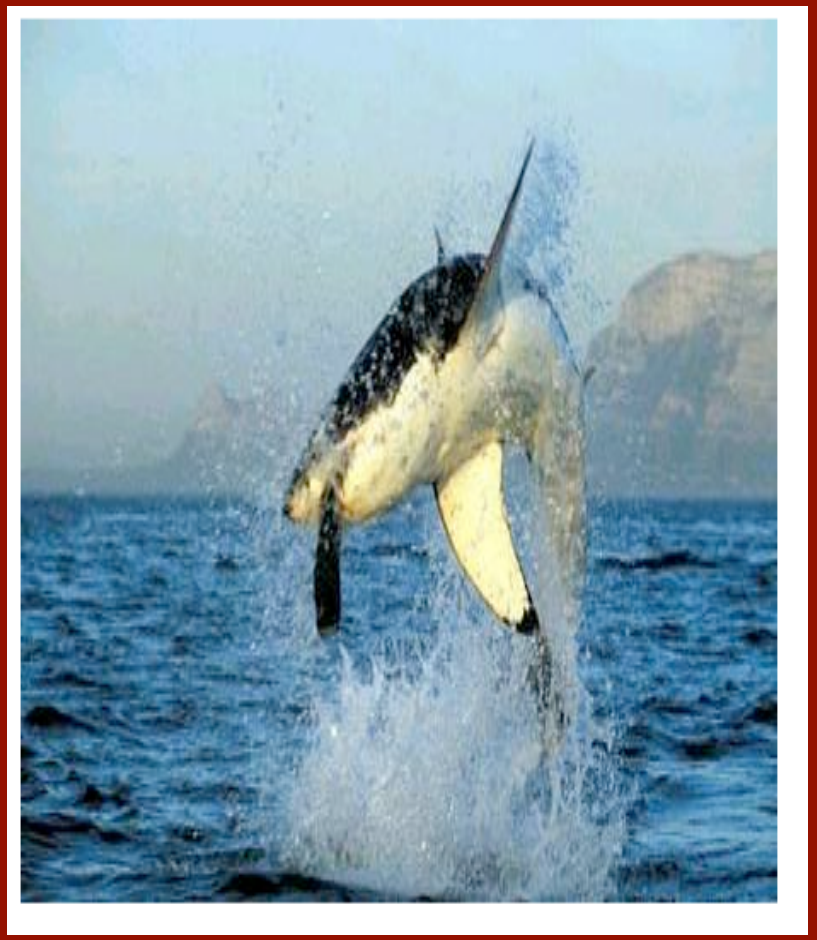
Publication of Origin of Species

- Russel Wallace, also exploring in Asia, wrote an essay summarizing evolutionary change came to similar conclusions
- Gave Darwin the drive to publish his findings

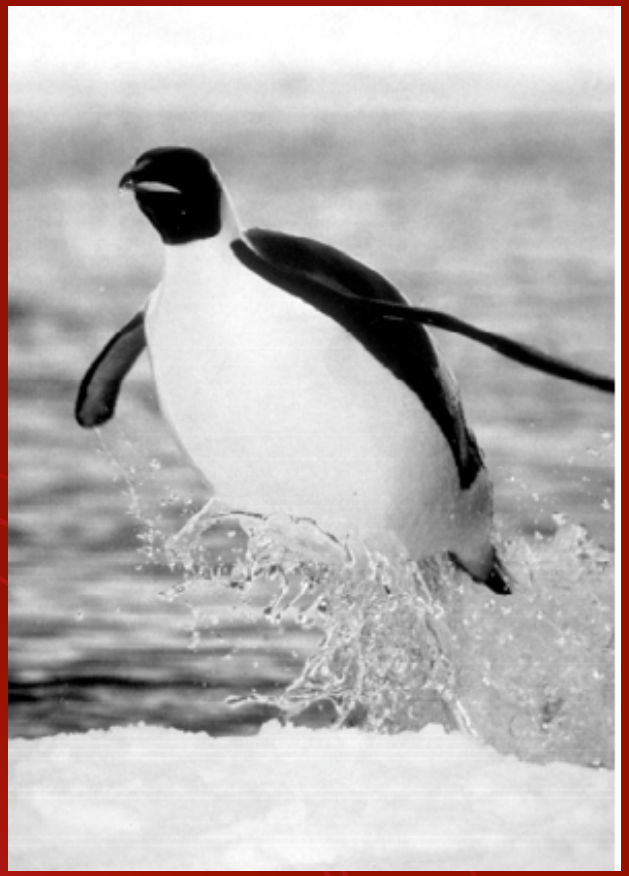
http://darwin-online.org.uk/

Natural Selection

- Over time, natural selection results in changes in inherited characteristics of a population. These changes increase a species fitness in its environment



Struggle For Existence & Survival of The Fittest



Common Descent

- **Descent with Modification**-Each living organism has descended, with changes from other species over time
- **Common Descent**- were derived from common ancestors

MODERN EVOLUTION


Conservation of overall form
and genes over time

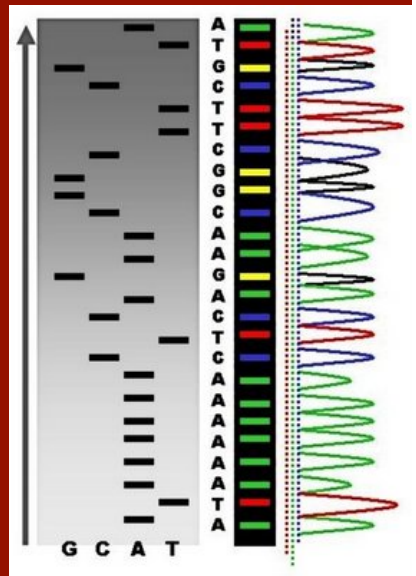
Molecules needed for Life

- Gene- DNA
- All genes in an animal/organism- Genome
- Genes code for special molecules called proteins
- Proteins are enzymes and take care of certain processes in the cell – be it bacteria or be it human

Common Molecular basis of life

Molecular Evolution

- Identify DNA by sequencing
- Human Genome
- Bacterial genomes
- ----atgccgtataa ----→----atgacgtataa ----



Applications: Genotype- Phenotype

- Human Genome sequence can be used to study how organs are formed
- How we get blue or brown eyes?
- How are hair is curly or straight?
- How do we acquire disease?
- Forensic Science- identify people from DNA
- Bacterial genomes
- Understand cellular processes
- Molecular Mechanisms of Evolution

REFERENCES

http://darwin-online.org.uk/

http://www.aboutdarwin.com/

http://www.cassiopeiaproject.com/

Thank you all for listening !