Darwin's Theory of Evolution
The Puzzle of Life's Diversity
WRITE A DEFINITION:

EVOLUTION:
change over time; the process by which modern organisms have descended from ancient organisms

THEORY:
a well-supported testable explanation of phenomena that have occurred in the natural world

FOSSIL:
the preserved remains of ancient organisms
The total variety of all the organisms in the biosphere = BIODIVERSITY

Where did all these different organisms come from?
How are they related?
What scientific explanation can account for the diversity of life?

**ANSWER:**
A collection of **Scientific facts**, **observations**, and **hypotheses** known as **EVOLUTIONARY THEORY**
The person who contributed the most to our understanding of evolution was **Charles Darwin**

In 1831, at age 22, he joined the crew of the **H.M.S. Beagle** as a naturalist for a **5 year** voyage around the world.
During his travels, Darwin wrote thousands of pages in his journals, drew pictures of the things he saw, and collected a vast amount of evidence that led him to propose a revolutionary hypothesis about the way life changes.
DARWIN WONDERED?

Why do Argentina and Australia have different animals even though they have similar grassland ecosystems?

Why are there no rabbits in Australia and no kangaroos in England?

Why have so many species disappeared?

How are these extinct species related to living species?
Who Was Charles Darwin?

While on his voyage around the world aboard the **H.M.S. Beagle**, Charles Darwin spent about one month observing life on the **Galápagos Islands**. There, he encountered some unique animals, such as **finches** and **tortoises**.

![Giant Tortoise](http://www.darwinadventure.com/pictures/galapagos_gianttortoise.jpg)

![Map of Galápagos Islands](http://mikebaird.com/ecuador/images/galapagos_off_ecuador_ng_map.jpg)
The Galápagos Islands are close together but have very different **climates**.

Some were hot and dry, with little vegetation. Others had more rainfall and were rich in vegetation.

Each island had its own **unique assortment** of plant and animal species.
and on Pinta Island, tortoise necks were somewhere in between…

On the desert-like Hood Island, tortoises had long necks…

…while on the lush rainforest of Isabela Island, tortoises had short necks…
After his voyage, Darwin spent a great deal of time thinking about his findings. He began to wonder if animals living on different islands had once been members of the same species that had developed different characteristics after becoming isolated from one another in different habitats.
Darwin's Theory of Evolution
Ideas that Shaped Darwin's Thinking
Chapter 15-2
Ideas that shaped Darwin's thinking:

In 1785 ______________ James Hutton proposes that the EARTH was ________ by 
____________ geological forces occurring over 
very long periods of 
time, and is 
__________ millions of years old.

http://www.creationism.org/books/TaylorInMindsMen/TaylorIMMc03.htm
Ideas that shaped Darwin’s thinking:

In 1833 **Charles Lyell** explains that the geological processes still **occurring now** have shaped Earth’s features over **long periods of time**.
Ideas that shaped Darwin’s thinking:

Theory of Pangaea

...and continental drift
Living things must compete for food, shelter, space, mates.

REMEMBER! Chapter 3

competition

http://www.wasatchcomputers.net/gallery/elk_fight.jpg
Ideas that shaped Darwin’s thinking:

Thomas Malthus (1798)

He observed that babies were being born faster than people were dying. He reasoned that if the human population continued to grow, sooner or later there would be insufficient space & food.
Ideas that shaped Darwin’s thinking

Jean-Baptiste Lamarck (1809) was one of first scientists to recognize living things changed over time and that all species were descended from other species.

Lamarck published his hypothesis of Inheritance of Acquired traits the year Darwin was born.
The male fiddler crab uses its front claw to **attract** mates and fight off **predators**.

Through **repeated** use, the front claw becomes **larger**.

The fiddler passes on this **acquired** characteristic to its offspring.
What's wrong with Lamarck's hypothesis?

Lamarck didn't know about genes and how traits are inherited.

If you lifted weights your whole young adult life, and then you had children, would your kids be more muscular?

NO! **ACQUIRED** traits can **NOT** be **PASSED ON** to their offspring.
What's right with Lamarck's hypothesis?

Lamarck was first to develop a scientific hypothesis about evolution and recognize that organisms are adapted to their environments.
a. The earth is really old, and slowly changes
b. Living things pass changes on to their offspring, leading to species changes
c. Sooner or later growing populations run out of resources
d. Living things change slowly over time because of competition for resources, and pass those changes on to their offspring
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Evidence of Evolution

- The fossil record
  - which is composed of
    - Physical remains of organisms
- Geographic distribution of living species
  - which indicates
    - Common ancestral species
- Homologous body structures
  - which implies
    - Similar genes
- Similarities in early development
  - which implies
    - Similar genes