**HUMAN EVOLUTION** 

#### **NATURAL SELECTION**

#### **THEORIES & ALTERNATIVES**

## **EVOLUTION**





# HOW a THEORY is FORMED



- Scientists have the job of **observing** everything around them, and **explaining** where each part of it came from.
- Based on evidence they see, they might <u>suggest</u> an answer to some specific aspect.
- This is an <u>hypothesis</u>, which can be tested towards being proved wrong, by experimentation.
- If it cannot be proven to be wrong, it remains an hypothesis, and is seen by all as a **possible** explanation.
- When trying to explain bigger issues, they take all these suggested hypotheses, and put them together. The overall suggestion that results has not been proved to be wrong. (Or proved to be right!) This is now called a <u>THEORY</u>.



## Your Religion must NEVER feel threatened by Science!



- Each religion has looked at the evidence, and has made its own <u>theory</u> as to how the universe was made.
- Scientists argue that <u>they</u> are also simply sharing how <u>they</u> are interpreting the same evidence of Nature to obtain their theory.
- In both cases, nobody can <u>prove</u> that they are wrong, just like they cannot <u>prove</u> that they are correct – we all <u>respect</u> each other's right to our own beliefs, and so we are <u>not</u> threatened by other religions or by the sciences.

## **OTHER RECOGNISED THEORIES (Page 104)**

- **CREATIONISM** A SuperNatural God created all forms of life in a short period of time.
- **LITERALISM** it happened <u>exactly</u> as stated in the book of their religion e.g. Bible, Quran. etc.



- INTELLIGENT DESIGN It is impossible to explain absolutely everything in a scientific way, so we must accept another force in the form of God:- The bacterium flagellum is a complex structure on a simple cell, and could not have developed to this point. The eye is too intricate to have resulted from random development. The universe is too massive and organised to not be from a controlled designer.
- THEISTIC (Religious) EVOLUTION God created the universe and all life on earth as a dynamic unit in which conditions are ever-changing. His way of allowing <u>living</u> things to adapt to these changes (so that life does not die out on earth) is through the process of Natural Selection.

## The BIG CRUNCH and BIG BANG THEORIES

- Time is infinite (in the past **and** in the future).
- The universe builds up, and then collapses, in cycles.
- So all the energy of our previous universe collapsed into a tiny dot, no bigger that the head of a drawing pin. This is the theory of the **Big Crunch**.
- All our energy then built up in this tiny area to such an extent that it burst out of it - the **Big Bang** occurred and exploded out through space, 13 billion years ago.
- These masses of energy collected in different places to form suns and stars, around which were spread smaller clumps of energy that became planets and moons.



## The THEORY of EVOLUTION (by NATURAL SELECTION)

- The earth was formed and was originally covered in water.
- A number of extreme freakish events all occurred at the right times to form ideal conditions to stimulate the formation of a very simple protein-like "*cell*".
- This *cell* was able to divide (in a way similar to mitosis).
- Over millions of years this *cell* spread in the waters across the whole earth.
- Small **<u>differences</u>** in their plans now started to occur:
- At the Poles, some died if their exact plans were not suited to the cold. Survivors here had the right plans for the cold.
- At the Equator, some died if their plans were not suited to the heat – survivors here had the right plans for the heat.

- And so, over millions of years the original plans <u>changed</u> to suit the specific conditions in each area.
- So <u>Nature</u> selected which plans were best suited for the conditions in that particular area, and <u>these</u> plans survived.
- And <u>that</u> is what is meant by *Evolution* (change) through Natural Selection (Nature choosing).



- In this way, over more millions of years, some of these original *cells* eventually developed into sea plants. As land appeared, some of them evolved into land plants. And then they evolved into different plants for different conditions in different areas.
- The same thing happened as animals evolved.
- And that is how we have such a variety of living things today, even though all of them are descended from the same original *cell*.
- At its slow pace, the process of Evolution by means of Natural Selection is still at work right now.

## **"SUPPORT" for EVOLUTION**

- Fossils these suggest definite steps in the different stages of development. (*See Time Scale, page 90*.)
- Modification by descent (Gr. 10) all vertebrates have some things the same (like our front legs/arms), so we might all have the same ancestor. (*Table page 74*.)
- **BioGeography** (Gr. 10) plants and animals on different continents are so similar that they could have had the same ancestor before continental drift separated them.
- Genetics (Chpt. 4) all living things have the same structure of DNA and make proteins in the same way – their bioChemistry is so similar to suggest the same origin.

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#### FOSSILS





#### **FRONT LEGS, BIO-GEOGRAPHY, GENETICS**



- These show how different organisms developed over time as a result of variation. You **must** be able to *read* these:
- Always start at the **earliest** point of the tree.
- As you move along it, some can cope with the changed environment, so do not need to change their form. They stay simple, unchanged.
- The other organisms continue to adapt to new changes, until they are identified as coping, unchanged. Only then are they mentioned.

# Ancestral primate EVOLUTIONARY TREE OF PRIMATES



Anthropoids



- Law of Use and DisUse if you choose to use a body part often, it will develop. If you choose not to use it, it will get smaller and disappear.
- Law of Inheritance of Acquired Characteristics these changes will happen in your own lifetime, they will become part of your body plan, and your sperm/ovum will pass it on to your children.

#### <u>Problems</u>

- By often stretching your own neck will not give you a longer neck. (His suggestion for giraffe necks.)
- Children of de-tailed rats were **still** born with tails.