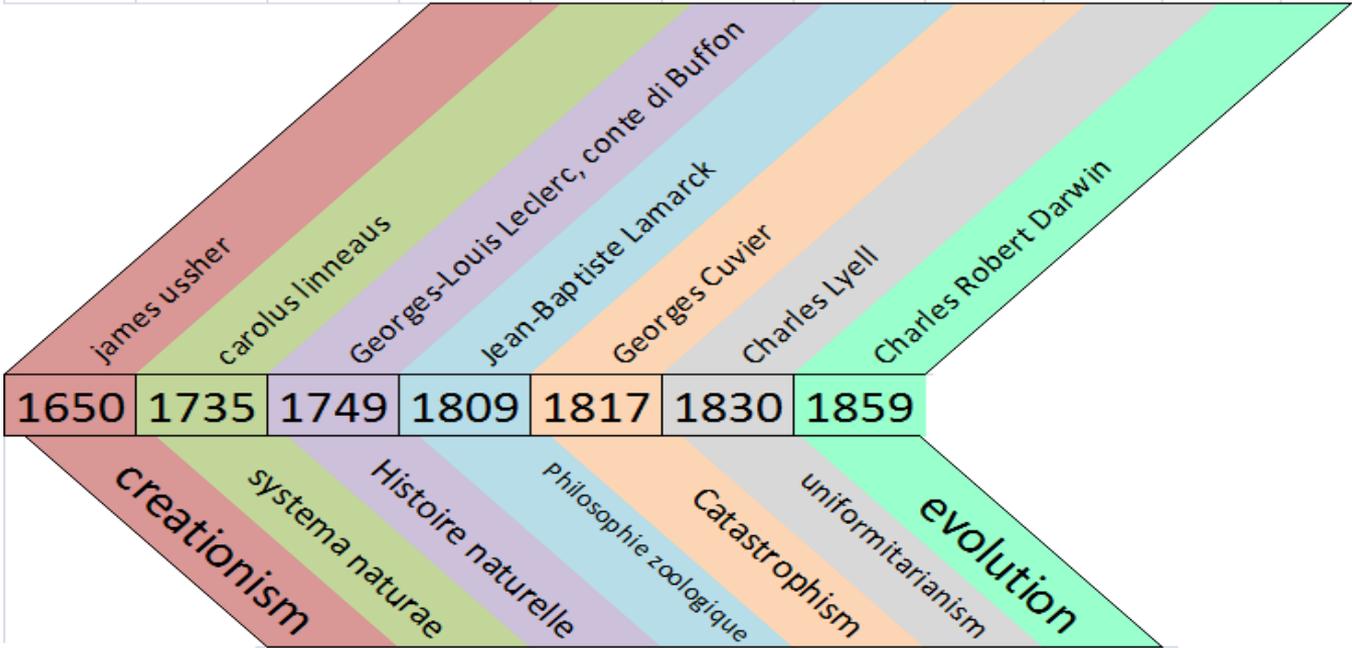


The
146
REVOLUTION
of



EVOLUTION

Story line



James Ussher



- ❖ 1581-1656
- ❖ Creationism
- ❖ October 23, 4004 B.C.

creationism: creazionismo



Carolus Linneaus



❖ 1707-1778

❖ *Systema Naturæ* (1735)

❖ He used a binomial nomenclature to describe living things

- to claim: *sostenere*
- to name: *nominare*



Georges-Louis Leclerc, conte di Buffon



❖ 1707-1788

- ❖ Living things do change through times
- ❖ The earth must be much older than 6000 years

to speculate: ipotizzare

chance: caso/fortuna

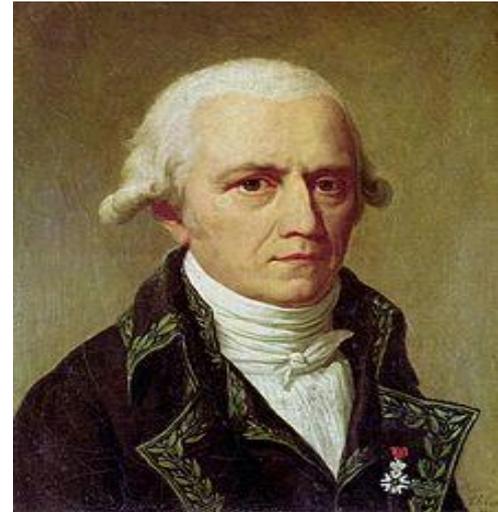


Jean-Baptiste Lamarck



❖ 1744-1829

- ❖ Variety of life forms
- ❖ The use and non-use of organs
- ❖ The inheritance of acquired characters through use and disuse



inheritance: eredità

acquired: acquisito

Georges Cuvier



- ❖ 1769-1832
- ❖ Catastrophism
- ❖ Earth has been affected in the past by sudden, short-lived, violent events
- ❖ New life forms have moved in from other areas after local floods



to affect: colpire sudden: improvviso
short-lived: breve to move in: spostarsi
floods: inondazioni

Charles Lyell



❖ 1797-1875

❖ Uniformitarianism

❖ The present is the key to the past

❖ The same natural laws and processes that operate in the universe now have always operated in the universe in the past

uniformitarianism: *attualismo*

laws: *leggi*



Charles Robert Darwin



❖ 1809-1882

❖ Evolution

❖ Natural selection

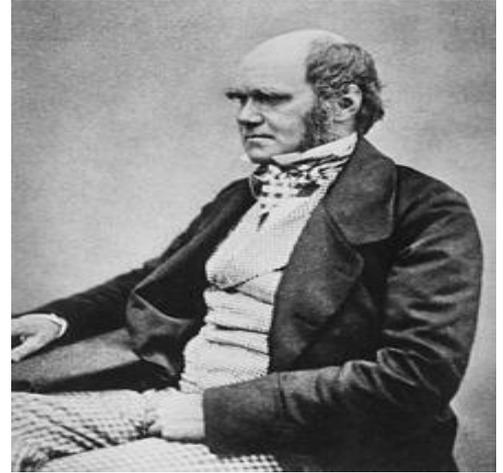
❖ Common ancestor

❖ Variability of hereditary characteristics

natural selection: selezione naturale

common ancestor: antenato comune

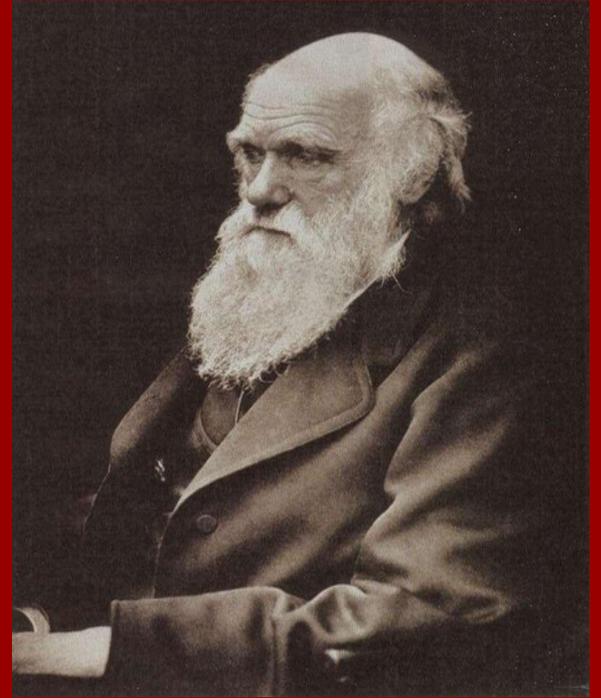
hereditary: ereditario



Jean-Baptiste
de Lamarck



VS



Charles
Darwin

Now for a little example...



Before

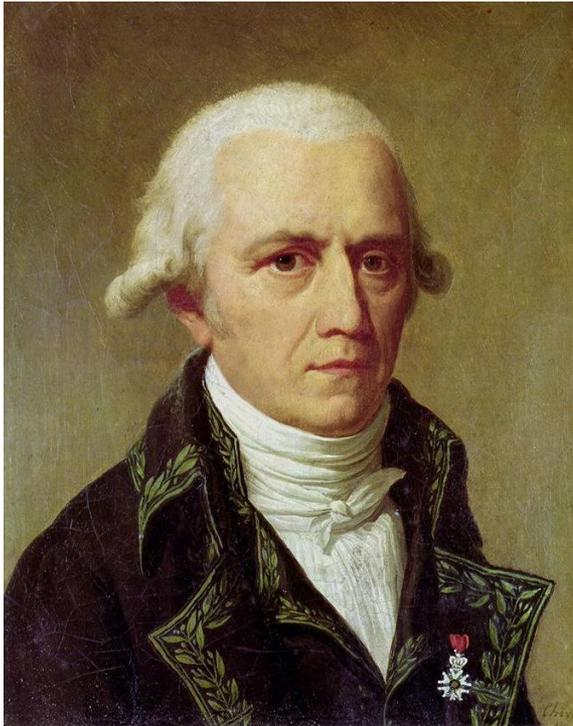


After



...does this look right to you?

Evolution According to Lamarck

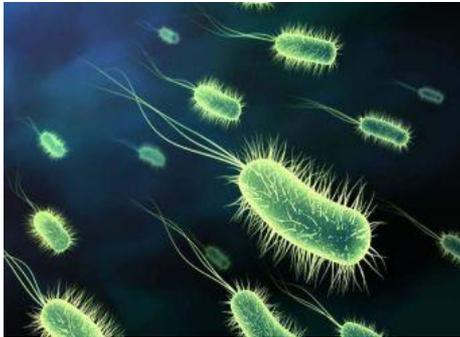


- ❖ From simple to complex
- ❖ Evolution through use and disuse
- ❖ Ereditary traits

From simple to complex



- ❖ A microscopic organism appears from inanimate materials
- ❖ It begins to evolve into more complex forms
- ❖ The organism becomes perfect, a human being



Simple forms

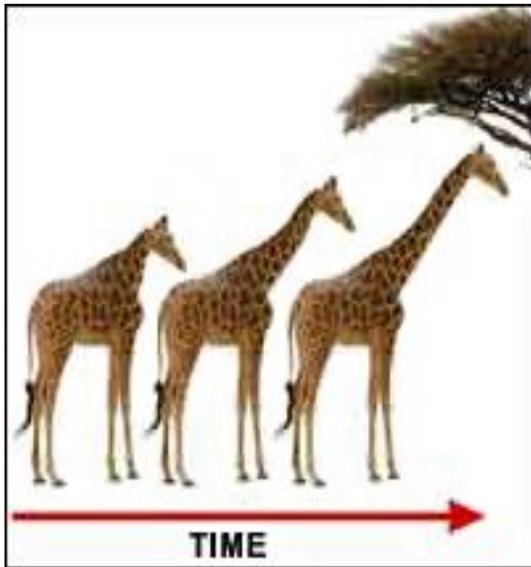


Complex forms



Evolution

through use



- ❖ Use of a part of the body to adapt to the environment
- ❖ The use of a body part makes it bigger and stronger
- ❖ The disuse of a body part makes it smaller and weaker

Hereditary traits



- ❖ Evolved organisms' goal is now to pass their modified characteristics to their offspring
- ❖ New born organisms have to keep evolving towards the “perfect form”

“Perfect form”





Hereditary traits



- ❖ Evolved organisms' goal is now to pass their modified characteristics to their offspring
- ❖ New born organisms have to keep evolving towards the “perfect form”

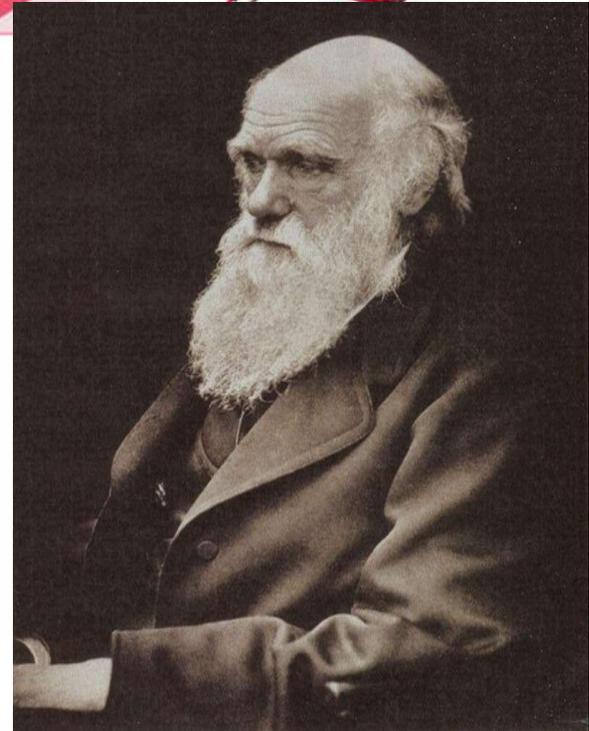
“Perfect form”



Evolution according to Darwin



- ❖ Natural selection
- ❖ Common ancestor
- ❖ Individual variability



Natural selection



Natural selection \neq evolution

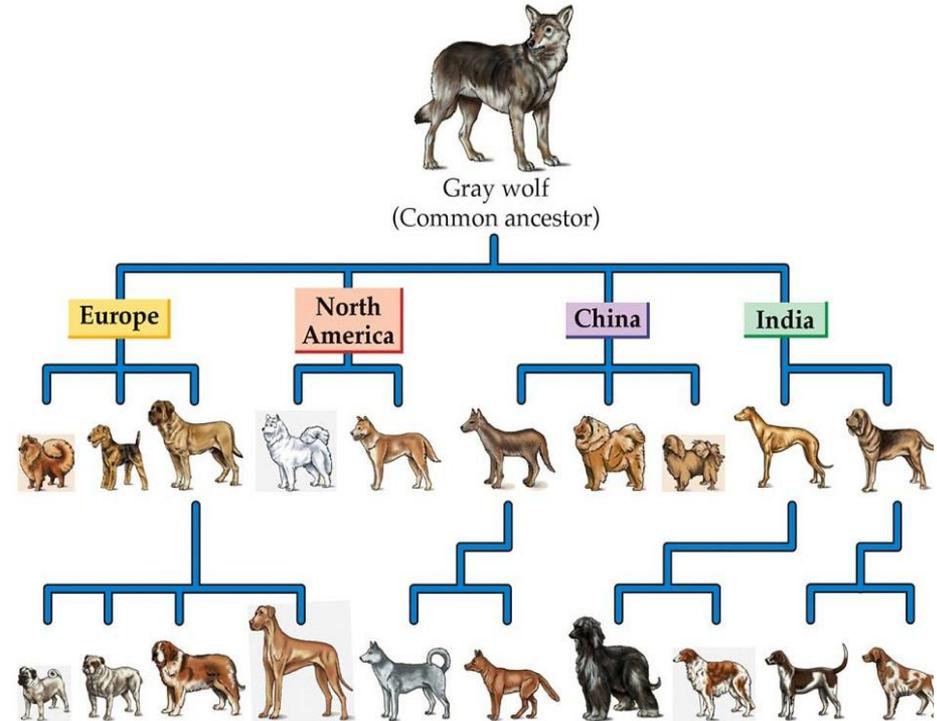
- ❖ The organisms best adapted to their environment will survive
- ❖ Their offspring will have the same useful traits of the parents
- ❖ The least adapted ones will die



Common ancestor



- ❖ Many organisms share a common ancestor
- ❖ Many species have a similar body structure which comes from their common ancestor
- ❖ Species that have a common ancestor have a similar DNA structure



Individual variability



- ❖ In the same species there are organisms with different characteristics
- ❖ These variations exist for the survival of the species



Differences between Darwin's theory and Lamarck's



LAMARCK

- ❖ Use and disuse of a body part
- ❖ Evolution to more complex forms
- ❖ Transmission of acquired characteristics
- ❖ No extinction

DARWIN

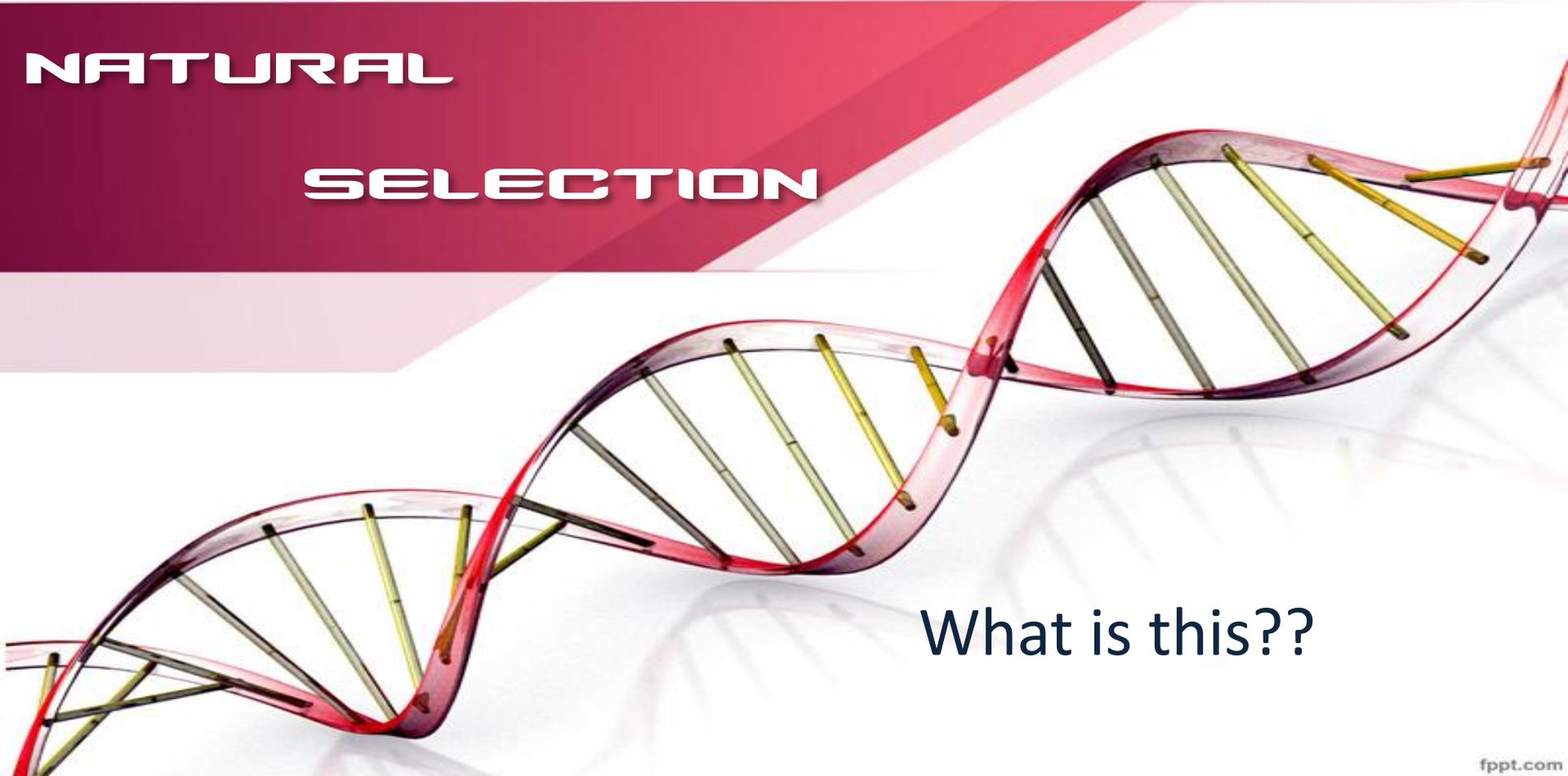
- ❖ Individual variability
- ❖ Inheritance
- ❖ Different survival rate
- ❖ Extinction



Natural selection

NATURAL

SELECTION



What is this??

Carrying capacity



Population increases

Achievement of carrying capacity

Population losses

- Struggle for survival = lotta per la sopravvivenza
- Offspring = prole
- Losses = perdite
- Growth = crescita



Too much??



Individual variability



❖ Different individuals



❖ More and different features



❖ Someone takes advantage



❖ Those favourable traits are inherited

- Inherited = ereditati



Ready for
an experiment?

an experiment?

An island...



...Three types of

Finches...



- Finches = fringuelli

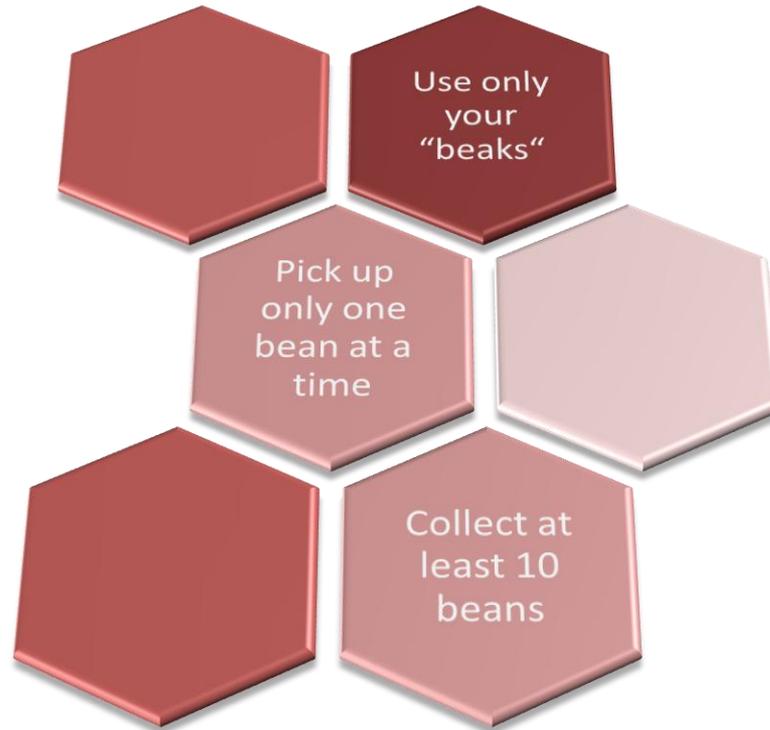
...One type of food...



BEANS



The Rules:





GO!!!

GO!!!

At the end:



Only one survivor:



Advantaged birds

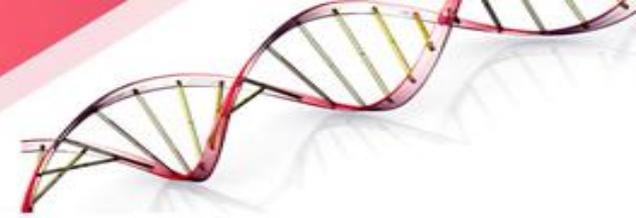


Easily reproduce



Characteristics inherited

Summing up:



Darwin's theory:



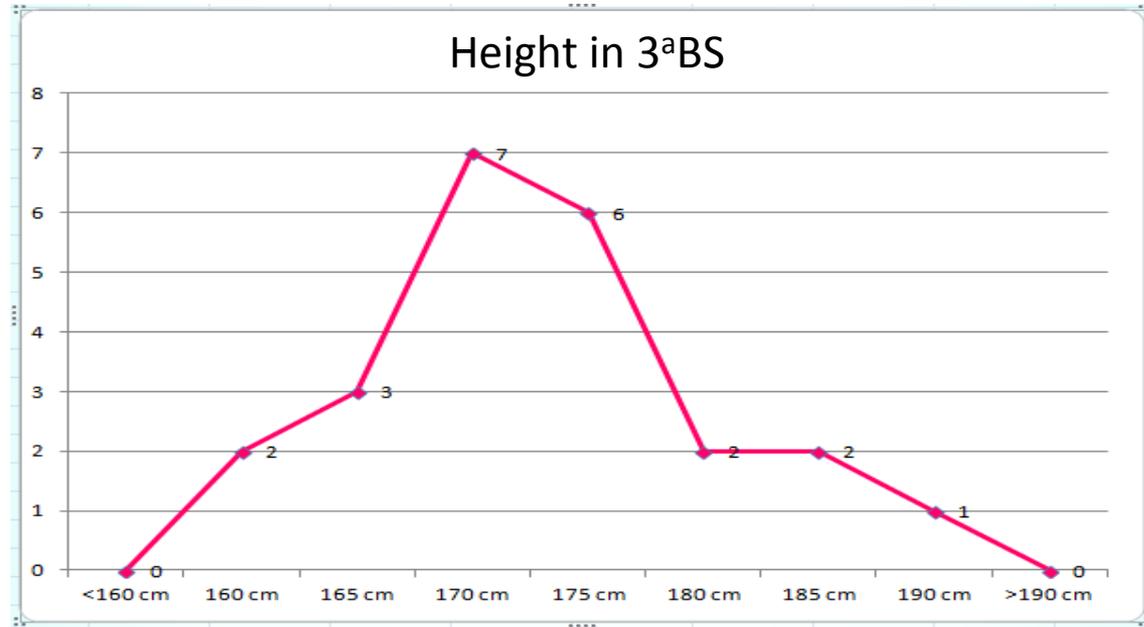
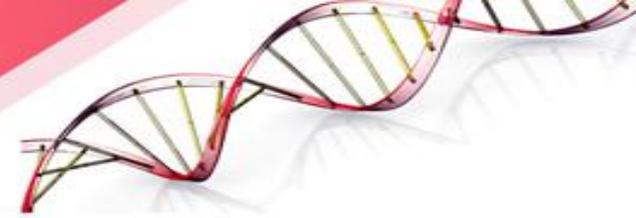
INDIVIDUAL

VARIABILITY

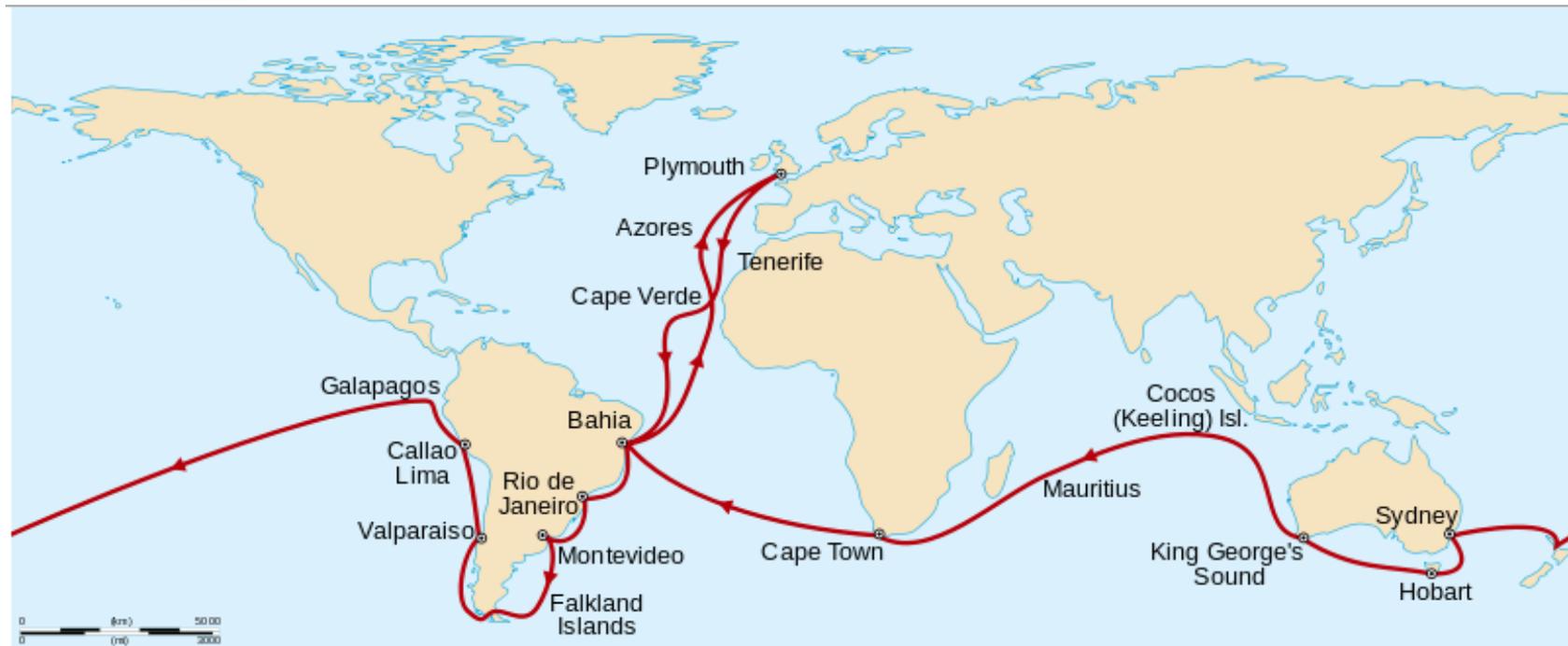


What does it mean?

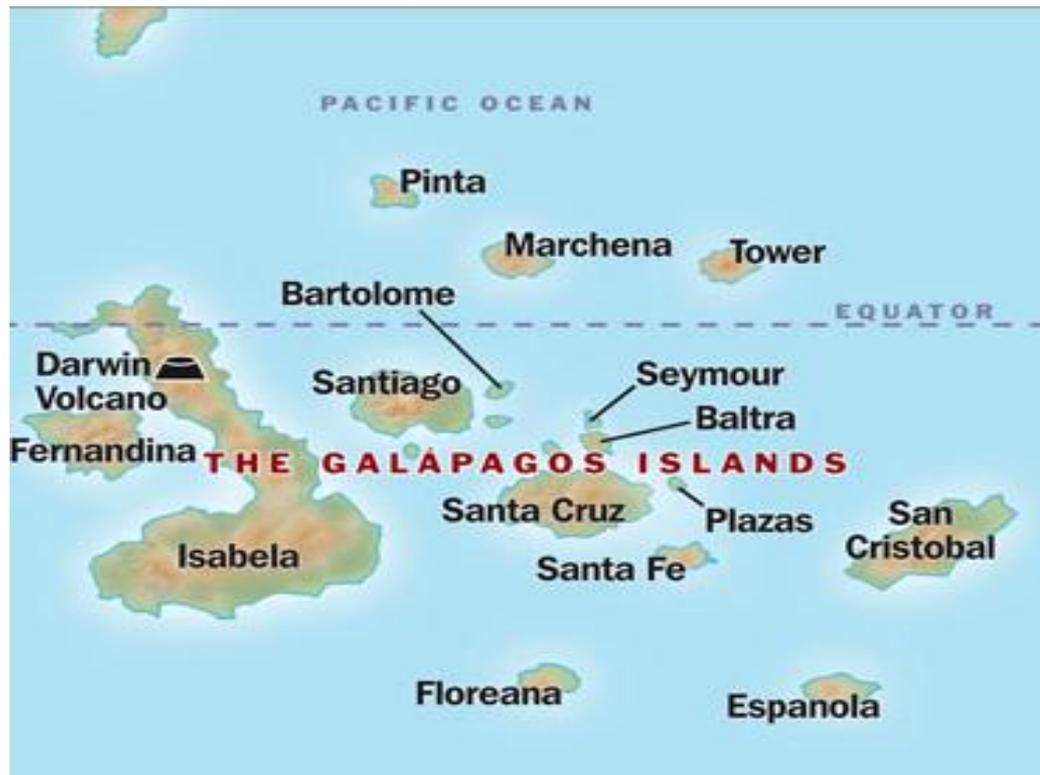
**In our school,
in our class..**



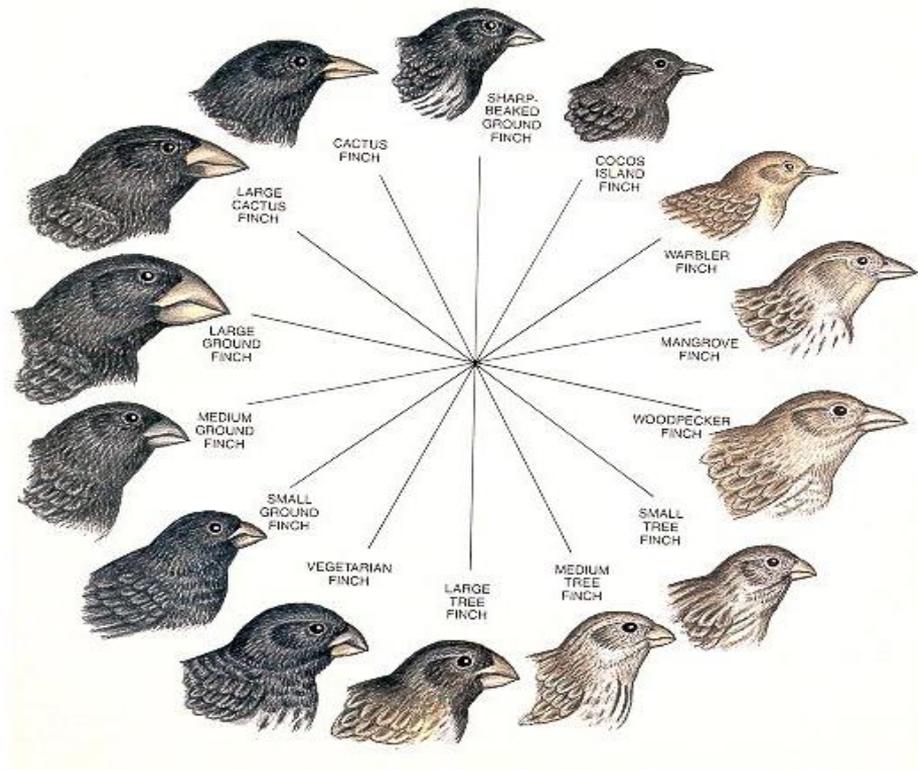
Darwin's voyage



Galapagos island



Different finches: populations or species?



Different colours of the hair



COMMON ANCESTRAL ORIGINS

Why are they important??



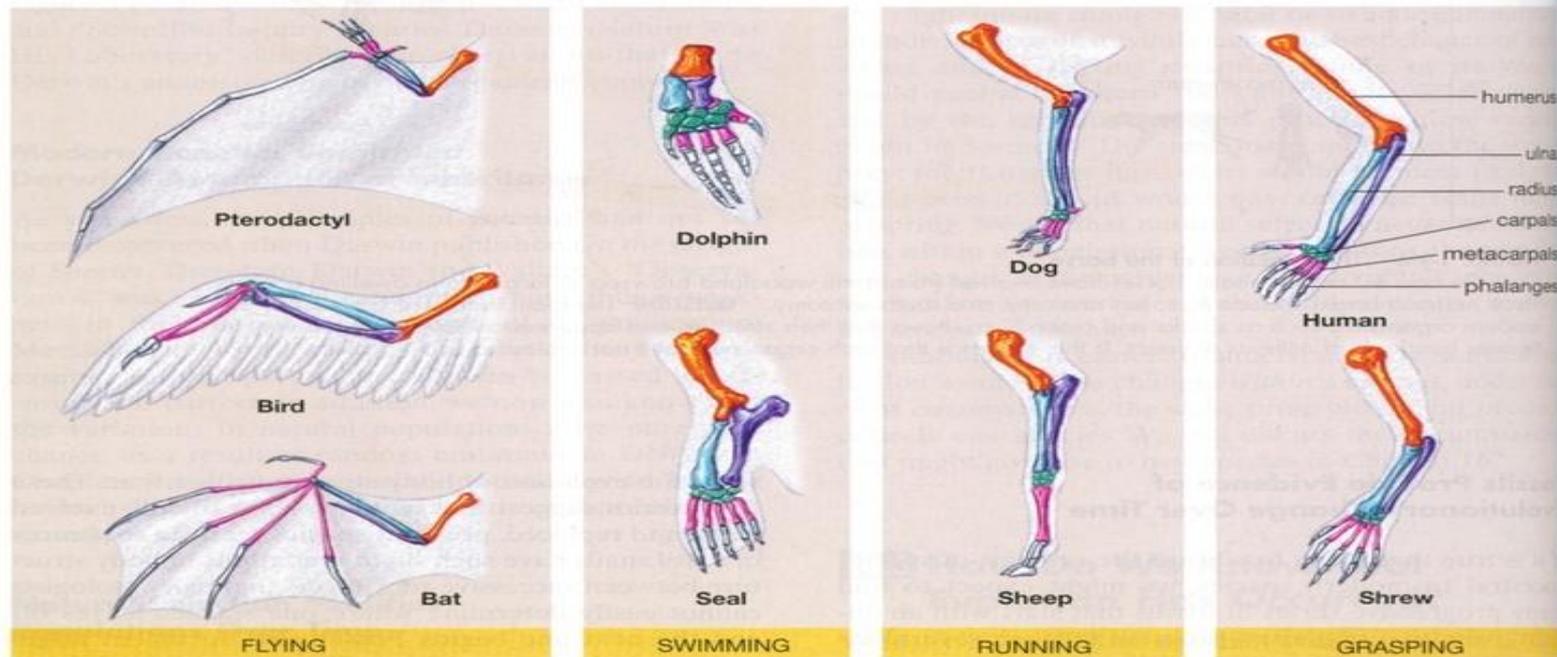
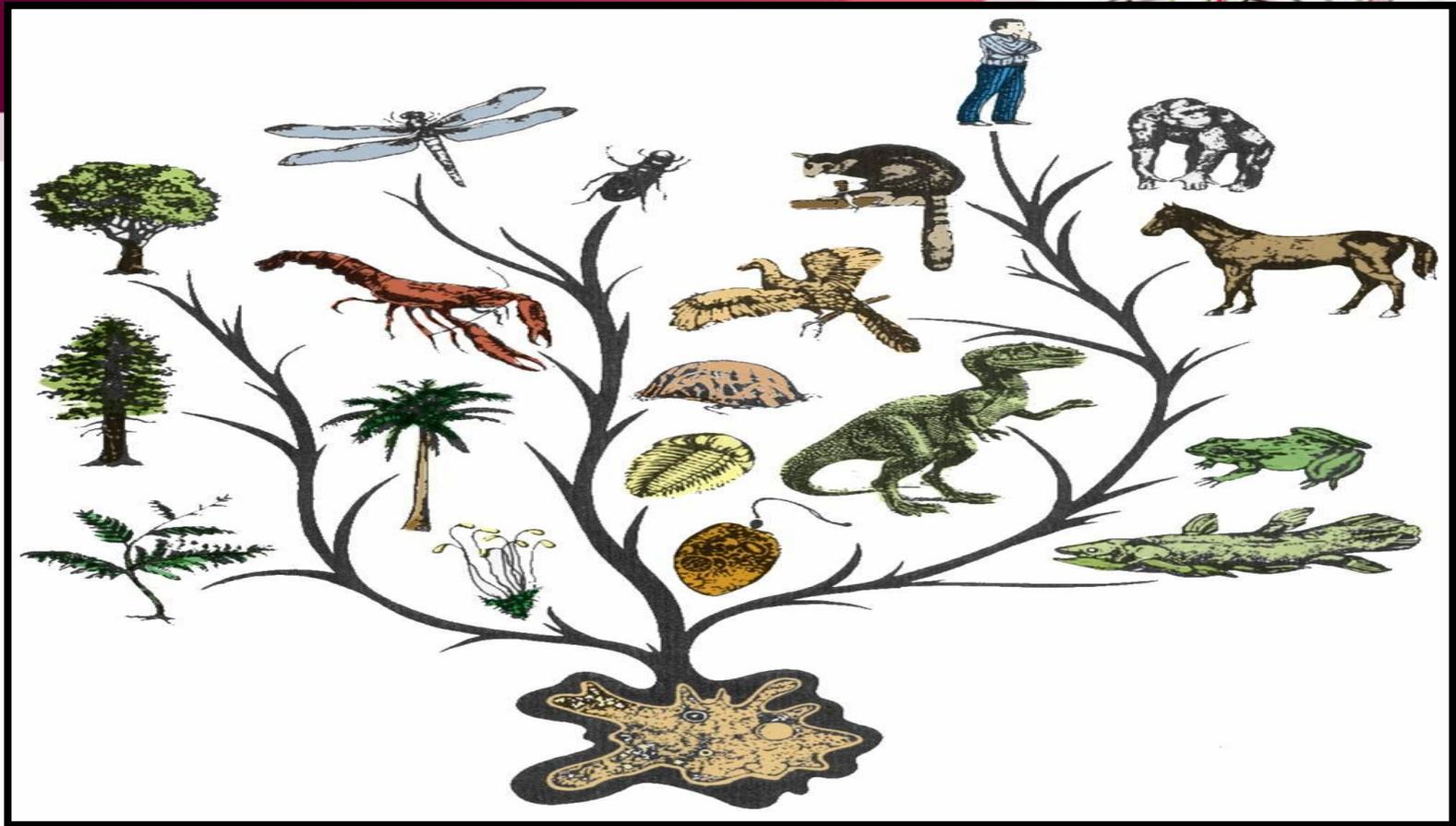


FIGURE 14-7 Homologous structures

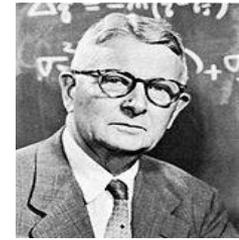
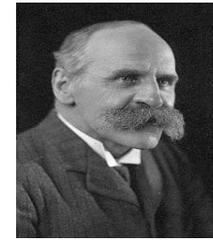
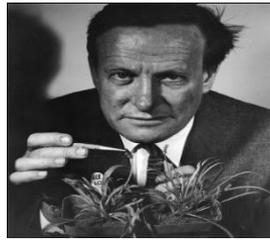
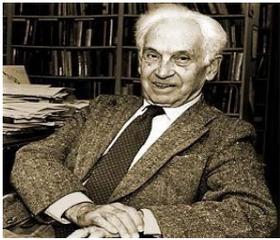
Despite wide differences in function, the forelimbs of all these animals contain the same set of bones, inherited through evolution from a common ancestor. The different colors of the bones highlight the correspondences among the various species.



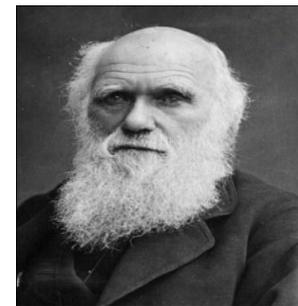
The synthetic theory of evolution



It was developed by T. Dobzhansky, R.A. Fisher, J.B.S. Haldane, Sewall Wright, Ernst Mayr, and G.L. Stebbins.

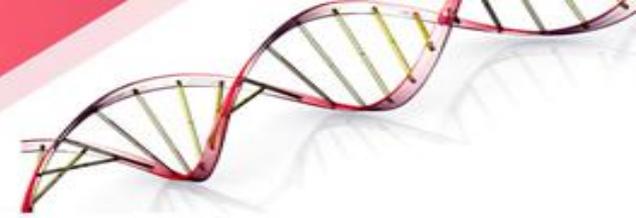


This theory encompasses multiple causes, including Charles Darwin's concept of natural selection, Gregor Mendel's experimental results concerning genetic inheritance, as well as a number of crucial 20th century discoveries

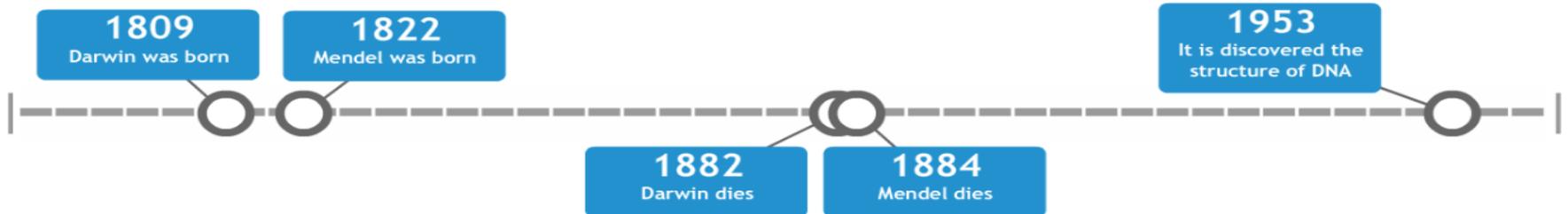


Encompass = includere

5 fundamental points:



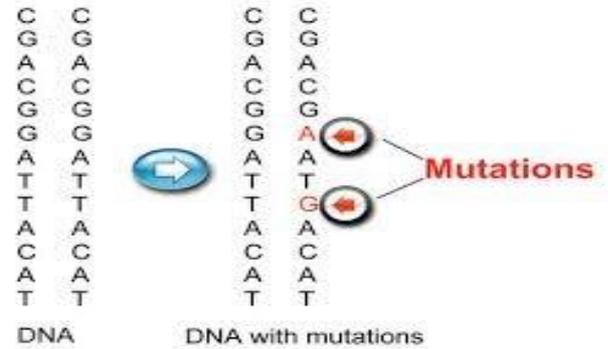
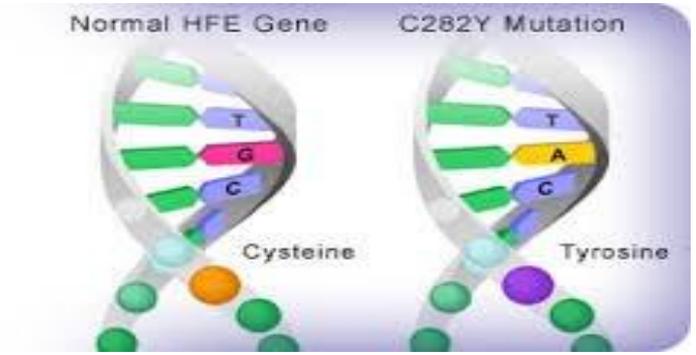
- 1) Gene mutation
- 2) Variation (recombination)
- 3) Heredity
- 4) Natural selection
- 5) Isolation



Gene mutation

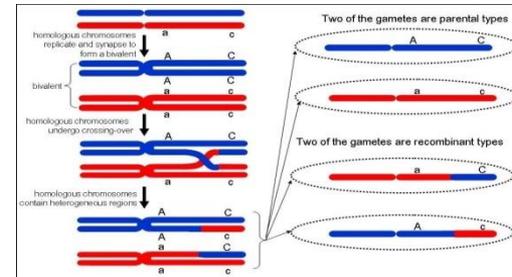
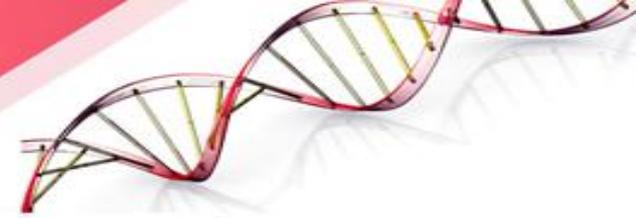


- ❖ It's the alteration in the chemistry of gene (DNA);
- ❖ can be harmful, lethal or can remain insignificant;
- ❖ recessive alleles only appear with omozygosis condition;
- ❖ gene mutation tends to produce variations in the offspring.



(The gene is the basic hereditary unit of living organisms)

Variation (recombination)



Recombination means that new genotypes appear from already existing genes of several types:

- ❖ gene combinations;
- ❖ random mixing of chromosomes;
- ❖ crossing over;
- ❖ chromosomal mutations.

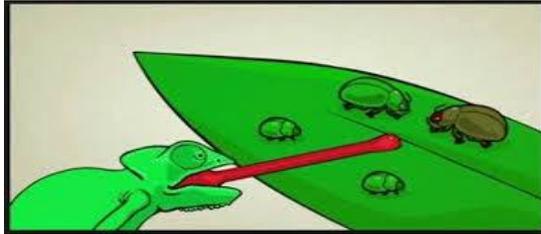
Heredity



- ❖ It's the transmission of variations from parents to offspring.
- ❖ It helps in the struggle for existence.
- ❖ As a result, the offspring benefit from the advantageous characteristics of their parents.



Natural selection



Natural selection does not grant organisms what they "need".

- ❖ it allows differential transmission of genes;
- ❖ it acts to favour some genes over others;
- ❖ it creates adaptive relationship between population and environment.

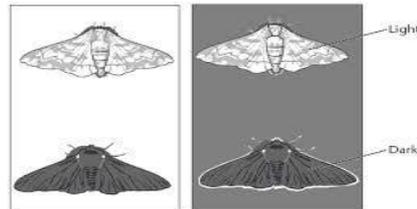


FIGURE 8.1. Light and Dark Peppered Moths

Isolation



- ❖ spreading of organisms of a species into several populations or groups;
- ❖ geographical barriers prevent interbreeding between related organisms;
- ❖ physiological barriers help maintain the individuality of the species.





Thank you for your attention!



Made by 3^a BS 2015/2016:

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8. Colombo Andrea
9. Donini Gabriele
10. Faglia Federico
11. Fossati Giorgia
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13. Giacobone Marco
14. Le Caldare Alberto
15. Liera Jacopo
16. Malucelli Luca
17. Mascherpa Francesca
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