



NATURAL SELECTION AND THEIR FORMS

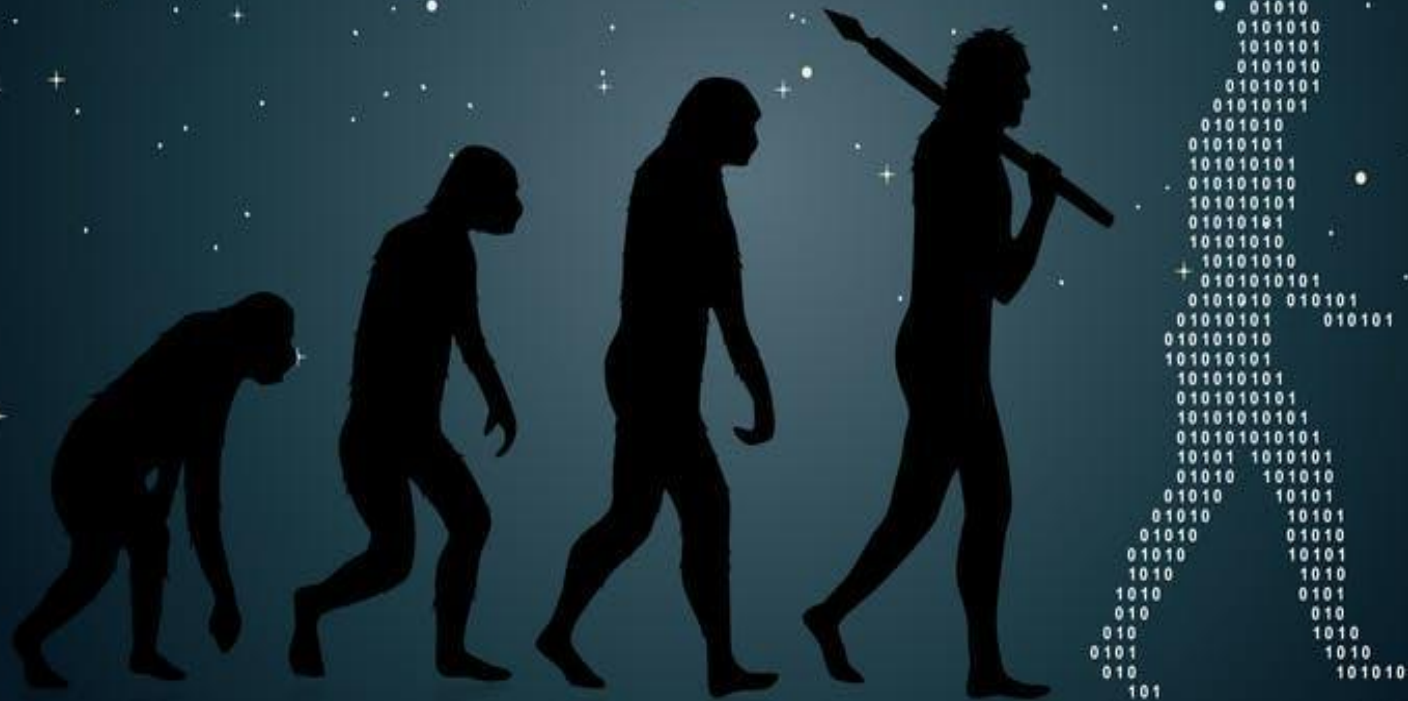
MEDICAL ACADEMY NAMED AFTER S.I.GEOIEVSKY OF VERNADSKY CFU

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1. DEFINITION

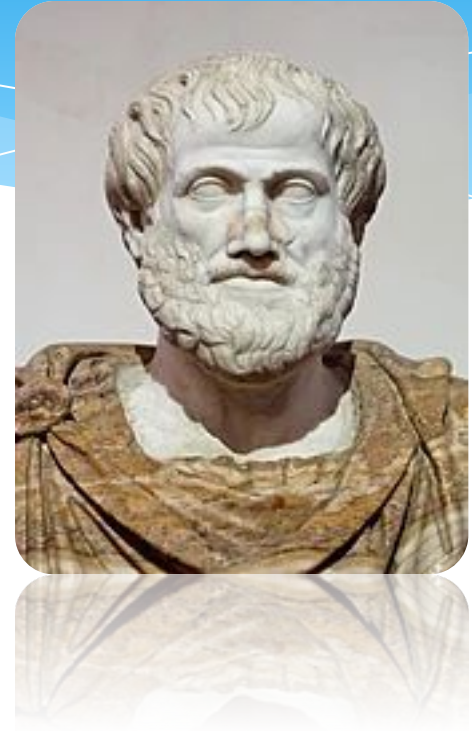
Natural selection, process that results in the adaptation of an organism to its environment by means of selectively reproducing changes in its genotype, or genetic constitution



2. PRE-DARWIN THEORY

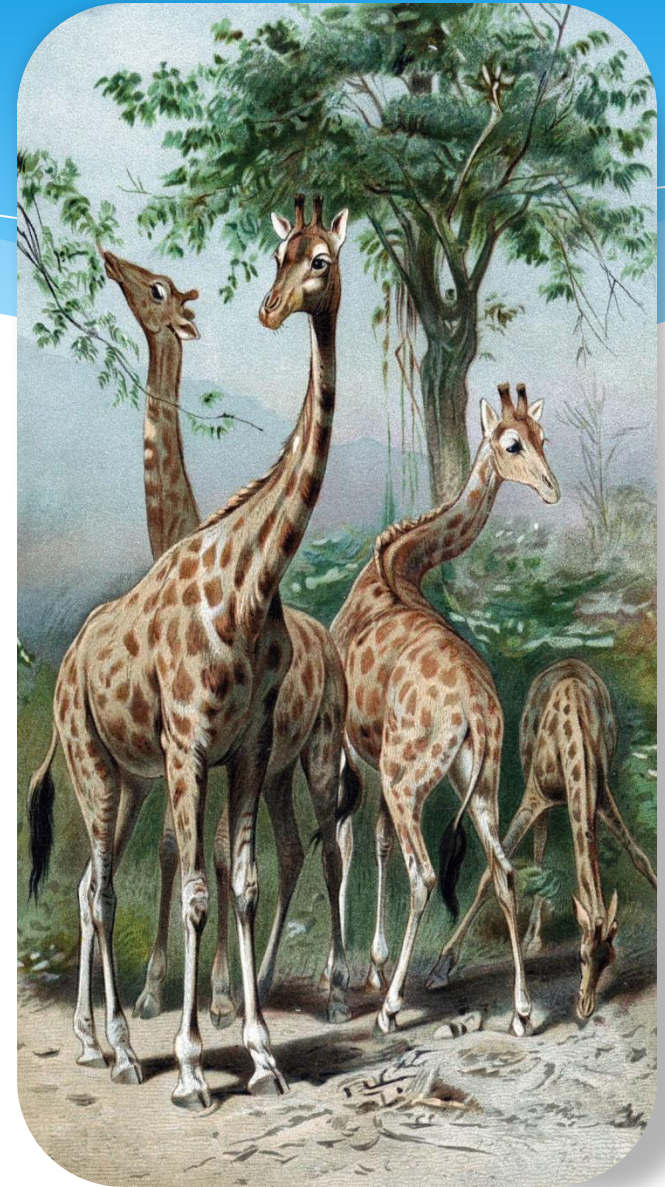
- A) *Aristotle considered whether different forms might have appeared accidentally, but only the useful forms survived.*

Eg: Our “*teeth*” for example come up by necessity-the front teeth sharp, fitted for tearing , the molars broad and useful for grinding down the food– since they did not arise for this end but it was merely a coincident result. Wherever then all parts came about just as if they had come for a certain purpose, such things survived ;whereas those which grew otherwise perished and will always perish.



□ B) *Lamarckism*, a theory of evolution based on the principle that physical changes in organisms during their lifetime—such as greater development of an organ or a part through increased use—could be transmitted to their offspring and thus naturally selected.

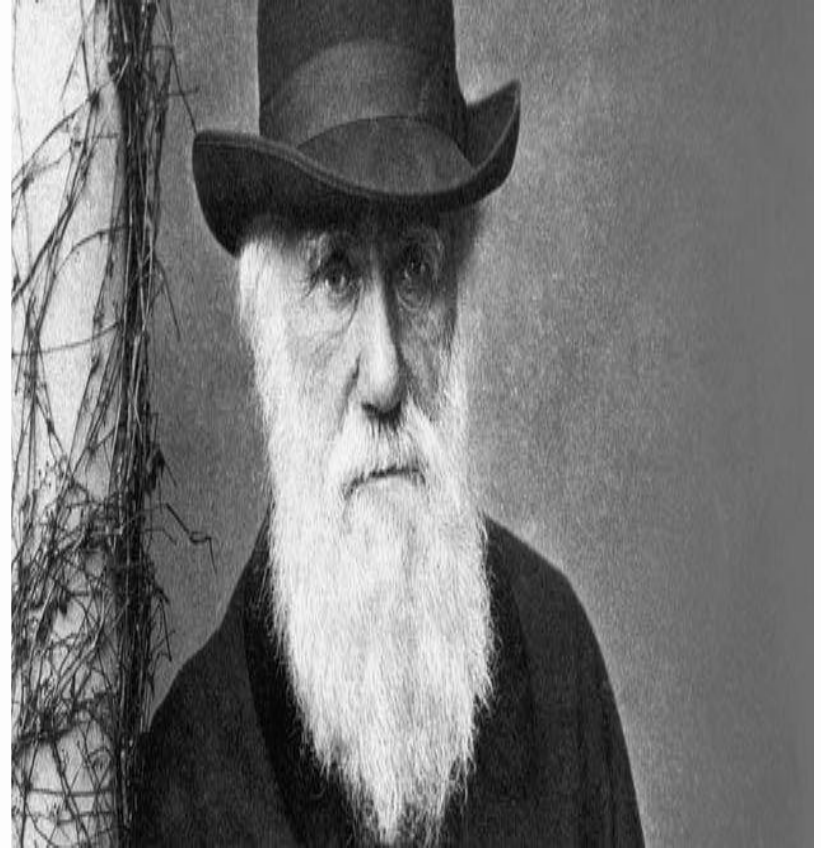
Eg: “*giraffe’s*” front limbs and neck have gradually grown longer. the giraffe, seeking to browse higher and higher on the leaves of trees on which it feeds, stretches its neck. As a result of this habit, continued for a long time in all the individuals of the species, the giraffe’s front limbs and neck have gradually grown longer



3. DARWIN'S THEORY

Darwin proposed that:

- * *individual organisms within a particular species show a wide range of variation for a characteristic*
- * *individuals with characteristics most suited to the environment are more likely to survive to breed successfully*
- * *the characteristics that have enabled these individuals to survive are then passed on to the next generation*



4. MAIN POINTS



OVER POPULATION

COMPETITION

VARIABILITY

SURVIVAL OF THE
FITTEST

The Theory of Evolution by Natural Selection

5 Key Observations

In each generation, populations produce more offspring than there are adults

Populations do not continue to grow in size.

Food & many other resources are limited.

Individuals within all populations vary.

Many variations are heritable.

Inferences

Individuals within a population compete for resources

Some individuals will inherit characteristics that give them a better chance of surviving & reproducing

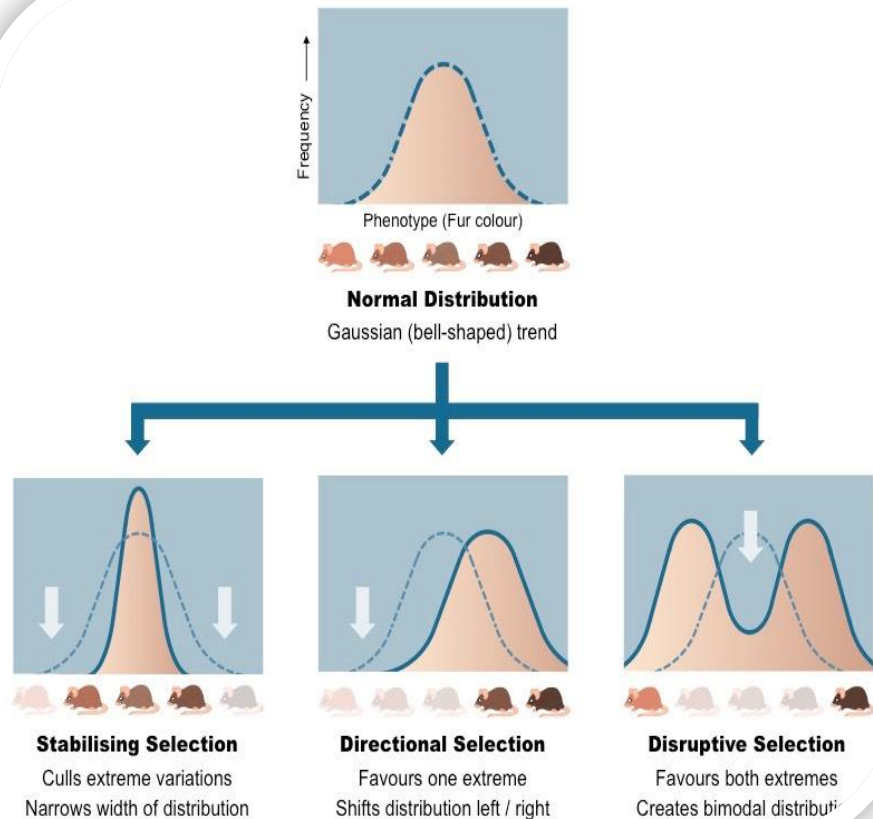
Theory of Natural Selection

Over time the population changes as advantageous heritable characteristics become more common generation after generation.

5. PATTERNS OF NATURAL SELECTION

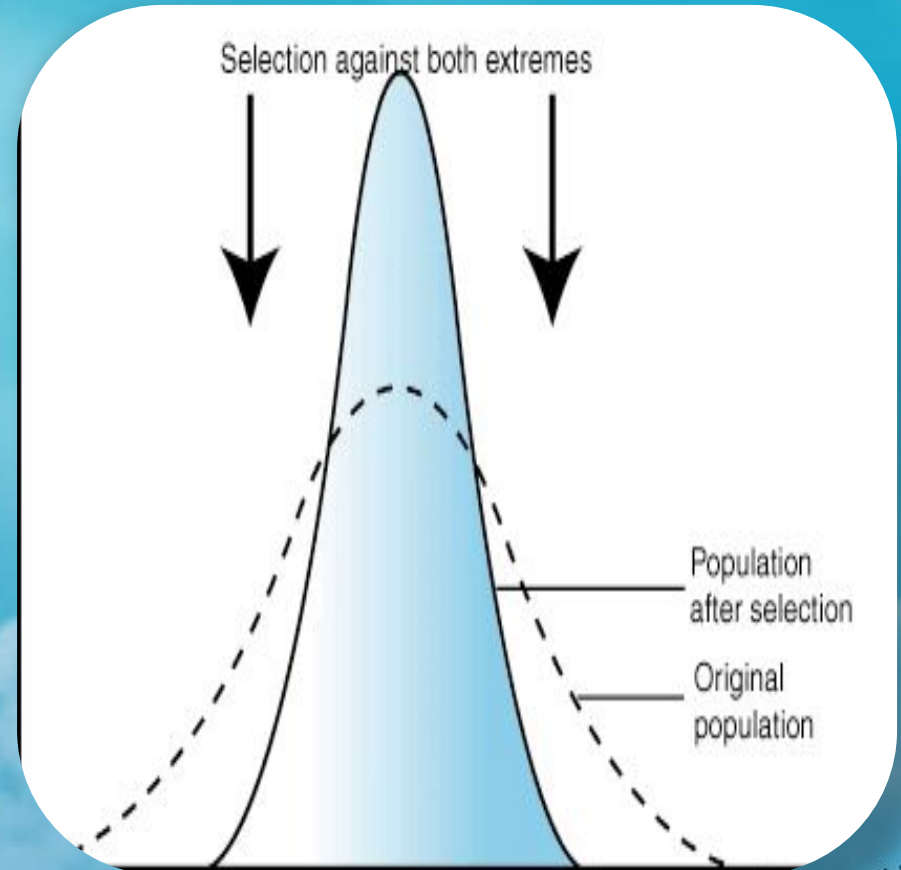
There are several ways selection can affect population variation:

- * stabilizing selection
- * directional selection
- * diversifying selection



A) STABILISING SELECTION

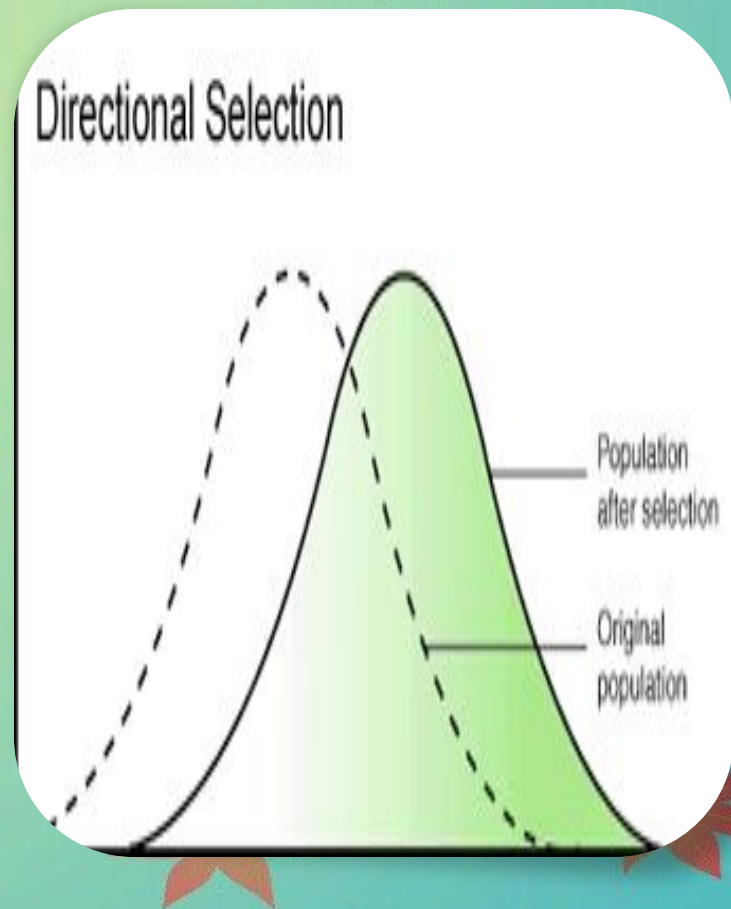
- * It is a type of natural selection in which the population mean stabilizes on a particular non-extreme trait value. Stabilizing selection tends to remove the more severe phenotypes, resulting in the reproductive success of the norm or average phenotypes.





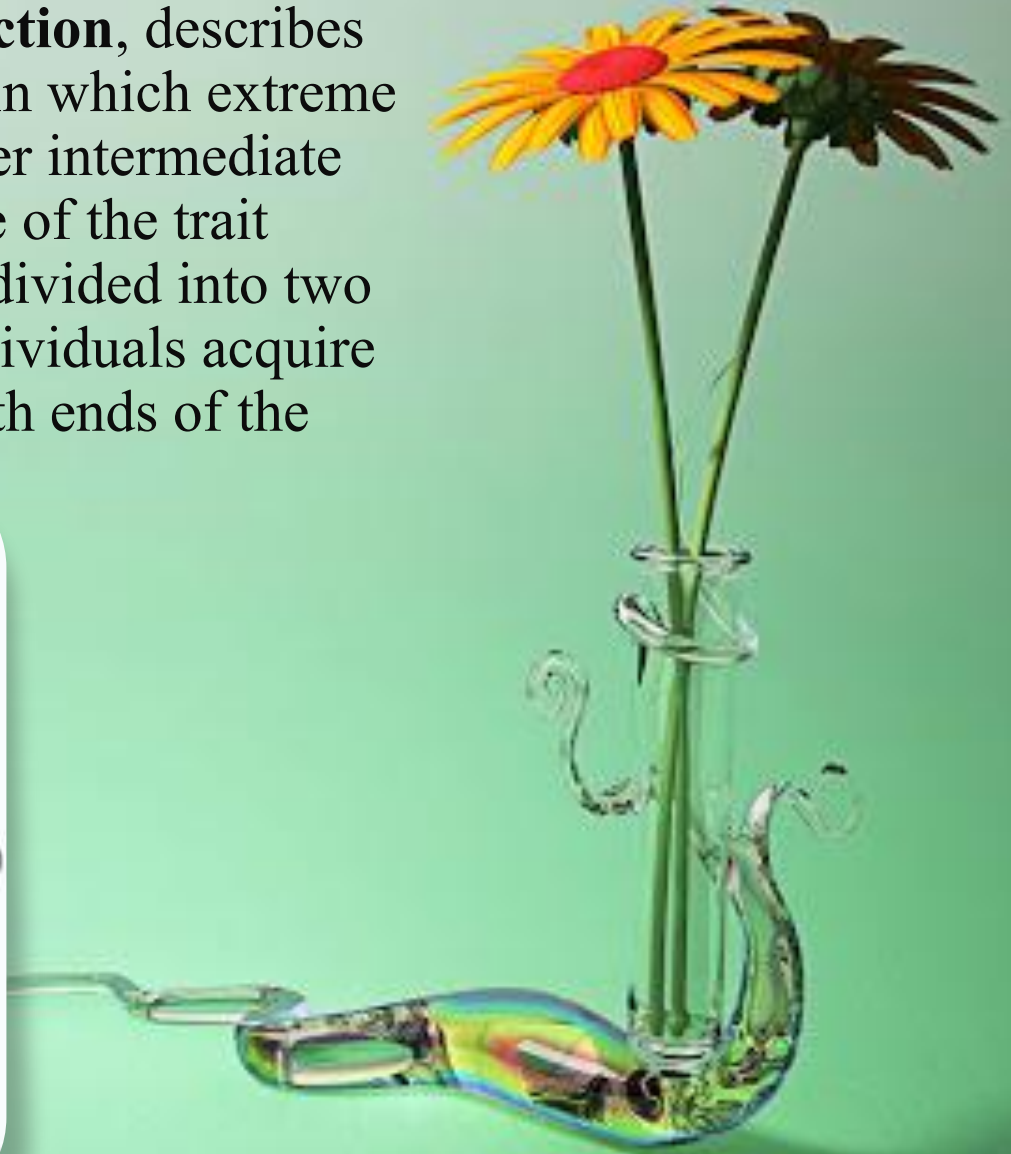
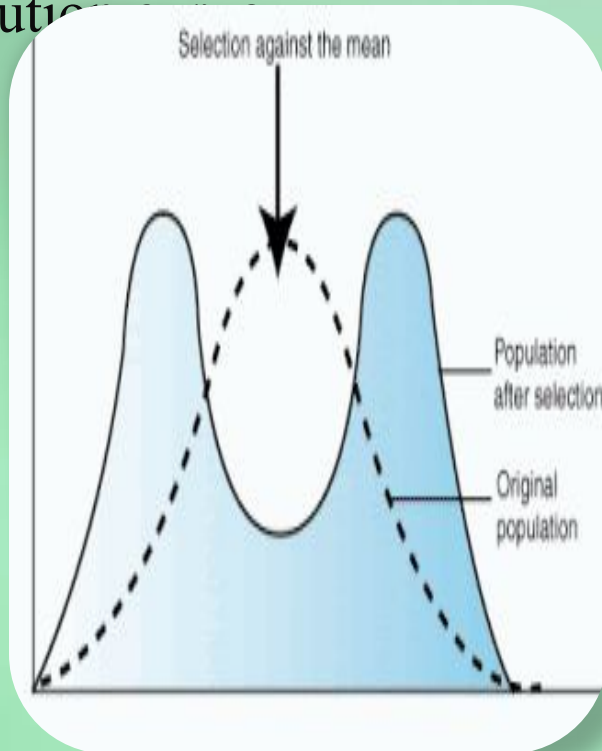
B) DIRECTIONAL SELECTION

- * It is a mode of natural selection in which an extreme phenotype is favored over other phenotypes, causing the allele frequency to shift over time in the direction of that phenotype. Under directional selection, the advantageous allele increases as a consequence of differences in survival and reproduction among different phenotypes.



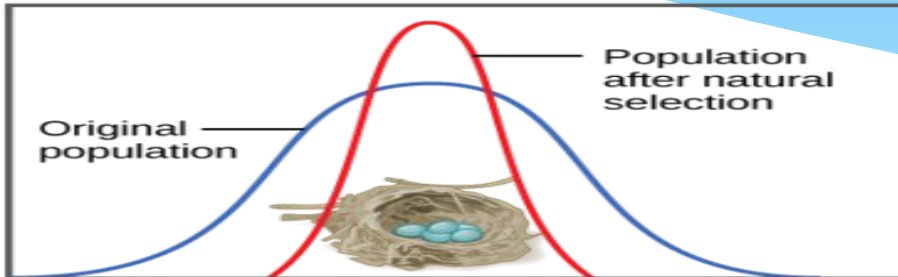
C) DISRUPTIVE SELECTION

- * Its also called **diversifying selection**, describes changes in population genetics in which extreme values for a trait are favored over intermediate values. In this case, the variance of the trait increases and the population is divided into two distinct groups. In this more individuals acquire peripheral character value at both ends of the distribution.



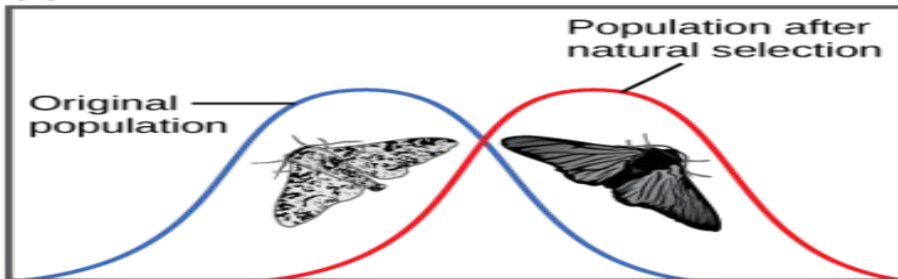
6. GENERAL EXAMPLES OF DIFFERENT TYPES OF SELECTION

(a) Stabilizing selection



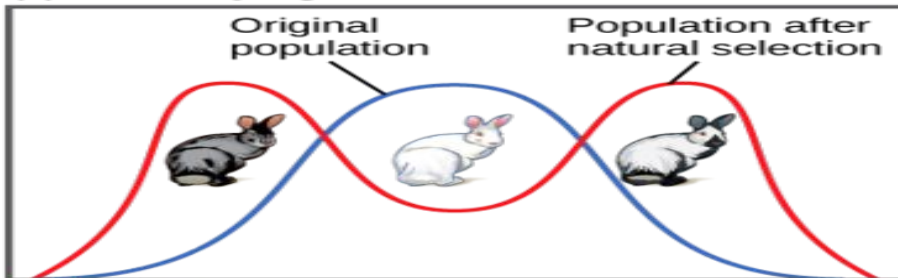
Robins typically lay four eggs, an example of stabilizing selection. Larger clutches may result in malnourished chicks, while smaller clutches may result in no viable offspring.

(b) Directional selection



Light-colored peppered moths are better camouflaged against a pristine environment; likewise, dark-colored peppered moths are better camouflaged against a sooty environment. Thus, as the Industrial Revolution progressed in nineteenth-century England, the color of the moth population shifted from light to dark, an example of directional selection.

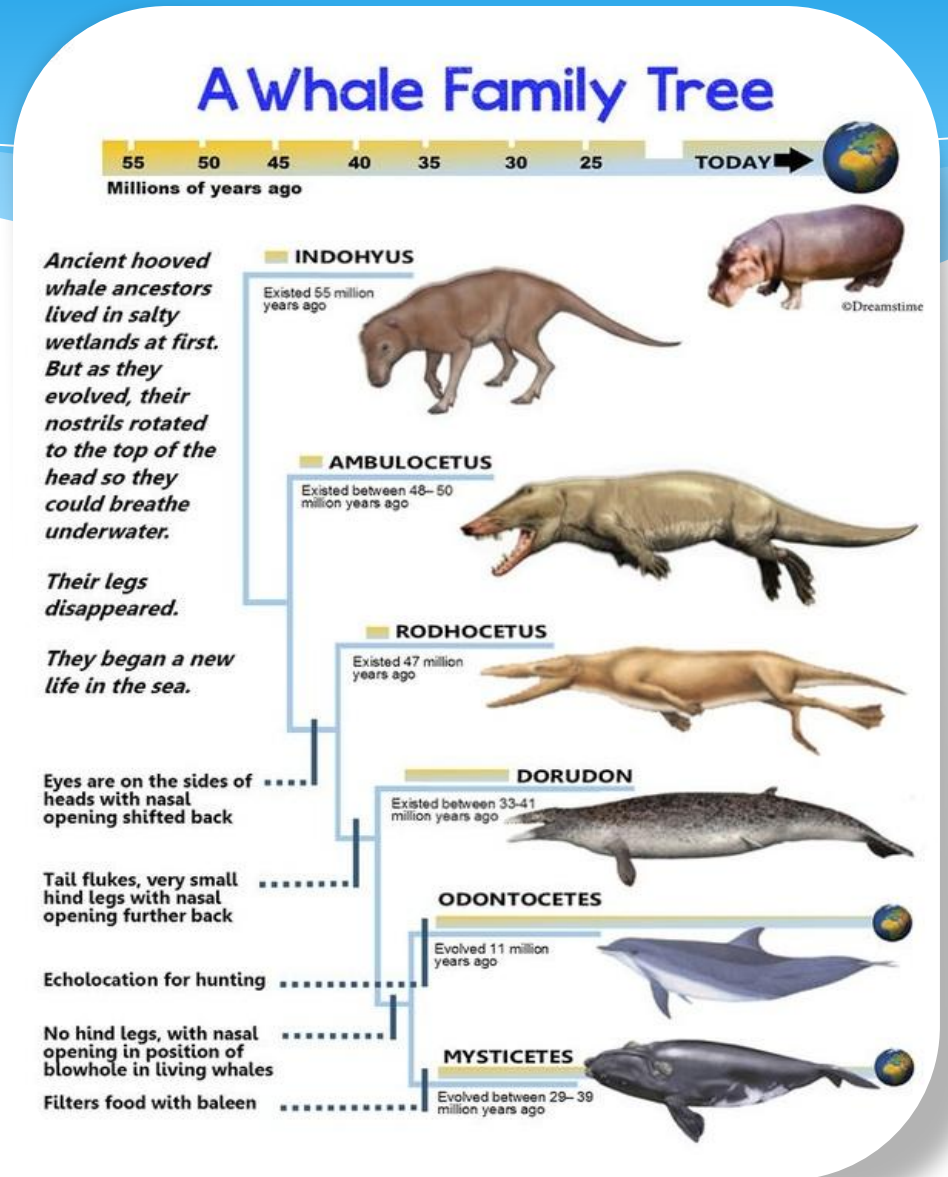
(c) Diversifying selection



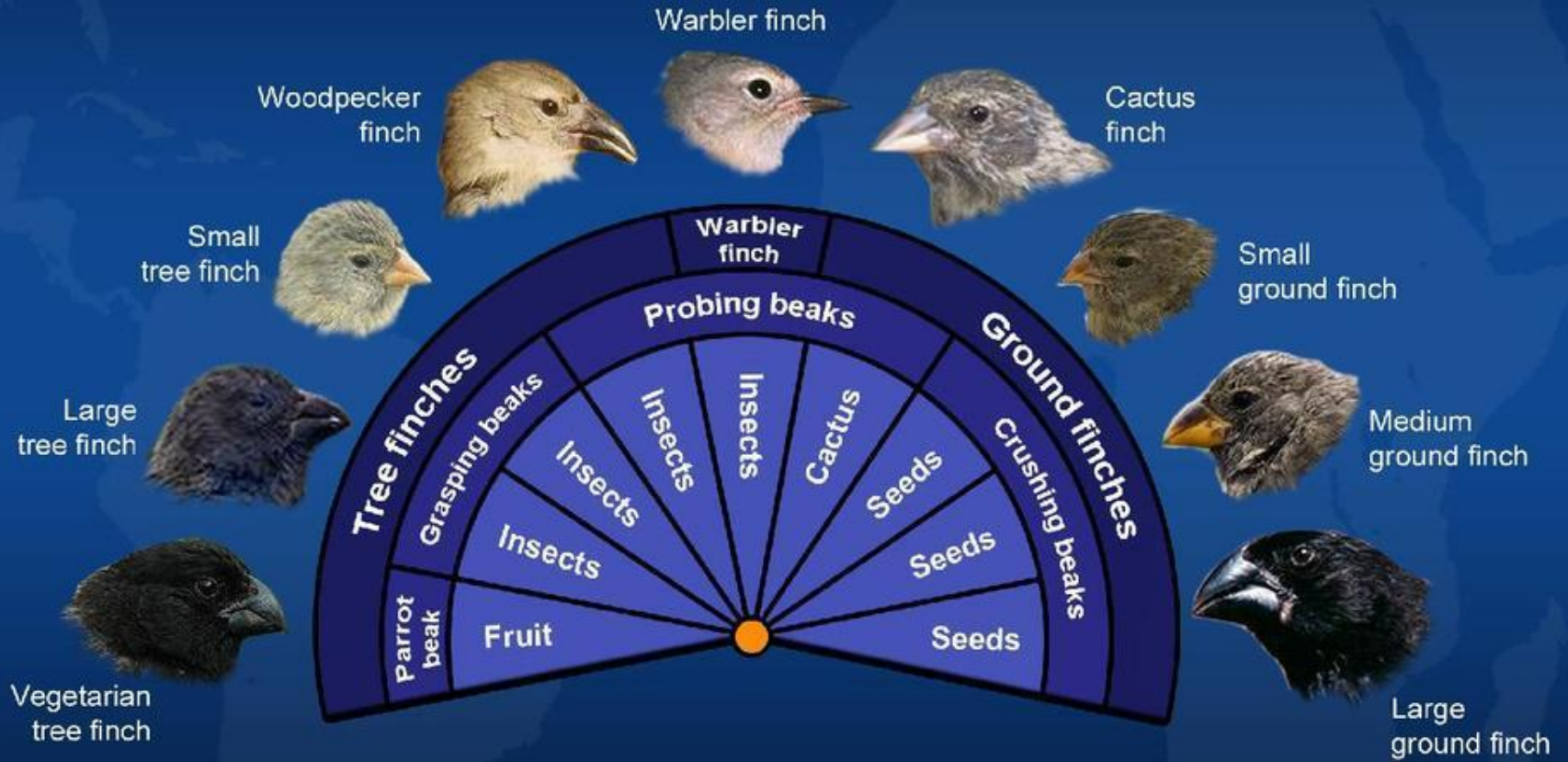
In a hypothetical population, gray and Himalayan (gray and white) rabbits are better able to blend with a rocky environment than white rabbits, resulting in diversifying selection.

7. EVIDENCE OF NATURAL SELECTION:

- a) Charles Darwin speculated about how natural selection could cause a “*land mammal*” to turn into a “*whale*” . Darwin used North American black bears, which were known to catch insects by swimming in the water with their mouths open:



Activity – Darwin's finches



8. EXTERNAL LINKS

https://www.youtube.com/watch?v=aTftyFboC_M

https://www.youtube.com/watch?v=0SCjhI86gr_U

https://www.youtube.com/watch?v=UHLcne_WKXjc



Good Bye

Have a GREAT week!

