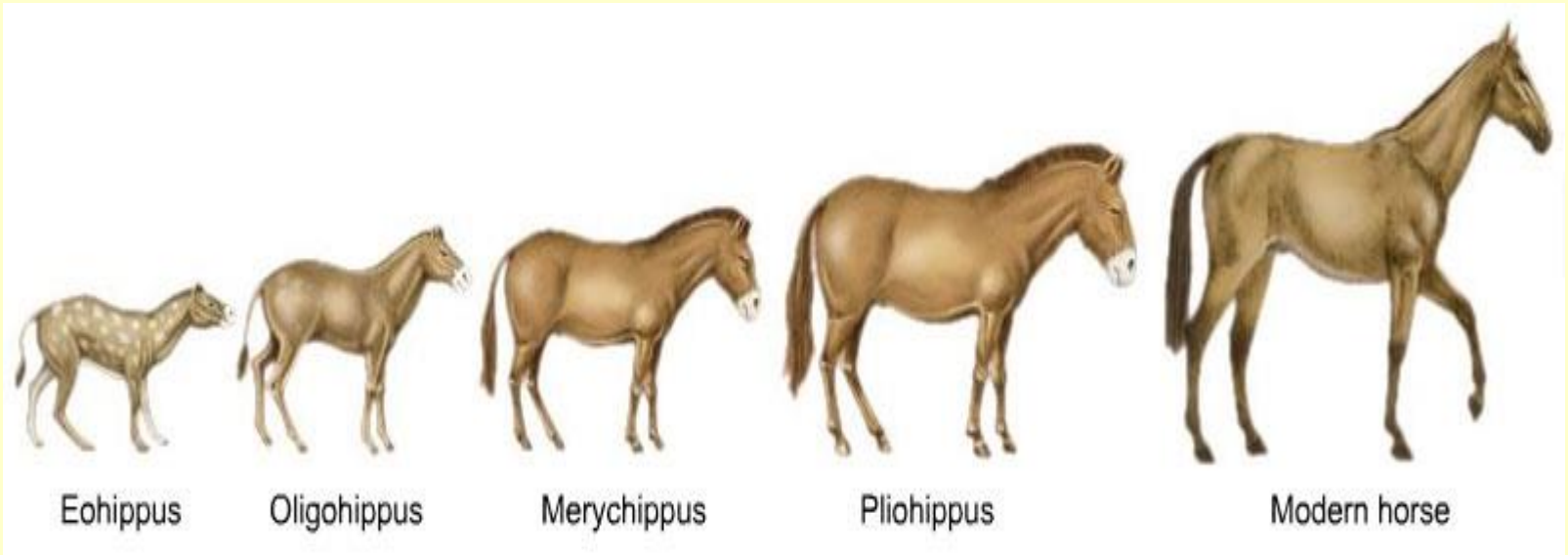


Impact of Natural Selection On Allelic Frequency



What is it?

Does it really happen?

If it is happening, how does it work?



Early giraffes probably had short necks that they stretched to reach food.

a. Lamarck's proposal



Their offspring had longer necks that they stretched to reach food.



Eventually, the continued stretching of the neck resulted in today's giraffe.

Inheritance of Acquired Characteristics



Early giraffes probably had necks of various lengths.

b. Darwin's theory

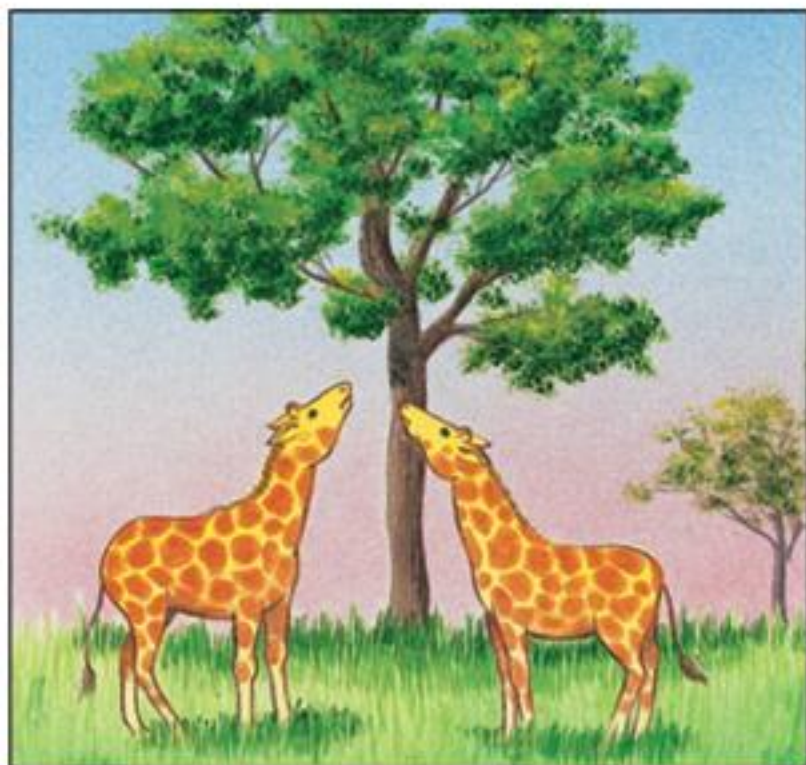


Natural selection due to competition led to survival of the longer-necked giraffes and their offspring.



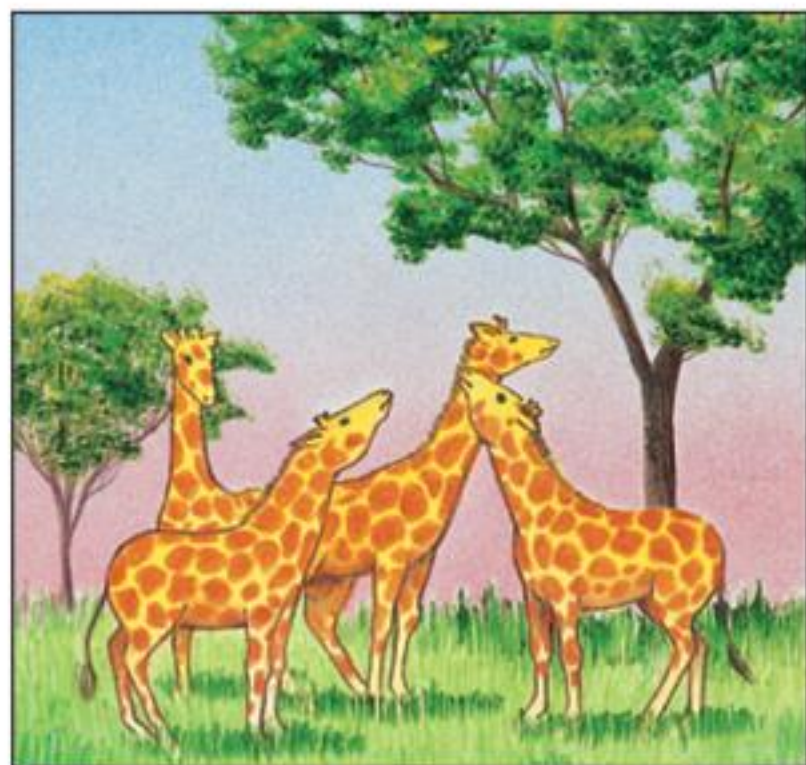
Eventually, only long-necked giraffes survived the competition.

Natural Selection – Survival of Fittest



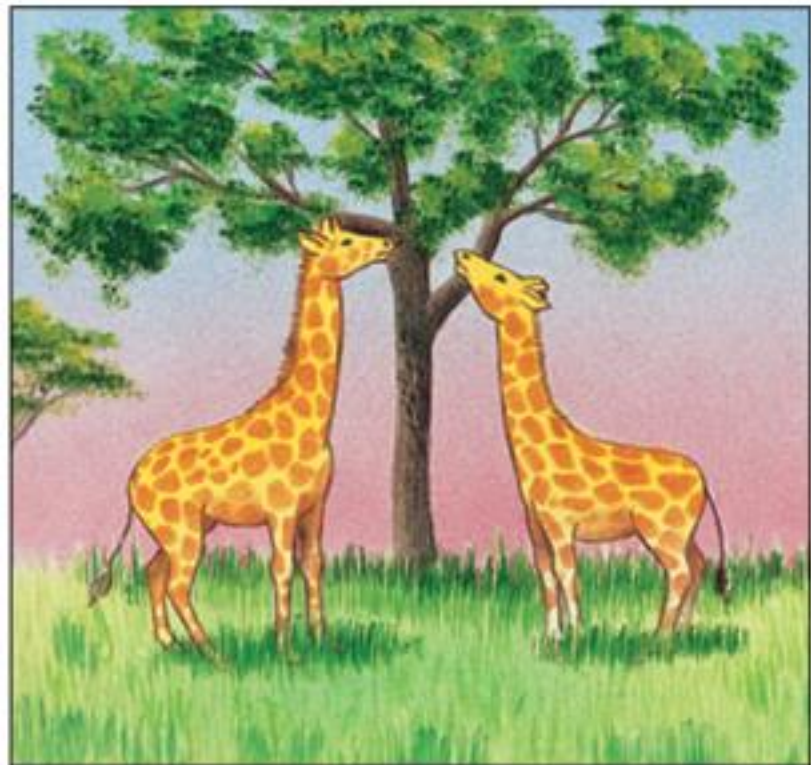
Early giraffes probably had short necks that they stretched to reach food.

a. Lamarck's proposal



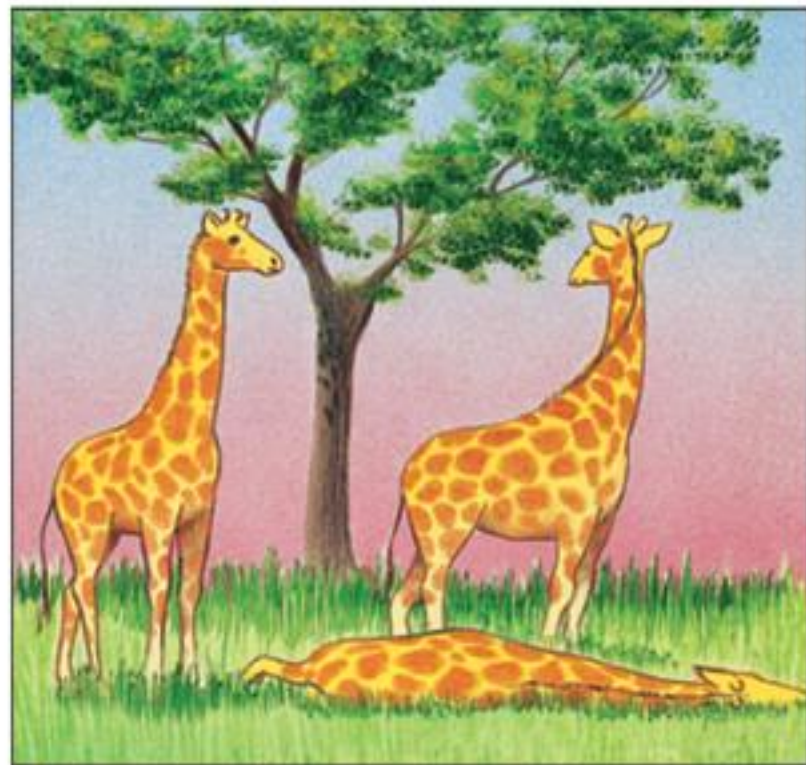
Early giraffes probably had necks of various lengths.

b. Darwin's theory



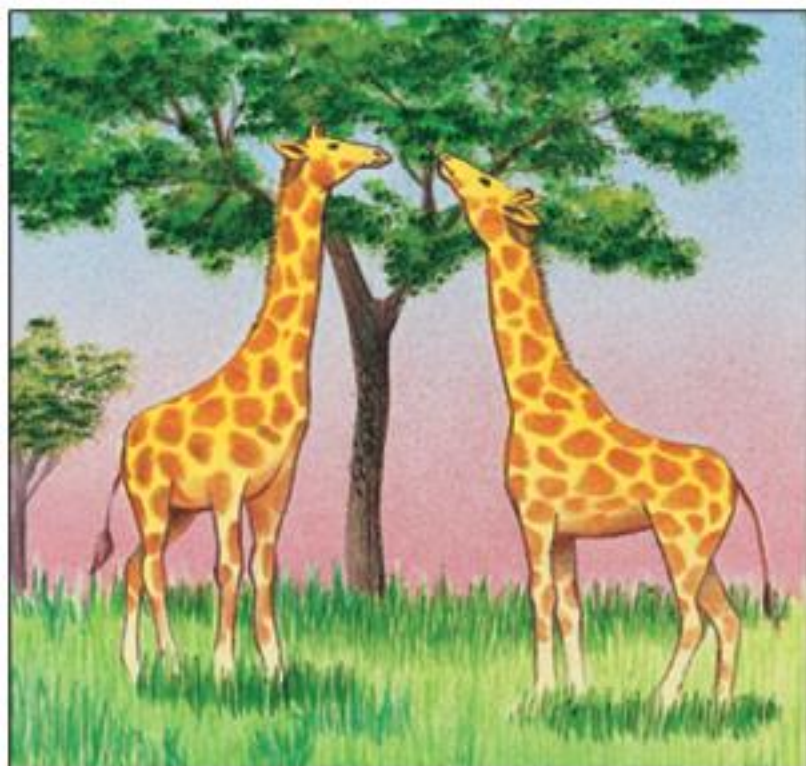
Their offspring had longer necks that they stretched to reach food.

a. Lamarck's proposal



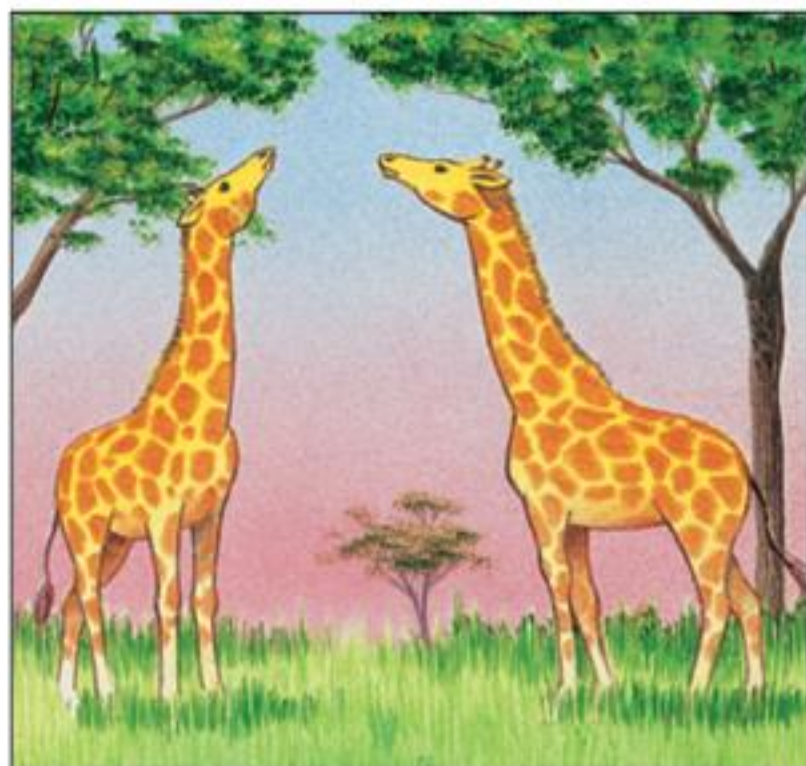
Natural selection due to competition led to survival of the longer-necked giraffes and their offspring.

b. Darwin's theory



Eventually, the continued stretching of the neck resulted in today's giraffe.

a. Lamarck's proposal



Eventually, only long-necked giraffes survived the competition.

b. Darwin's theory

Sexual Reproduction Creates more Diversity



Mutation Can Also Create Diversity



**a. Original population:
10% dark-colored
phenotype**



**b. Several generations
later: 80% dark-colored
phenotype**

BASIC GENETICS

Perhaps the Spoon allele of the gene is dominant to the recessive Fork allele

Male = Sf

Female
=
Sf

	S	f
S	SS	Sf
f	Sf	ff



Bill -shape Gene had three alleles. An organism could be carrying a recessive allele and pass on that recessive trait

Marble Bill Population

Allele Frequency

Year 1 Population

StSt Stf

ff ff

SS Sf

Stf StSt

ff ff

SS SS

Total alleles = 24

**What is the percentage
for each allele ?**

Year 2 Population

ff Sf

SS SS

Sf SS

Sf Sf

Total alleles = 16

**What is the percentage
for each allele ?**

Ground finches

large
cactus
ground
finch



small
ground
finch



medium
ground
finch



sharp-beaked
ground finch



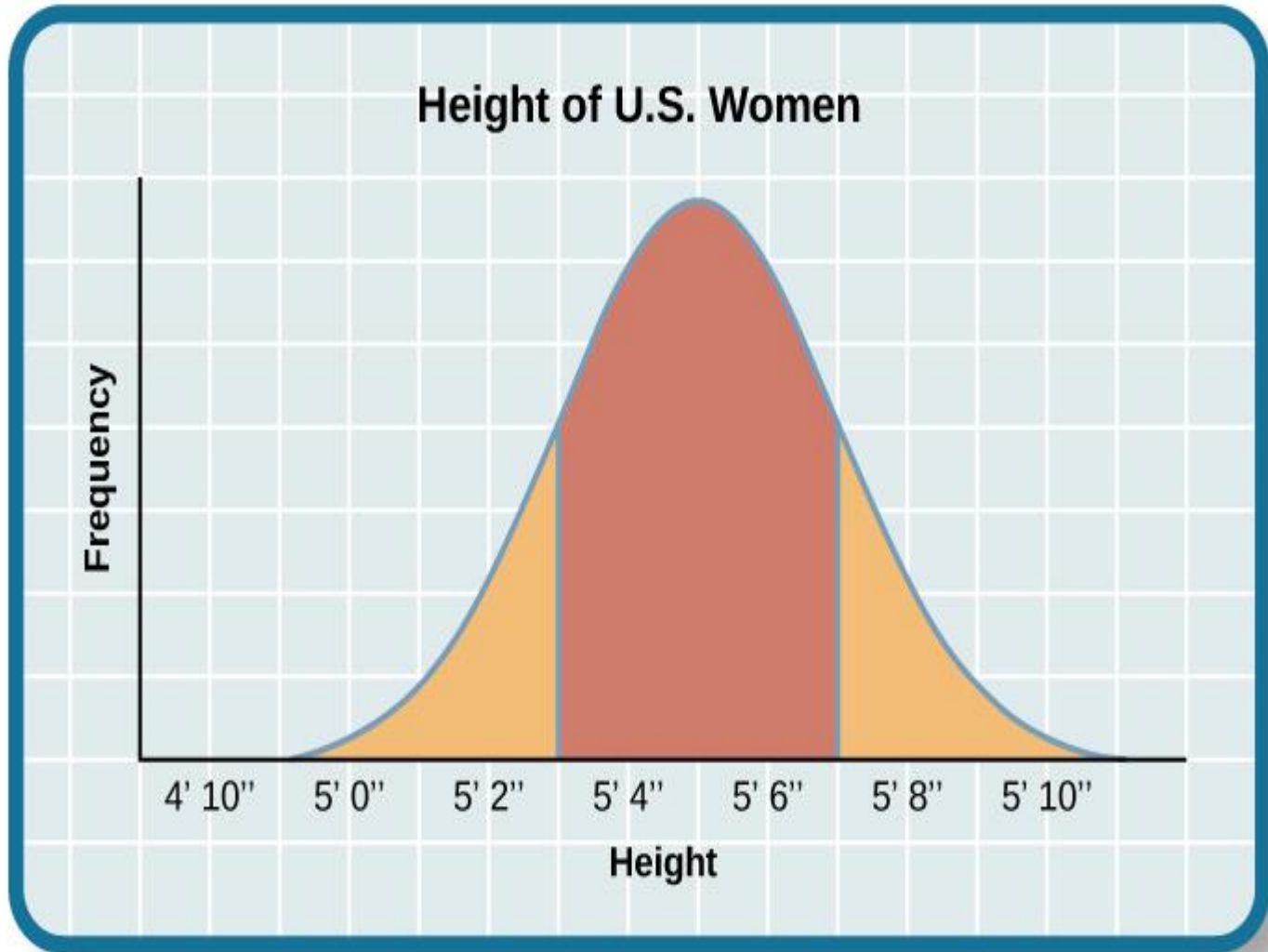
large
ground
finch

The Impact of Natural Selection



Bell Curve – Normal Distribution

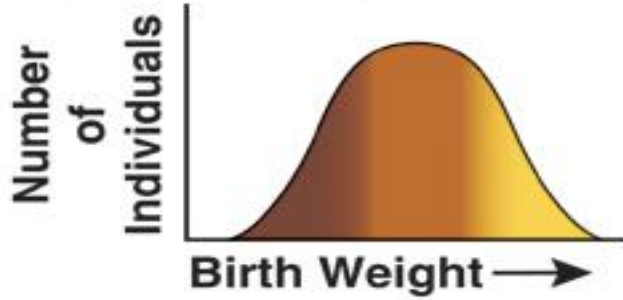
In this graph, the trait is Height



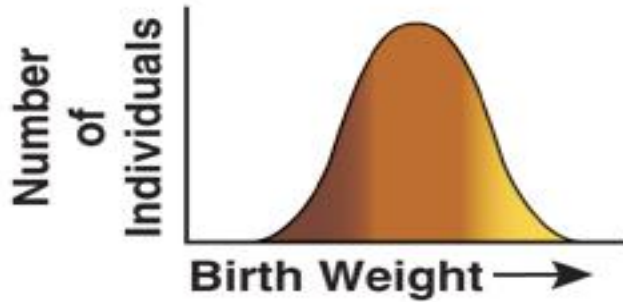
STABILIZING SELECTION

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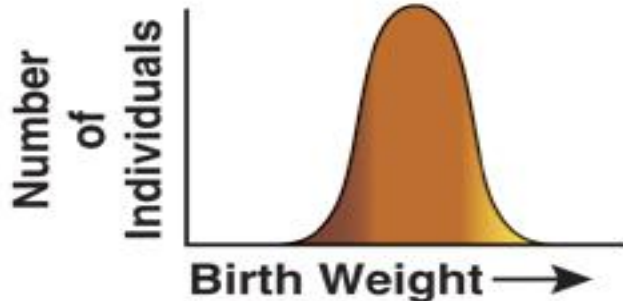
initial
distribution




after
time



after
more
time



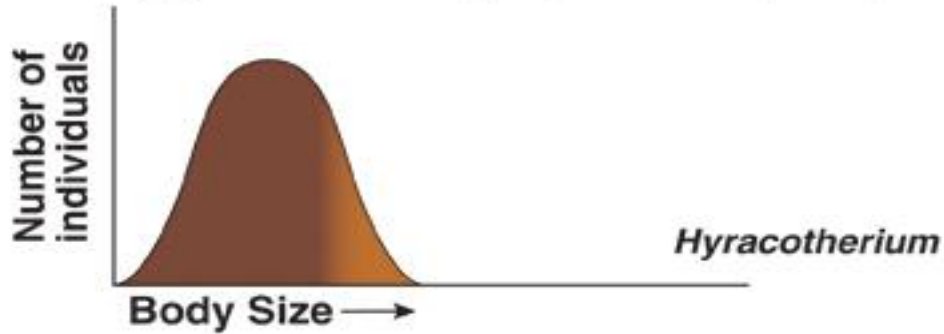
Color Key:

-  = Underweight newborns
-  = Normal-weight newborns
-  = Overweight newborns

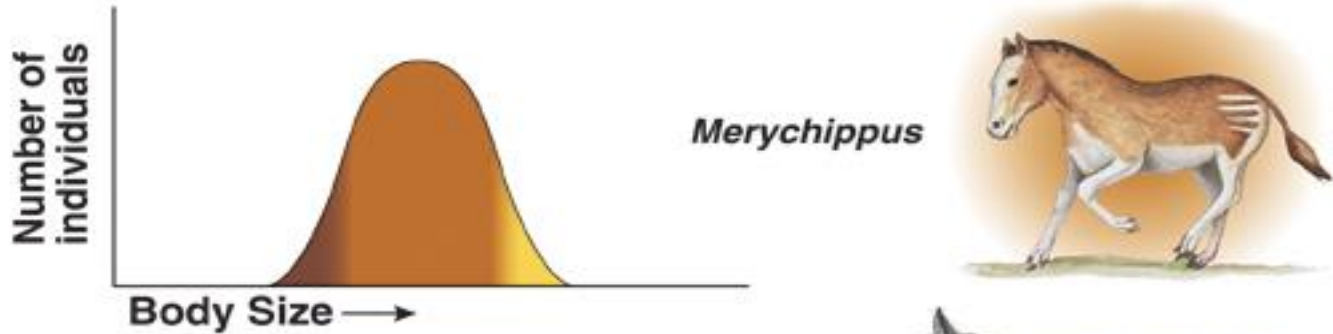
DIRECTIONAL SELECTION

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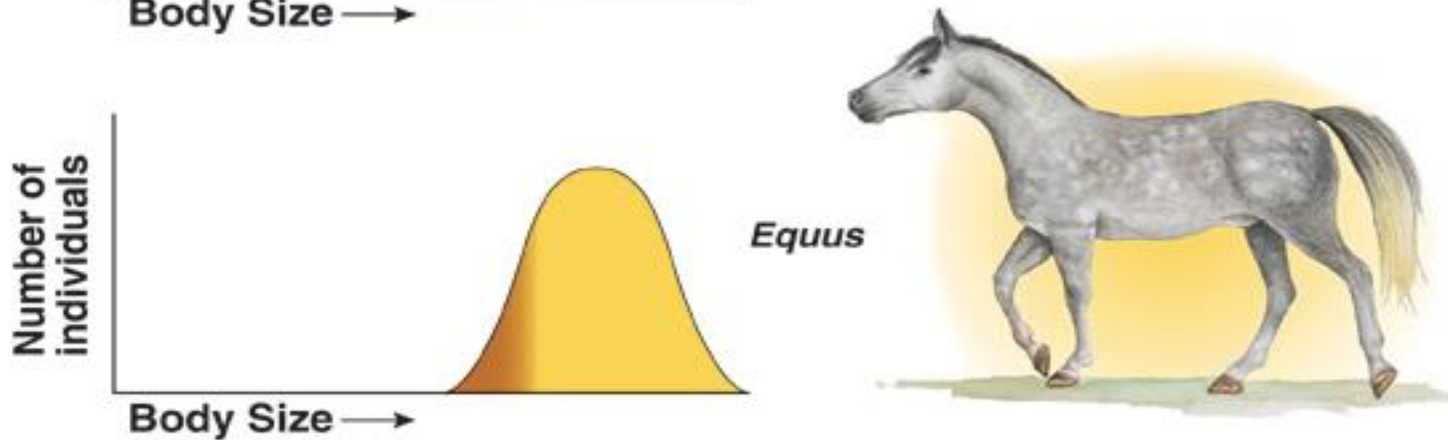
initial
distribution



after
time

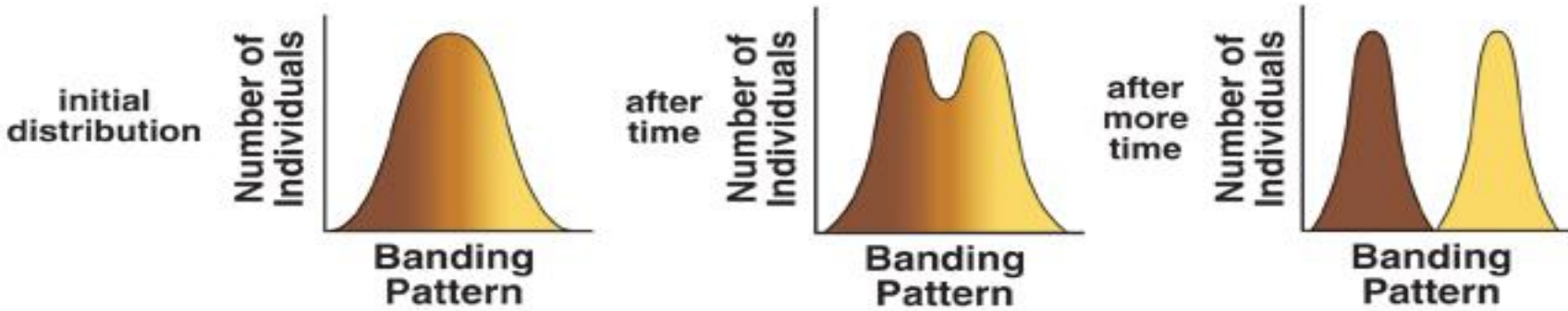


after
more
time



DISRUPTIVE SELECTION

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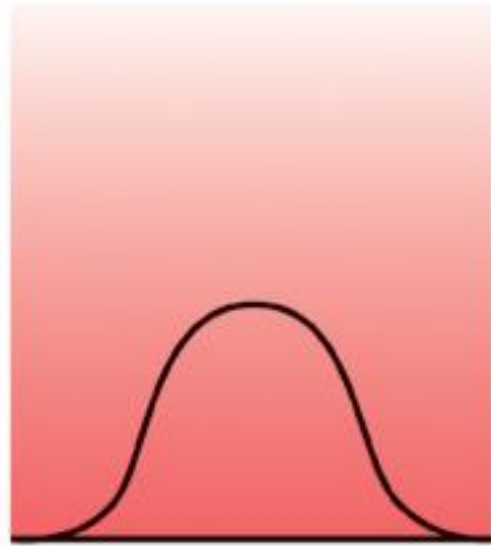




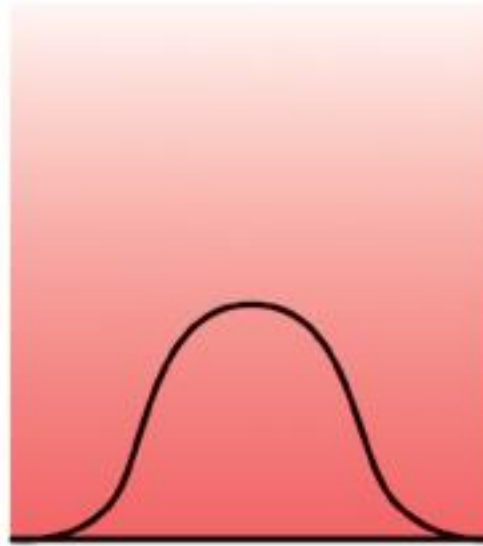
Maybe one extreme phenotype with light colour is perfect for fields, other extreme phenotype with dark colour is perfect for forest. While the mouse with the colour in between doesn't do well in either habitat



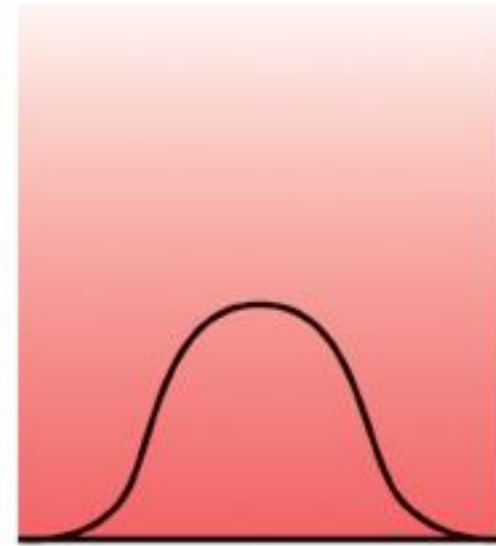
What Will Happen To Each ?



a. Disruptive selection



b. Stabilizing selection



c. Directional selection