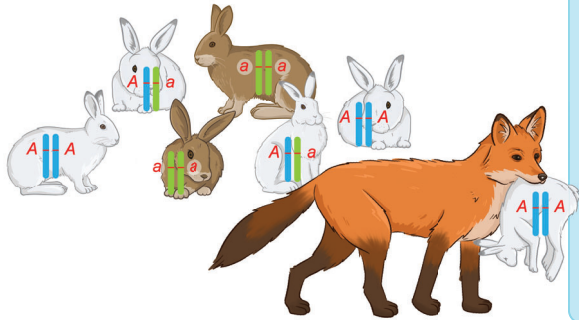


TOPIC: EVOLUTION OF POPULATIONS

Introduction to Evolution of Populations

Evolution: _____ in a population over time.

- ◆ _____ evolution: large changes, long time.
- ◆ _____ evolution: small changes, short time.



Evolution: change in _____ frequency over time.

- ◆ *Recall:* alleles are different _____ of a gene.
- ◆ Evolution requires _____ variation, *i.e.* multiple alleles.
 - Introduced through _____.
- ◆ Mechanisms of evolution:
 - Natural Selection:** certain alleles make it more likely that individuals _____.
 - Genetic Drift:** _____ changes to allele frequency.
 - Gene Flow:** Movement of alleles _____ populations.

- ◆ **Modern Synthesis:** combination of Darwinian evolution and _____ genetics.
 - **Population Genetics:** study of processes that affect genes at the _____ level.

EXAMPLE

Four situations are described below. Match each situation with the mechanism of evolution that describes it. Mechanisms may match more than one situation.

Natural Selection: _____ **Gene Flow:** _____ **Genetic Drift:** _____

- A camper brings firewood to a campsite from a different state. That firewood contains a beetle with a variant of an allele not present in the native beetle population.
- A population of dandelions has two variants for the gene that codes a protein active in photosynthesis. There is no difference in the fitness of plants with either variant. After 100 generations one variant has become much more common, while the other has become much less common.
- A mutation in an allele allows Eastern Screech Owls to better camouflage in their environment. After 100 generations, most of the owls in this population have the allele for better camouflage.
- During a forest fire, almost all of the mountain lions in a population were killed. The remaining population happened to have a higher frequency of an allele that makes their eyes appear more brown than yellow.

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PRACTICE

What do natural selection, genetic drift, and gene flow all have in common?

- a) They were introduced as ideas by Charles Darwin in his book *On the Origin of Species*.
- b) The combination of those three ideas represents what is known as “The Modern Synthesis”.
- c) They all contribute to microevolution within a population.
- d) They are three ways that new alleles may be introduced to a population.

PRACTICE

Which description below best describes “The Modern Synthesis”?

- a) The combination of modern genetic techniques, such as DNA sequencing, with Darwinian theory.
- b) The combination of Mendel’s and Darwin’s ideas into one theoretical framework.
- c) The combination of micro and macro evolutionary ideas into one unified theory.
- d) The combination of computer modeling and DNA sequencing to investigate evolutionary relationships.