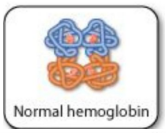
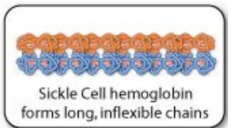




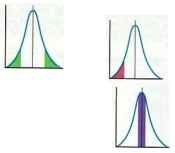
CHAPTER 8 THE ORIGIN OF SPECIES

8.1 NATURAL SELECTION p. 326

Explain how natural selection favours the sickle-cell trait in some African countries.

The sickle-cell allele results from a single base mutation in the DNA coding. Individuals with the heterozygous gene are resistant to malaria and thus have a higher chance of surviving than those without the allele.

Three Types of Selection Explain each of the following:



Stabilizing Selection

Selection against individuals exhibiting traits that deviate from the current population mean

Directional Selection

Selection that favours an increase or decrease in the value of a trait from the current population mean

Disruptive Selection

Selection that favours two or more variations of a trait that differ from the population mean

Additionally, there is Sexual Selection

Varying reproductive success caused by variations in the ability to obtain mates; results in sexual dimorphism, mating, and courtship behaviours

Explain why sexual selection is in check by predation.

Specific traits like bright colours and large antlers may be favoured by sexual selection, they are often a disadvantage when it comes to longevity

Which type of selection led to the following characteristics?

a) hollow and very lightweight bones in birds - directional selection

b) hundreds of different but genetically very similar species of fruit flies living in the Hawaiian Islands - distributive

c) turtles species that have changed little over millions of years - stabilizing selection

d) males of many frog species that calle very spring, while females are silent - sexual selection

Genetic Drift

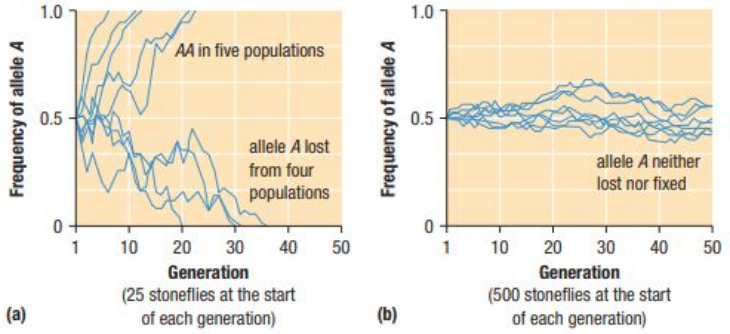
Changes to allele frequency due to chance that are more pronounced in small populations

Allele fixation = lost alleles.

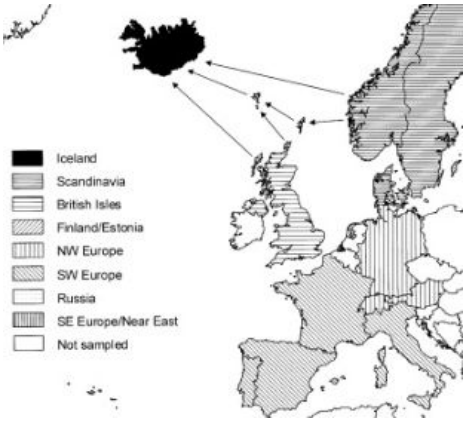
Any lost alleles result in a net reduction in the genetic diversity of a population.

Differentiate between two types of genetic drift: Bottleneck and Founder Effect.

Bottleneck: A dramatic reduction in population size, typically resulting in significant genetic drift



Founder's Effect: Genetic drift that results when a small number of individuals separate from their original population and establish a new population.



The human population of Iceland was founded by a relatively small initial population more than 1000 years ago. Would you expect the genetic diversity of Icelanders to be more or less than the genetic diversity of Canadians? Explain.

Less - genetic drifts regress toward the mean

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1. The frequency of allele combination is a result of natural selection

2. Due to selection, there was an increase in the population of people adapted to high altitudes.

4. Through sexual selection, males with greater dominant traits are selected

6. No need for a directional selection.

7. No - stabalizing selection still occurs

8. No, females are not attracted to that trait as it is common to females as well. It is a stabilizing selection.

8.2 SPECIATION p. 336

Speciation always involves isolation. Explain.

A group is put into a new environment and must then adapt to survive.

Explain the following mechanisms which keep separate species distinct:

Reproductive isolating mechanism

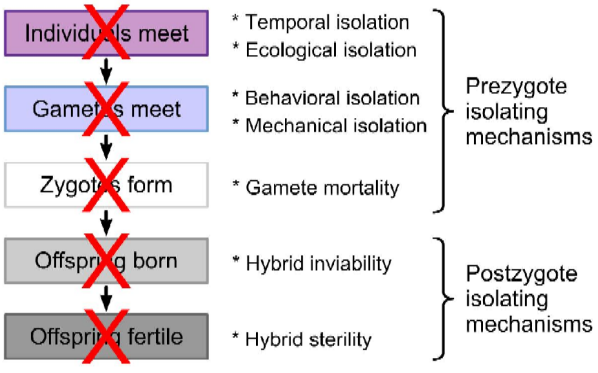
Any structural, behavioural, or biochemical trait that prevents individuals from different species reproducing together successfully

Prezygotic mechanism

A reproductive isolating mechanism that prevents interspecies mating and fertilization

Post zygotic mechanism

A reproductive isolating mechanism that prevents maturation and reproduction in offspring from interspecies reproduction

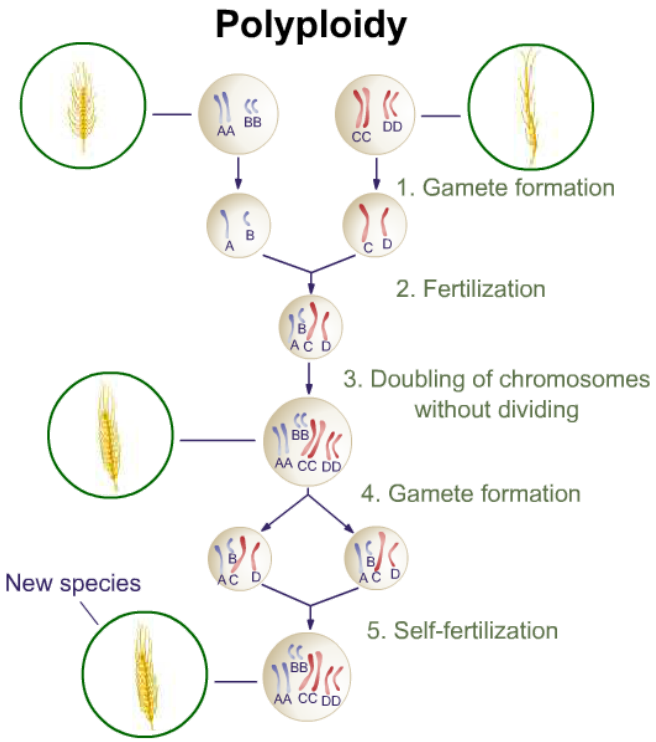


Define allopatric speciation.

The formation of a new species as a result of evolutionary changes following a period of geographic isolation

Define sympatric speciation.

The evolution of populations within the same geographic area into separate species.



Explain polyploidy and hybrid species.

Polyploidy results in sympatric speciation. Mutations causing polyploidy double the number of chromosomes in an individual. Polyploids produce fertile offspring when they mate but produce sterile offspring when mated with the original species.

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1. Morphology, Carbon dating,
2. A) Post-zygotic mechanism
   B) Pre-zygotic mechanism
   C) Pre-zygotic mechanism
   D) Reproductive isolating mechanism
   E) Reproductive isolating mechanism
3. The practice of isolating groups is the same as allopatric speciation.
4. The larger island – it's isolation allows for the speciation of more unique species
5. A) With the occurence of allopatric speciation
   B) Their speciation will reduce their diversity and then reduce their environmental adaptation
6. A) 2n, increase of chromosome result in sterile
   B) Yes, their reduction in genetic diversity is a key piece of evidence
   C) They are not able to produce fertile offspring