

# UNIT 8: EVOLUTION

## Speciation

# How can natural selection influence change in a species over time?

- ◎ Case study – Peppered moth
  - An example of directional selection
  - From a light to dark color

# Peppered Moth

- Before the industrial revolution – the light colored moth was well camouflaged among the light colored lichens that grew on tree bark around London



# Peppered Moth

- ◉ With the industrial revolution, soot killed the lichens, exposing the dark tree bark.
  - As a result – the dark moth became better camouflaged



# Remember variation can come from mutations!

- Example: Antibiotic and pesticide resistance
  - Alleles can be introduced by mutation
  - These alleles may already exist in the population
  - If you apply antibiotic or pesticides = eliminates susceptible individuals
    - Non-susceptible individuals reproduce rapidly without competition

# Mutations - Viruses

- Selective advantage = viruses that can reproduce quickly
  - Makes them more difficult to treat/prevent using antivirals or vaccines

## INDUCED IMMUNITY

Using antibodies to resist specific diseases

### ACTIVE IMMUNITY

Antibodies produced in the person's body

#### Natural

Pathogens enter the body in a natural manner.

*e.g. catching a cold.*

#### Artificial

The pathogen is introduced into the body as a vaccine.

*e.g. being immunised or vaccinated for polio.*

### PASSIVE IMMUNITY

Antibodies from another organism enter the person's body

#### Natural

Antibodies enter a person in a natural manner.

*e.g. antibodies cross the placenta into the foetus.*

#### Artificial

Antibodies are injected into a person.

*e.g. anti-tetanus injections.*

# What is a species?

- ⦿ A group of individuals capable of interbreeding
  
- ⦿ So, what is speciation?
  - Formation of new species



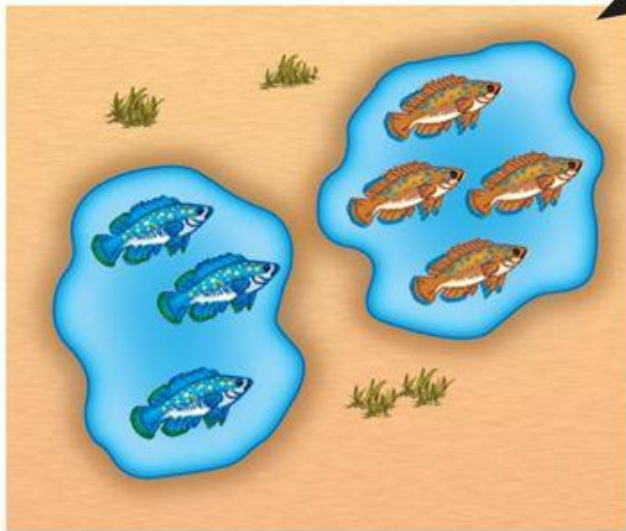
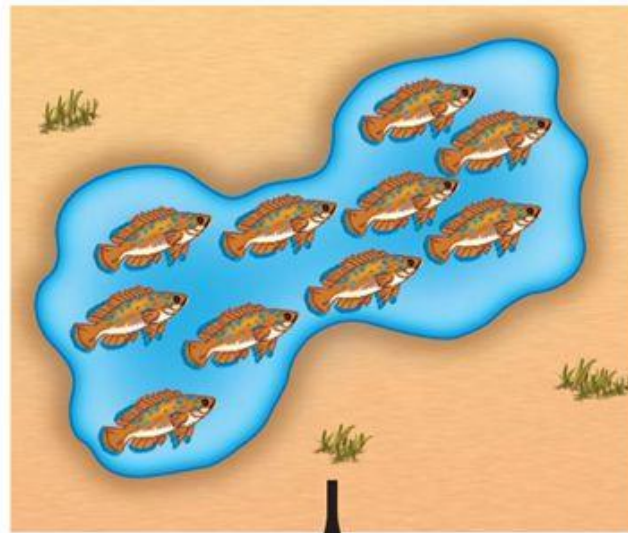
# How does speciation occur?

- Allopatric speciation – occurs when a population is divided by a geographic barrier i.e. geographic isolation
  - Barriers: mountains, rivers, etc.
- Sympatric speciation- without a geographic barrier

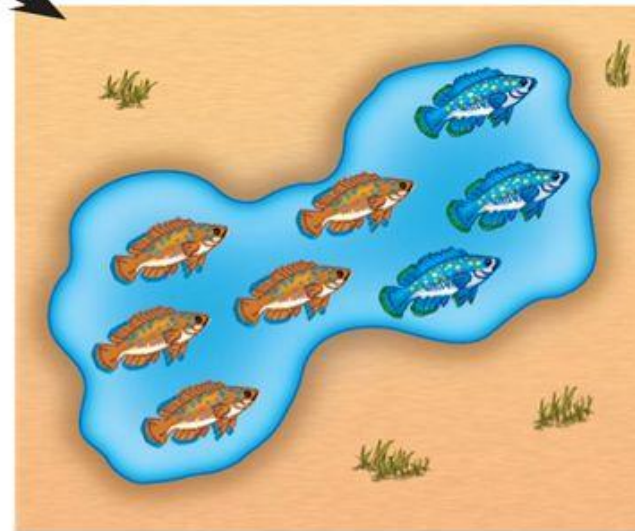
Fig. 24-5

Speciation can occur  
in two ways:

1. Allopatric  
Speciation
2. Sympatric  
Speciation



**(a) Allopatric speciation**



**(b) Sympatric speciation**

# Niche – role and position a species has in its environment

- ◎ New species have adapted to fill vacant niches in the environment
  - Includes:
    - What it eats (predator)
    - What eats it (prey)
    - Its habitat
    - What effect it has on other populations
    - What effect it has on the environment