CAIE Biology IGCSE

19 - Organisms and their Environment

Flashcards

What is the main source of energy in biological systems?

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The sun

Describe the flow of energy in biological systems

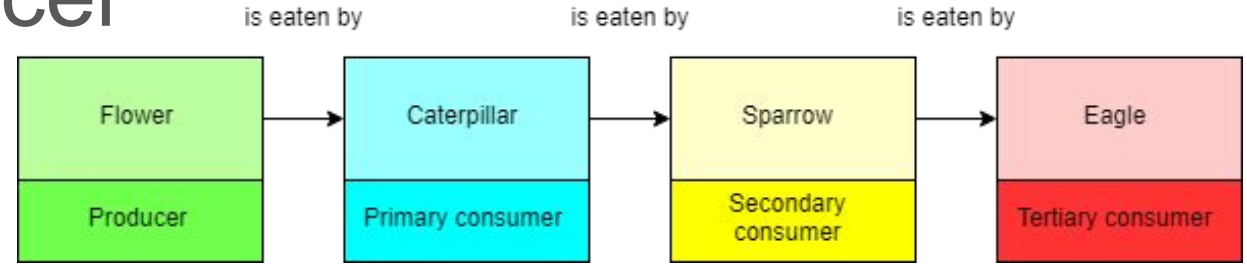
Describe the flow of energy in biological systems

- Light energy from the sun is trapped by photosynthetic organisms
- Energy is stored as chemical energy in organisms
- Energy is eventually lost to the environment

What is a food chain?

What is a food chain?

A way of showing the flow of energy between organisms starting with a producer



How is energy transferred between organisms in a food chain?

How is energy transferred between organisms in a food chain?

By ingestion (organisms eating other organisms)

What is a trophic level?

What is a trophic level?

The position that an organism holds in a food chain, food web, pyramid of numbers or pyramid of biomass

Why are biomass transfers not 100% efficient?

(Higher/Supplement)

Why are biomass transfers not 100% efficient? (Higher/Supplement)

Energy is lost through

- Egestion (removal of faeces)
- Excretion (removal of waste products e.g. urine)
- Respiration
- The production of inedible bones and shells

Why do food chains usually have fewer than 5 trophic levels? (Higher/Supplement)

Why do food chains usually have fewer than 5 trophic levels? (Higher/Supplement)

Biomass transfers are not 100% efficient and so there is often not enough energy to support 5 trophic levels

Why is it most efficient to supply plants as food for humans? (Higher/Supplement)

Why is it most efficient to supply plants as food for humans? (Higher/Supplement)

- Using the plants as food for livestock wastes energy as the biomass transfers are not 100% efficient
- Eating plant transfers can maximise the amount of energy gained as there is only one transfer

What is a food web?

What is a food web?

Multiple interconnected food chains

What is a producer?

What is a producer?

An organism that makes its own food (usually through photosynthesis)

What is a consumer?

What is a consumer?

An organism that gets its energy by eating other organisms

What is a primary consumer?

What is a primary consumer?

An organism that feeds on producers

What is a secondary consumer?

What is a secondary consumer?

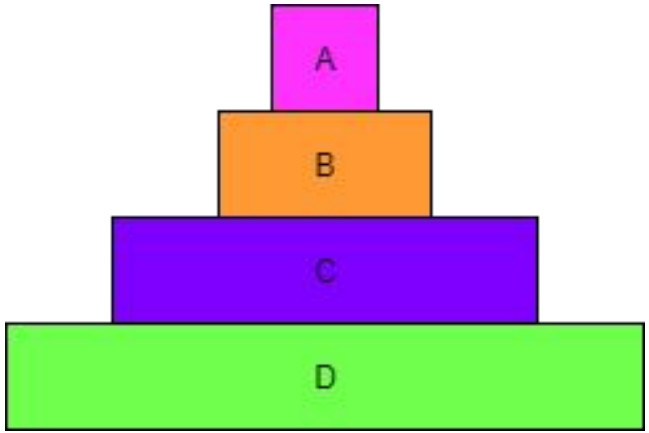
An organism that feeds on primary consumers

What is a tertiary consumer?

What is a tertiary consumer?

An organism that feeds on secondary consumers

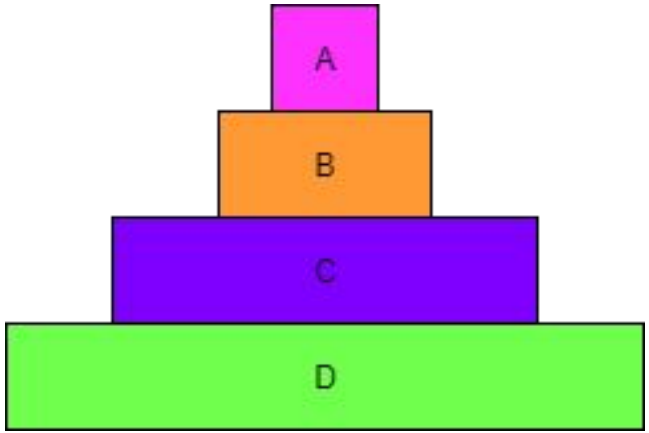
Identify the producer in this pyramid of biomass



Identify the producer in this pyramid of biomass

D is the producer

Identify the secondary consumer in this pyramid of biomass



Identify the secondary consumer in this pyramid of biomass

B is the secondary consumer

What are herbivores?

What are herbivores?

Herbivores are animals that only eat plants

What are carnivores?

What are carnivores?

Organisms that only eat animals

What are decomposers?

What are decomposers?

Organisms that break down dead matter

Identify the producer in the following food chain

Identify the producer in the following food chain

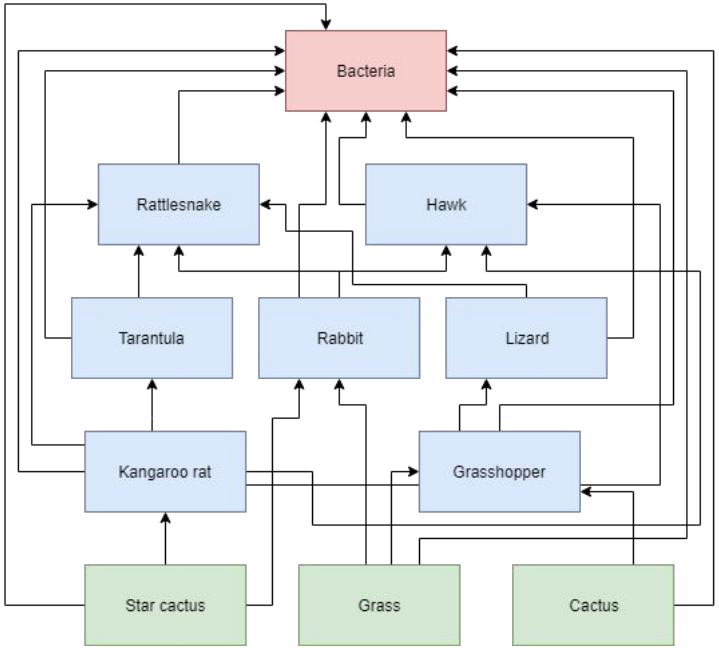
The grass

Identify one consumer in this food chain

Identify one consumer in this food chain

The grasshopper, frog, snake or hawk

Identify the 3 producers in this food web

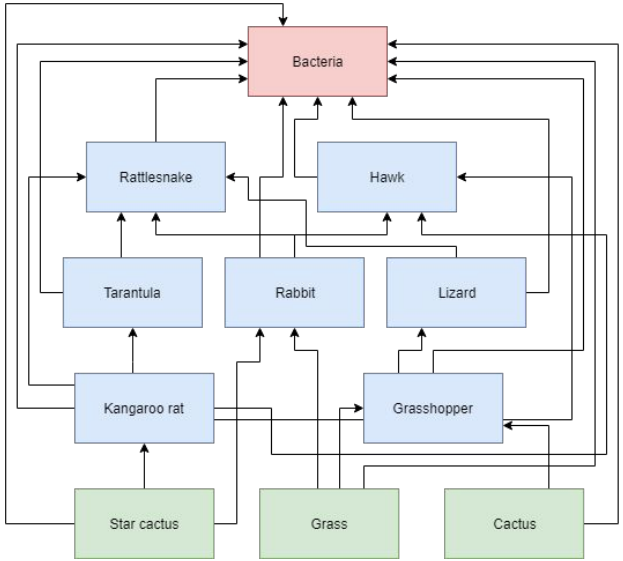


Identify the 3 producers in this food web

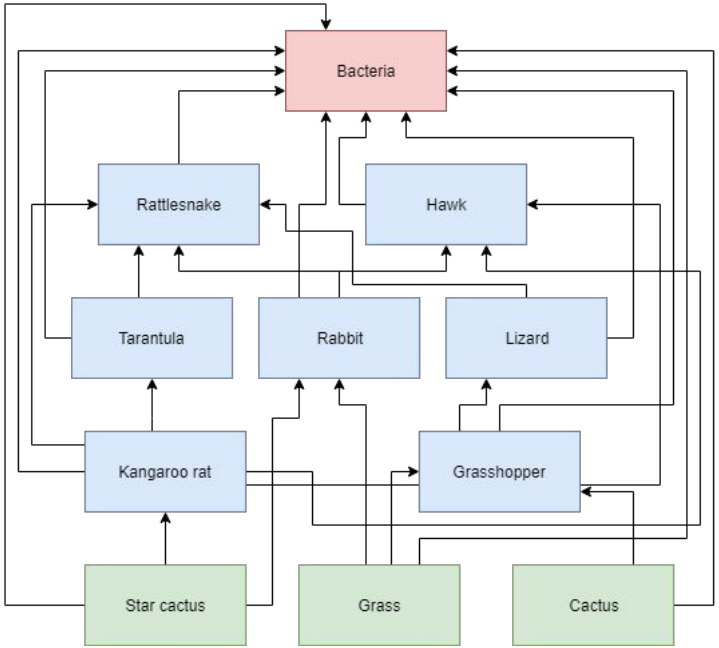
Grass

Star cactus

Cactus

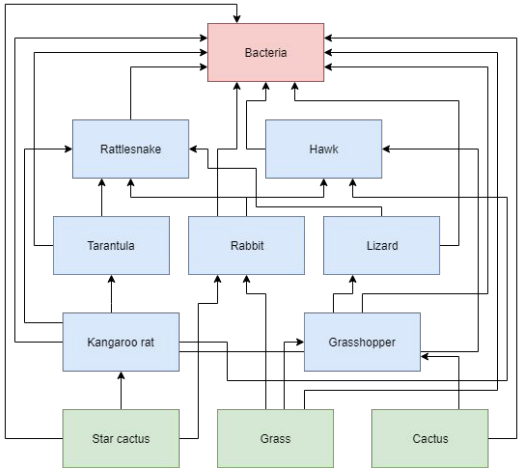


Identify one consumer in this food web



Identify one consumer in this food web

Anything in a blue rectangle (rattlesnake, hawk, tarantula, rabbit, lizard, kangaroo rat, grasshopper)



Explain the impact humans have on food chains and webs by overharvesting certain species

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Many organisms rely on other organisms for food, overharvesting can reduce the amount of food available for other animals

Explain the impact humans have on food chains and webs by introducing other species into a habitat

Explain the impact humans have on food chains and webs by introducing other species into a habitat

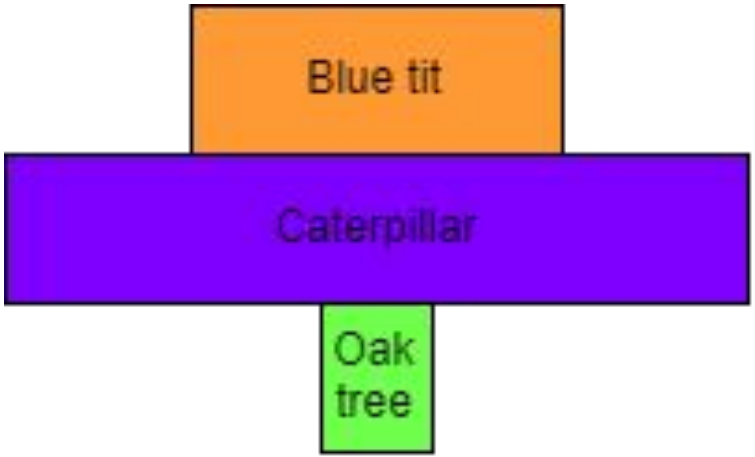
Introducing new organisms increases competition and can interfere with the food chain, causing organisms who cannot compete to die

What is a pyramid of numbers?

What is a pyramid of numbers?

A pyramid of numbers shows the number of organisms at each trophic level

Why is this pyramid of numbers not pyramid shaped?



Why is this pyramid of numbers not pyramid shaped?

Pyramids of numbers don't take size and mass of organisms into account

What is a pyramid of biomass?

What is a pyramid of biomass?

A pyramid that shows the total dry mass of organisms at each trophic level

Why is a pyramid of biomass a better way of representing a food chain than a pyramid of numbers?

Why is a pyramid of biomass a better way of representing a food chain than a pyramid of numbers?

Pyramids of biomass take into account the size of the organisms and are less easily misinterpreted

What is a pyramid of energy?(Higher/supplement)

What is a pyramid of energy?(Higher/supplement)

- They show the amount of energy within the biomass of organisms at each trophic level.
- There is a decrease in energy as it moves up the **trophic levels**.

Why is a pyramid of energy a better way of representing a food chain than a pyramid of numbers/biomass? (Higher/supplement)

Why is a pyramid of energy a better way of representing a food chain than a pyramid of numbers/ biomass?(Higher/supplement)

Pyramids of energy are the best at illustrating the efficiency of energy transfer between trophic levels.

Describe the carbon cycle

Describe the carbon cycle

- Plants fix carbon dioxide into organic molecules during photosynthesis
- The organic carbon-containing molecules are passed onto organisms that eat the plants
- Carbon dioxide is released back into the atmosphere by respiration from animals and plants
- Burning fossil fuels also releases carbon dioxide into the atmosphere

State the effect of burning fossil fuels on carbon dioxide concentration in the environment

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Burning fossil fuels releases more carbon dioxide into the atmosphere, increasing the concentration of CO_2

State the effect of deforestation on carbon dioxide concentration in the environment

State the effect of deforestation on carbon dioxide concentration in the environment

- Trees take in carbon dioxide during photosynthesis (decreasing the atmospheric carbon dioxide concentration)
- Cutting down trees prevents this and so the atmospheric carbon dioxide concentration does not decrease

Briefly describe how nitrogen is cycled through an ecosystem (Higher/Supplement)

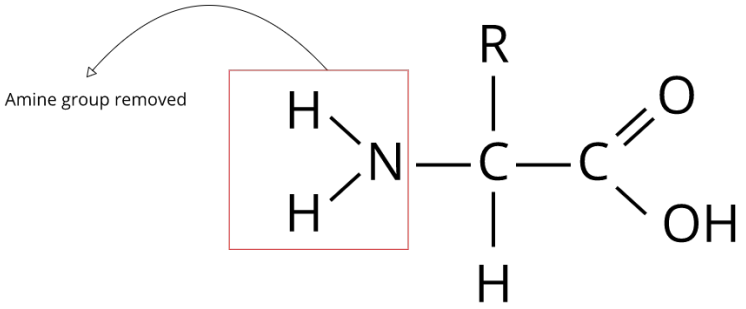
Briefly describe how nitrogen is cycled through an ecosystem (Higher/Supplement)

- Nitrogen is fixed by lightning and bacteria
- Decomposers break dead matter down into ammonium ions
- Nitrifying bacteria convert ammonia into nitrites and nitrates
- Plants absorb nitrate ions
- Denitrifying bacteria release nitrogen back to the atmosphere

What is deamination? (Higher/Supplement)

What is deamination? (Higher/Supplement)

The removal of the amine group in an amino acid



State 4 roles of bacteria in the nitrogen cycle (Higher/Supplement)

State 4 roles of bacteria in the nitrogen cycle (Higher/Supplement)

- Decomposition
- Nitrification
- Denitrification
- Nitrogen fixation

Define population

Define population

A group of organisms of one species, living in the same area, at the same time

Define community

Define community

All of the populations of different species in an ecosystem

Define ecosystem

Define ecosystem

A system in a specific area which contains the community of organisms and their environment, interacting together.

State 3 factors that affect population growth rates

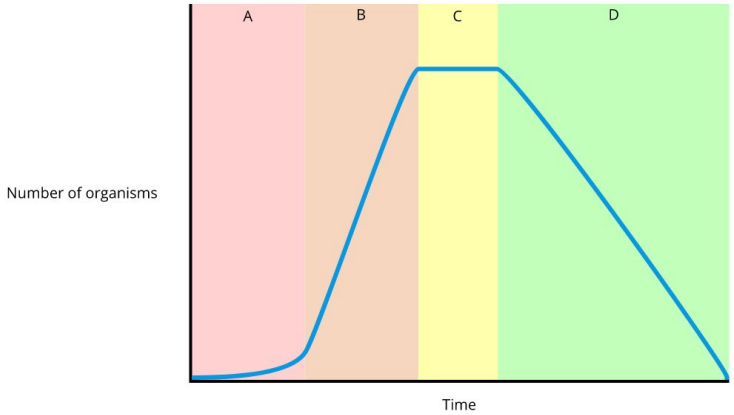
State 3 factors that affect population growth rates

Disease

Predation

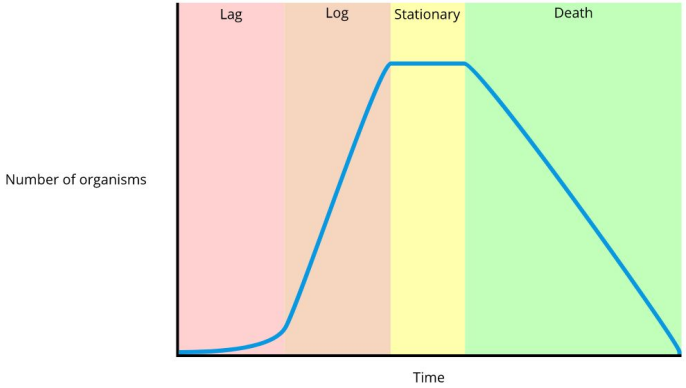
Availability of food

Name the sections of this chart showing population growth in an environment with limited resources

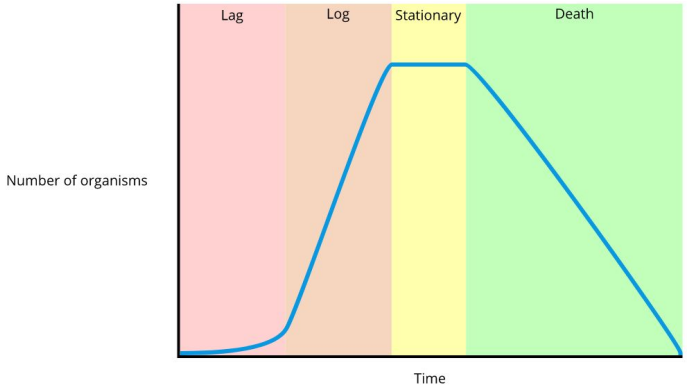


Name the sections of this chart showing population growth in an environment with limited resources

A	Lag phase
B	Exponential / log phase
C	Stationary phase
D	Death phase



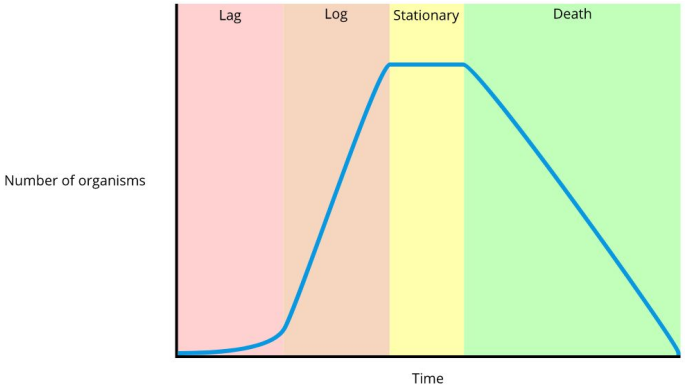
Describe the lag phase in population growth (Higher/Supplement)



Describe the lag phase in population growth (Higher/Supplement)

The organisms are adjusting to their environment

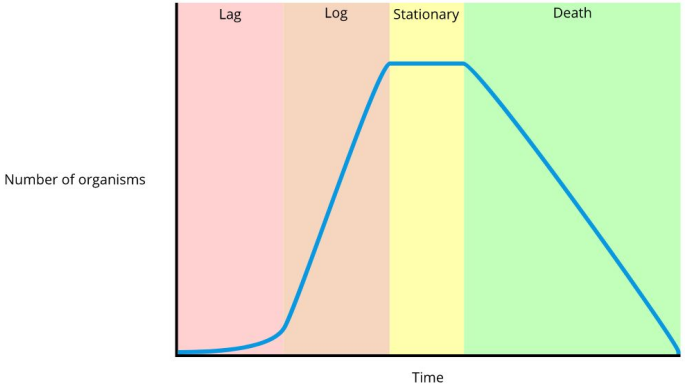
Describe the log phase in population growth (Higher/Supplement)



Describe the log phase in population growth (Higher/Supplement)

The growth of the population is increasing at a fast (exponential) rate. Organisms grow under optimum conditions with plentiful resources. There are no limiting factors.

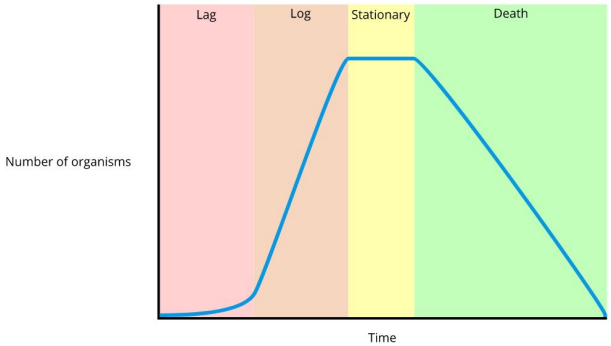
Describe the stationary phase in population growth (Higher/Supplement)



Describe the stationary phase in population growth (Higher/Supplement)

The amount of births and deaths are equal. The amount of resources becomes a limiting factor, causing the rate of reproduction to slow.

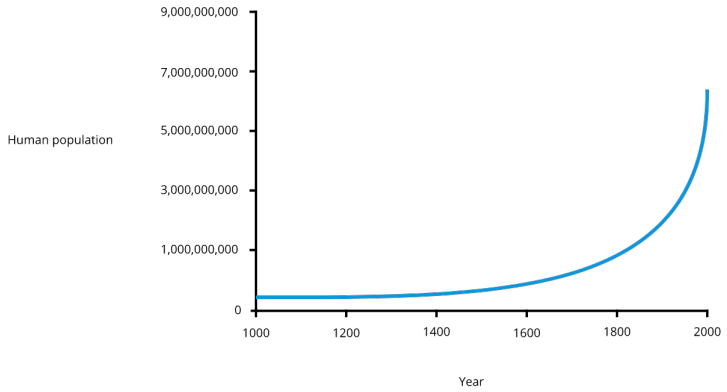
Describe the death phase in population growth in an environment with limited resources (Higher/Supplement)



Describe the death phase in population growth (Higher/Supplement)

Once the resources begin to be used up, organisms begin to compete for resources and organisms will die as resources become scarce

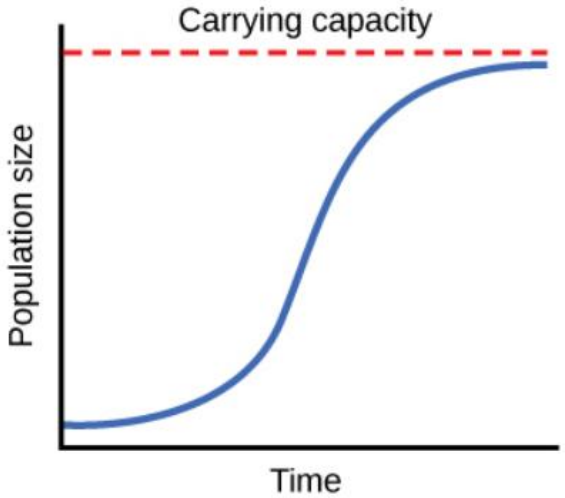
Describe the shape of the following graph showing human population growth



Describe the shape of the following graph showing human population growth

- The shape of the graph is an upwards exponential curve
- This shows that the population size is increasing more and more rapidly

Describe the shape of the following graph showing human population growth



Describe the shape of the following graph showing human population growth

- The shape of the graph is sigmoidal.
- The population size levels off at carrying capacity.
- Carrying capacity is the maximum population size that an environment can support.