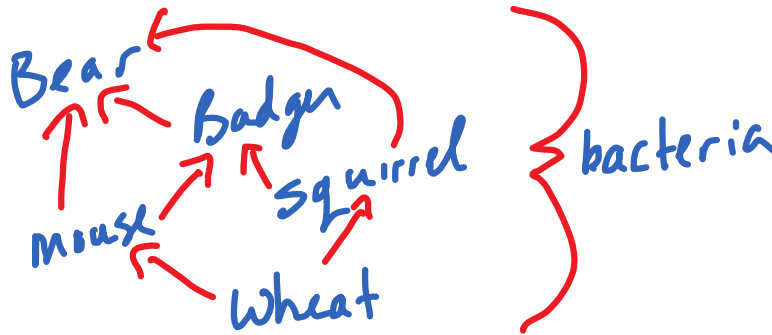


1. Define the following terms. Give an example where appropriate:
 - a. Ecosystem – An area consisting of living organisms and their physical environment
 - b. Habitat - the place where an organism lives (ex. meadow)
 - c. Niche- the function or job of an organism in an ecosystem (ex. Decomposer)
 - d. Autotroph – produces its own food (plants)
 - e. Heterotroph - feeds on others (animals)
 - f. Herbivore – eats only plants (moose)
 - g. Omnivore - eats both plants and animals (chickens)
 - h. Carnivore – Meat eater (wolf)

2. Draw a simple food web using the following species. Label the producer, primary consumer, secondary consumer, tertiary consumer and decomposer.

Wheat, bear, mouse, badger, bacteria, squirrel



Wheat – producer
Mouse – Primary Consumer
Squirrel – Primary Consumer
Badger – Secondary Consumer
Bacteria – Decomposer
Bear – Tertiary Consumer

3. Give an example of each of the following from your food web in #2:
 - a. Herbivore - Mouse
 - b. Omnivore - Bear
 - c. Carnivore - bear

4. Draw an example of one food chain from your food web in #2.

Wheat → Mouse → Badger → Bear

5. Explain the following ecological pyramids:

a. Pyramid of energy

Shows the amount of energy transferred from Level to level. Lots of energy at the bottom, less at the top (only 10% is transferred)

b. Pyramid of biomass

Shows the relative abundance of each trophic level. Very large amount of biomass at the bottom (lots of producers, but very few higher consumers). Doesn't follow the 10% rule.

6. Define and give 2 examples of the following:

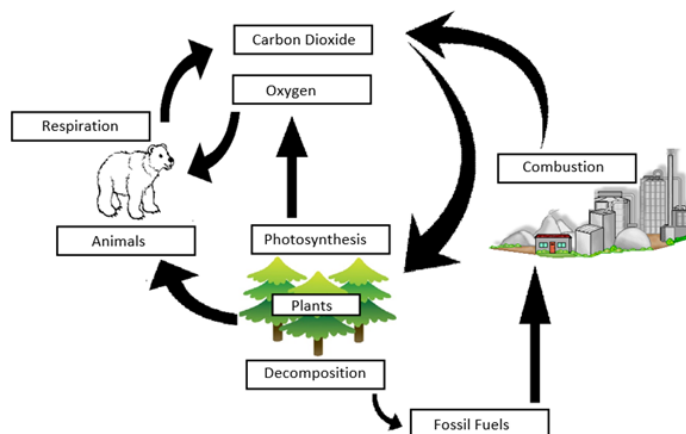
a. Abiotic Factors

Non-living parts of an ecosystem (air, water, soil, weather, temp, sunlight, etc.)

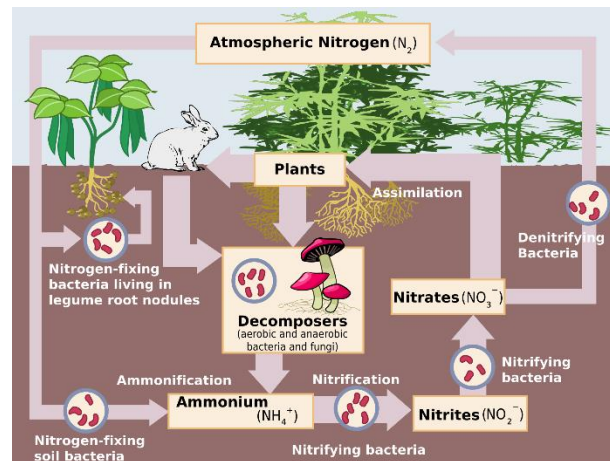
b. Biotic Factors

Living parts of the ecosystem (all the plants and animals)

7. Explain how carbon dioxide and oxygen are cycled through an ecosystem. Be sure to include the following terms: Photosynthesis, cellular respiration, decomposition.



8. Explain how nitrogen is cycled through an ecosystem. Be sure to include the following terms: nitrogen fixation, denitrification, bacteria, decomposition, ammonia, nitrates.



9. Describe 2 ways the carbon cycle. these disruptions?

- a. Combustion of fossil fuels
- b. deforestation

Effects: increase in $CO_2 \rightarrow$ leads to higher atmospheric temps \rightarrow climate change

that humans disrupt
What are the effects of

10. Describe 2 ways that humans disrupt the Nitrogen cycle. What are the effects of these disruptions?

- a. Use of Fertilizers
- b. Sewage (human/animal waste)

Effects: Increased nitrogen levels in lakes \rightarrow algae blooms

11. Describe bioaccumulation using an example, and explain its impact on consumers.

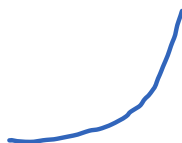
Perigrine Falcon – DDT was sprayed on wheat crops to control insects. The DDT is absorbed and stored in the wheat. Primary consumers feed on wheat, but need to eat a large amount, as they only get 10% of the energy, but in doing so they get 100% of the stored DDT. This process continues up the food chain, with the DDT levels rising (accumulating) in each level. The falcons are at the top of the chain, so they get the most DDT

12. Define and give examples of the following:

- a. Biodegradable – Breaks down over time (food wastes)
- b. Non-Biodegradable – Does not break down (plastics)

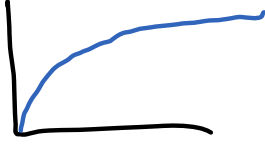
13. Sketch a:

- a. Exponential population growth curve





b. Logistic population growth curve



c. Carrying capacity curve

14. Describe the carrying capacity of an ecosystem. Give four factors that will keep a population at (or around) its carrying capacity.

The maximum population that an ecosystem can sustain.

Factors – Competition, Stress, Predation, Disease, Natural Disasters, Human activity

15. Define and give an example of the following:

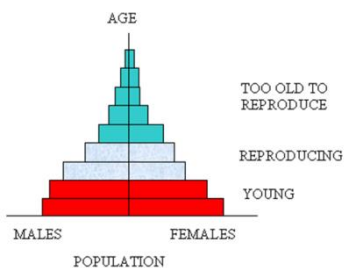
a. Density dependant factors

Factors that limit a population when it is large (dense).
Ex) Competition, stress, disease, predation, etc.

b. Density-independent factors

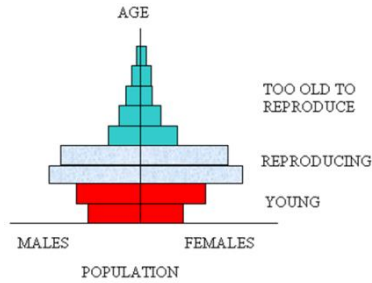
Factors that limit a population regardless of its size.
Ex) natural events (weather, fires), human activity (deforestation, pollution)

16. Given the following histograms, state whether the population will increase, decrease or stay constant. Explain your choice.



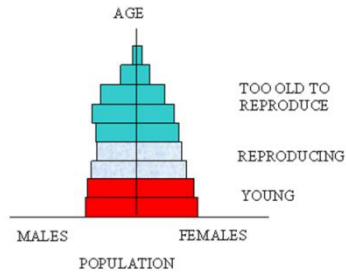
a.

Increase



b.

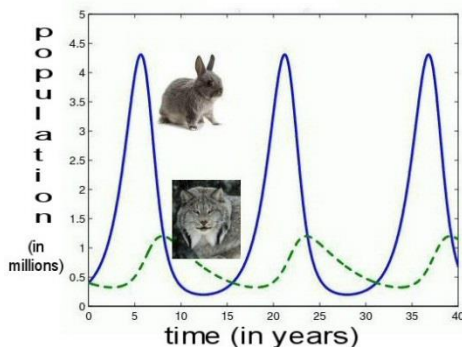
Decrease



c.

Stay the same

17. Given the following predator-prey graph, explain the pattern and how the two population sizes are related.



Rabbit population rises at the start, because there are few lynx to eat them. As there are more rabbits to eat, the lynx population rises.

As the lynx population rises, more rabbits are eaten, so their population goes down. Subsequently, the lynx population will fall as there are less rabbits to eat. The cycle keeps repeating.

18. Define biodiversity. Explain how the biodiversity of an ecosystem contributes to its sustainability.

The more biodiverse, the more organisms in the ecosystem. The system will be better able to bounce back from a loss of one of the organisms in the food web, as there are many organisms at each level.

19. The population of walleye in a small lake was determined to be 5,000. Over the course of the year, 525 walleye are born, and 700 are caught or eaten. 130 immigrate from the next lake, and 150 leave to go downstream.

a. Determine the population growth.

$$\begin{aligned}
 PG &= (B+I) - (D+E) \\
 &= (525+130) - (700+150) \\
 &= 655 - 850 \\
 &= -195
 \end{aligned}$$

b. What would be the new population?

$$5000 - 195 = 4805$$

20. Define the following terms:

- a. Extinct – species is no longer found on earth
- b. Endangered – Close to extinction in a very large region
- c. Threatened - Close to being endangered if changes are not made
- d. Extirpated – No longer exists in its regular habitat, but is still found in other areas.

21. What is an invasive species, and why can they be bad for an ecosystem?

A species that is not native to an ecosystem (was introduced). There are typically no predators to control the population, so the invasive species tends to take over and “choke out” the native species by stealing their resources.