

Biome Choices for the kids to choose from

Biomes



- **Biome** = geographical area characterized by specific kinds of plants and animals
- Major types are:
 1. Desert
 2. Grassland
 3. Savanna
 4. Taiga
 5. Temperate deciduous forest
 6. Tropical rain forest
 7. Tundra

ECOLOGY



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Place the terms in order from smallest to largest
(at the bottom of the page)

Ecosystem
Community

Organelle

Tissue

Biosphere
Macromolecules

Organ

Molecules

Cell

Organ System

Species/Individual

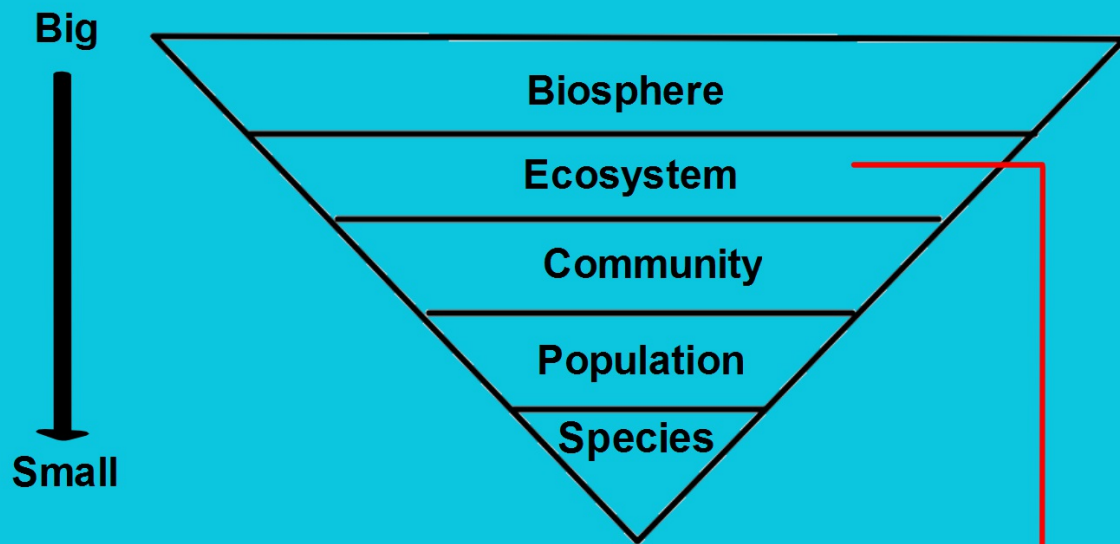
Population
Atoms

Inquiry:

Put an L next to all of the things you think are living and an N next to the things you think are nonliving:

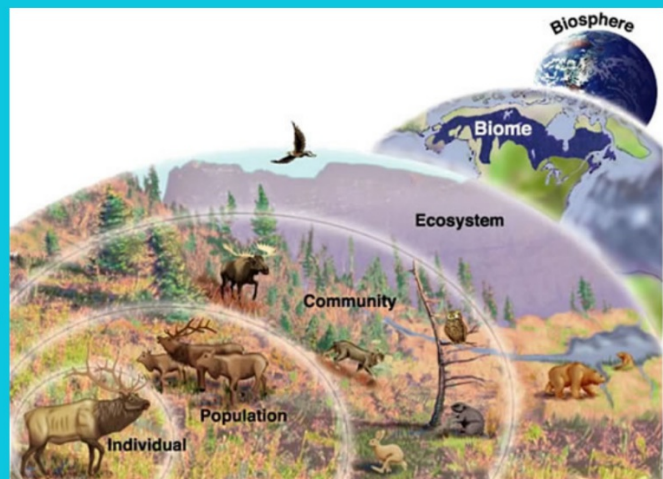
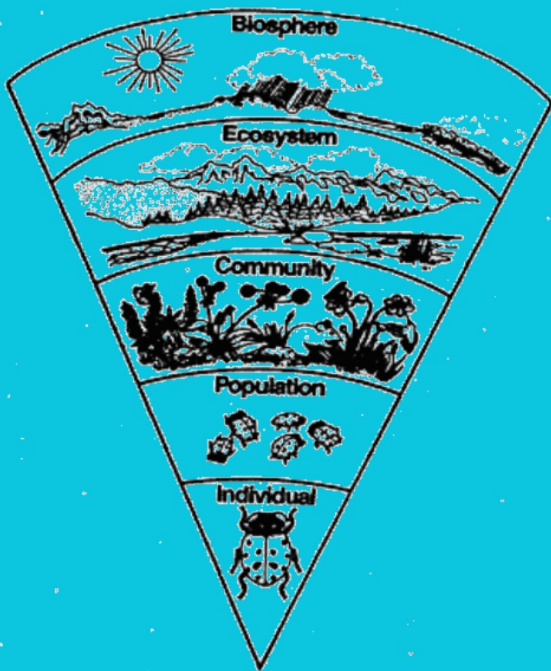
- | | | |
|-----------------------------------|--------------------------------------|-----------------------------------|
| <input type="checkbox"/> Plant | <input type="checkbox"/> Human | <input type="checkbox"/> Water |
| <input type="checkbox"/> Sunlight | <input type="checkbox"/> Flower | <input type="checkbox"/> Minerals |
| <input type="checkbox"/> Wind | <input type="checkbox"/> Yeast | <input type="checkbox"/> Rock |
| <input type="checkbox"/> Frog | <input type="checkbox"/> Bird | <input type="checkbox"/> Rain |
| <input type="checkbox"/> Mold | <input type="checkbox"/> Temperature | <input type="checkbox"/> Bacteria |
| <input type="checkbox"/> Oxygen | <input type="checkbox"/> Humidity | <input type="checkbox"/> Fire |

Levels of Organization



***First level to include both abiotic and biotic factors!**

Levels of Biological Organization: Ecology Emphasis



Limiting Factors

Abiotic = Parts of an ecosystem that are not alive.

Ex: Rocks, Soil, Sun

Biotic= Parts of the ecosystem that are living.

Ex: Birds, Bacteria, Fish



Name 2 biotic factors:

Name 2 abiotic factors:

What is a LIMITING FACTOR'

- Limits the _____ of a population and prevents it from growing _____
- They can be _____ and _____.

Relationships

Biotic (Living) factors in an ecosystem interact in 2 major ways:

1) Symbiotic relationships: two organisms depend on each other.

A) Mutualism -both organisms benefit

Ex: Bee and flower, bacteria and human gut

B) Parasitism- one organism benefits and one is harmed.

Ex: tapeworm and pig, flea or tick and dog



Key to Symbiotic Relationships:

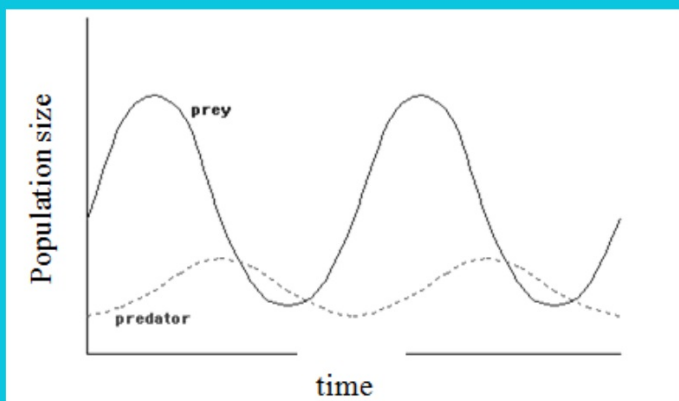
☺ = Positive Benefit

☹ = Negative



2) Feeding relationships:

A. Predator-Prey: Organism hunts and kills another for food (aka predation).



Explanation:

As the _____ increases, so does the _____.

When the _____ decreases, so does the _____.

C) Scavenger: Organism eats the remains of a dead animal after another has already killed it.

D) Feeding:

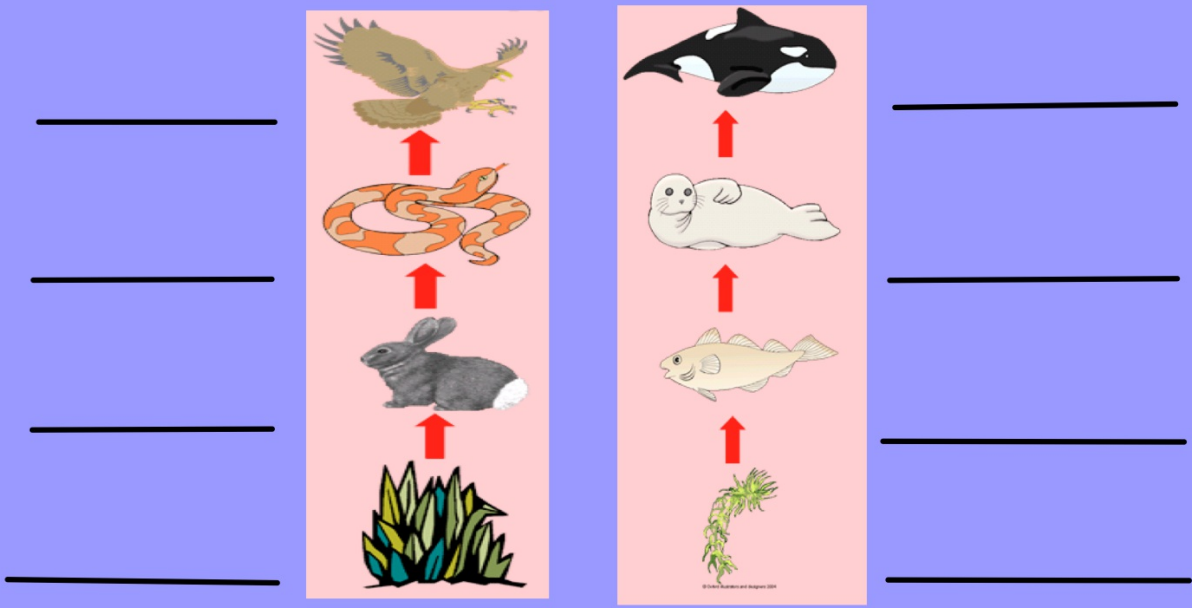
- **Carnivore: eats only meat.**
- **Herbivore: eats only plants.**
- **Omnivore: eats both plants and animals**
- **Decomposer: eats _____ and _____ matter (returns it to the soil)**



Food Chains and Energy Pyramids

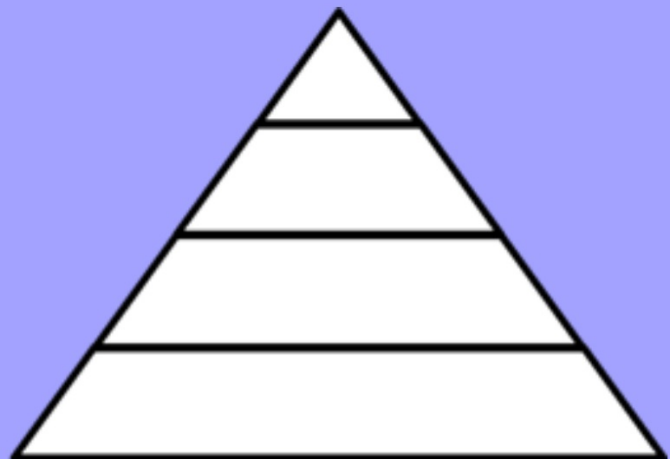
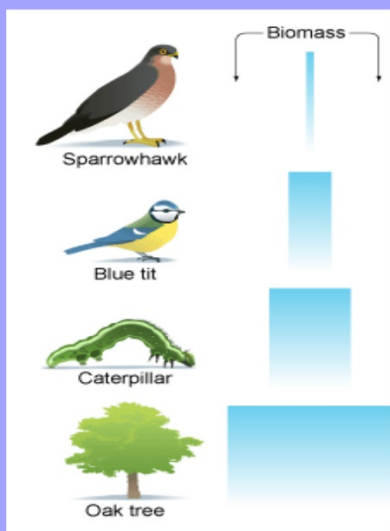
-food chains/webs-show who eats whom!

- The arrow points _____ the organism that does the eating
- Each level= _____ level
- Arrows show _____ flow



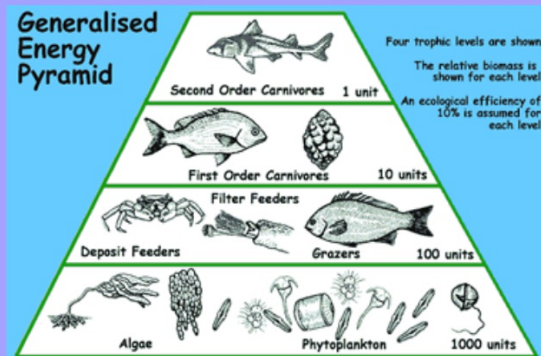
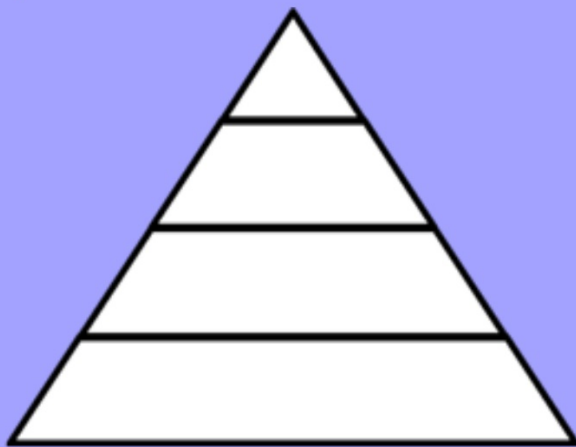
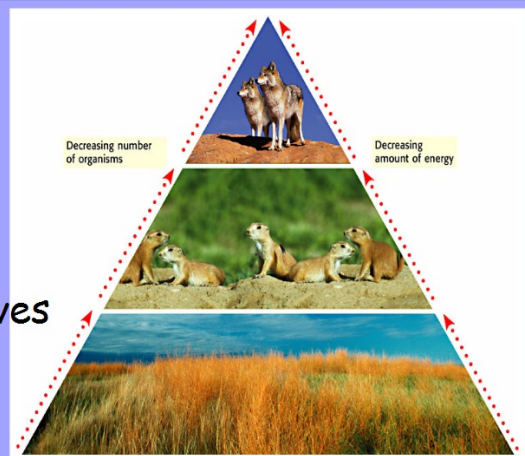
Number of Organisms: Biomass

- Shows how many at each level
- Should always be _____ producers than consumers
- Only ____% passed on to the next trophic level



Movement of Energy: The Energy Pyramid

- The _____ is the source of all energy
- Energy must be _____ put into an ecosystem
- Energy does not _____
- _____% is lost as _____ as it moves up a food web



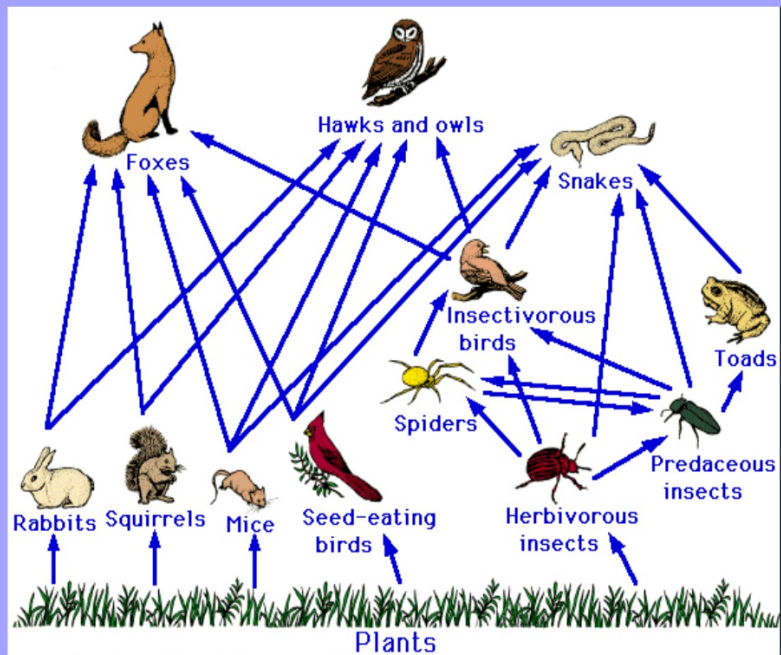
Food webs: Using the food web below, identify the following organisms

1. Producers/autotrophs:

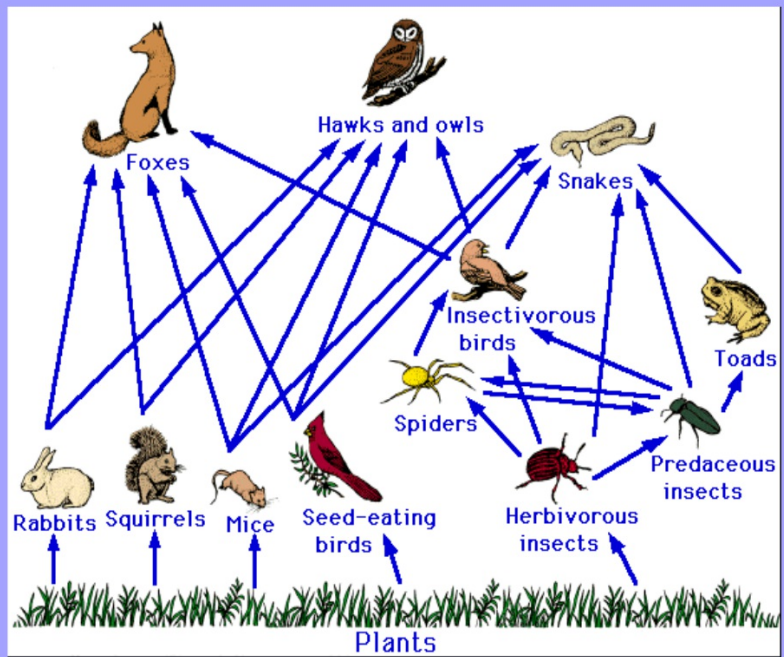
2. Primary consumers:

3. Secondary consumers:

4. Tertiary consumers:

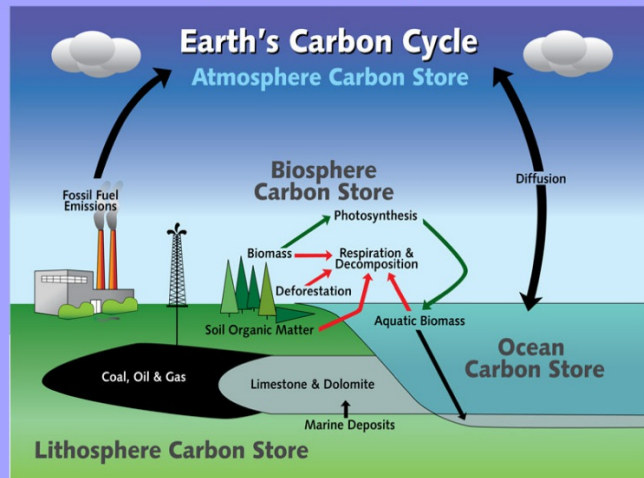
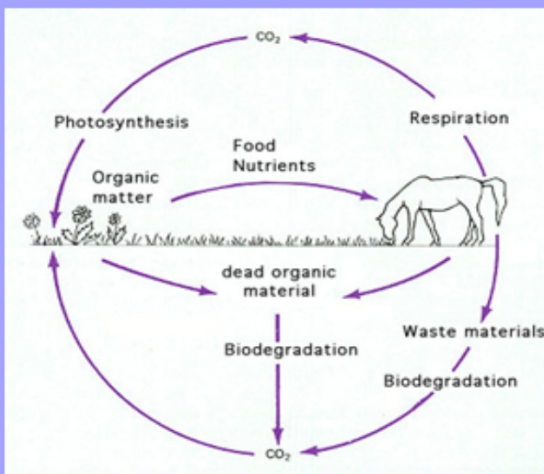


Food webs: Using the food web below, identify the following organisms



Movement of Matter--The Carbon Cycle:

- Carbon comes in _____ and _____
- Plants use _____ (gas) and turn it into _____ (solid) in _____
- Animals eat _____ and turn it into _____ gas in _____
- Matter is _____!
- Humans interrupt the carbon cycle by burning _____. This can lead to the _____ Effect and _____



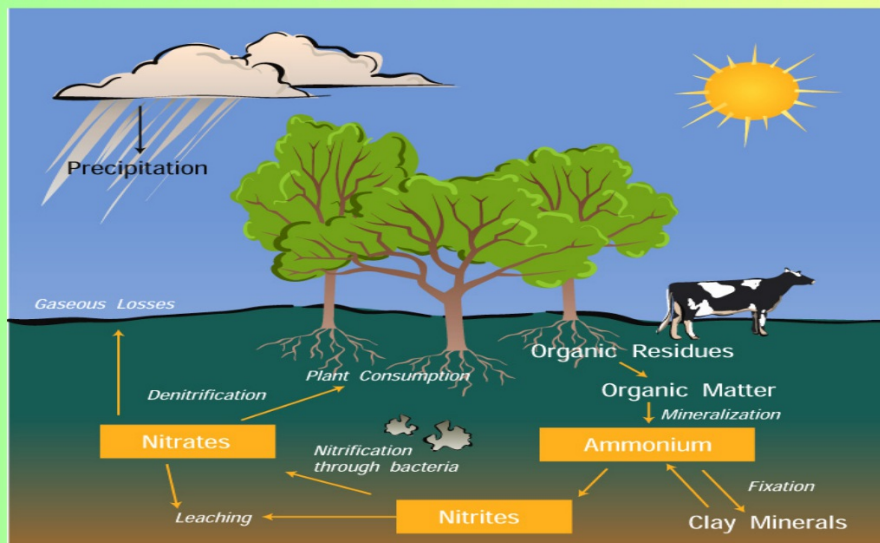
The Nitrogen Cycle:

- Nitrogen is used to build _____ and _____
- It can be found in the _____, but cannot be used by organisms in this form
- _____ can fix the nitrogen from the atmosphere and turn it into a form that can be used by plants.
- Animals eat the plants as a source of _____ to build proteins
- Decomposers such as _____ and _____ break down dead organisms and return nitrogen to the _____.

Key terms for nitrogen cycle!

nitrogen fixation: process by which bacteria attached to the roots of plants (aka. legumes: beans, etc) fix nitrogen compounds into usable forms for plants to take up.

denitrification: process by which decomposers convert nitrogen in the soil to nitrogen gas to release back into the air.



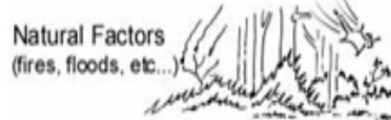
Population Growth: Several factors limit population growth.

Density-independent

limiting factor: Affects all populations in similar ways, regardless of the population size. Usually abiotic.

(Size _____ matter)

Examples:



Density- dependent

limiting factor: DEPENDS on the population size.

Affects the population if the population _____, or number of organisms, reaches a certain level.

Usually biotic.

(Size matters)

Examples:

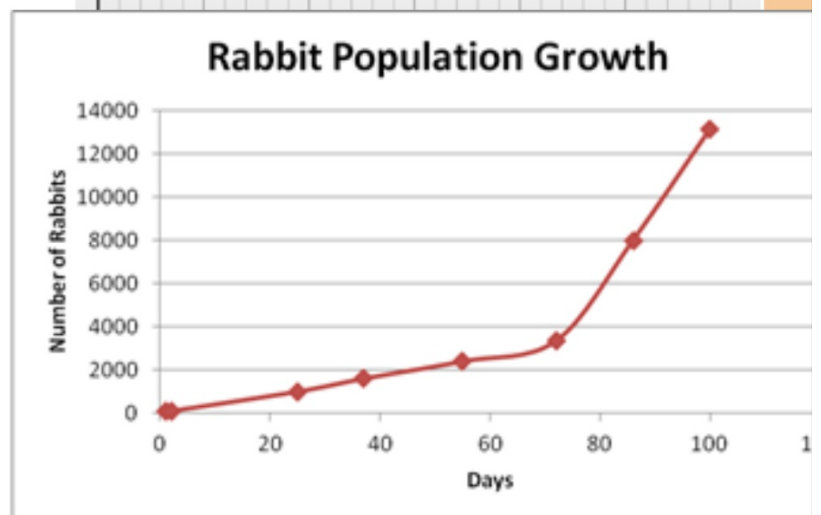
Population Growth can follow one of two patterns:

Exponential Growth = _____ Curve	Logistic Growth = _____ Curve
Grows at a fast, _____ rate	Levels off due to _____ factors <ul style="list-style-type: none">• Reaches _____ capacity= largest # of organisms the ecosystem can support

Directions: Represent the following tables as graphs so you can analyze the information. Then, using your knowledge about population growth and limiting factors, interpret the graphs and explain the relationships you see. Be sure to label your axes and title your graphs, including all necessary information! All questions must be answered in **complete sentences**.

Data Set 1: Rabbit Population Growth

Generations	Number of Rabbits
1	100
2	105
25	1000
37	1600
55	2400
72	3350
86	8000
100	13150

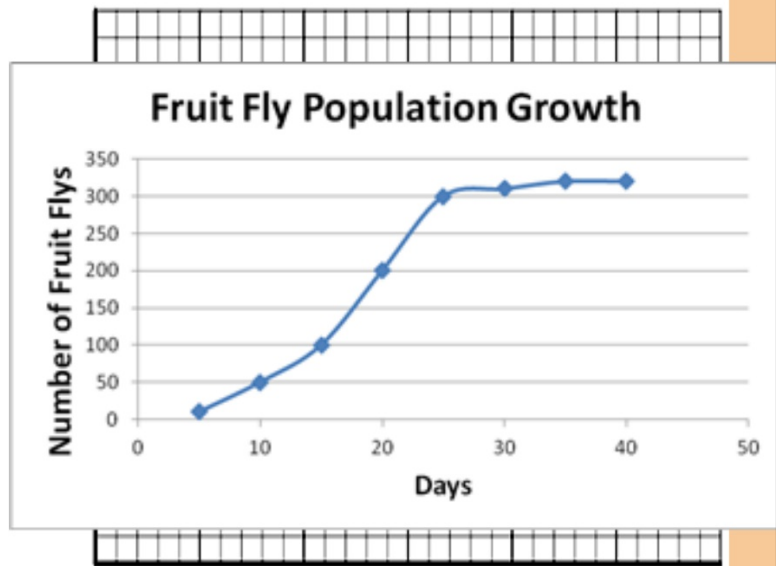


Analysis Questions: *Answer in complete sentences!*

1. Discuss the results of your graph. What trends do you see?
2. What type of growth is exhibited by this population? How can you tell?
3. Did this population reach carrying capacity? Why or why not? If so, indicate WHEN the population reaches carrying capacity and indicate the maximum number of individuals that can be supported.
4. What factors are responsible for this type of growth pattern?
5. If predators like foxes and cats, which often prey on rabbits, were introduced into this environment during the 10th generation, what would happen to the population growth? Explain AND sketch your answer below:

Data Set 2: Fruit Fly Population Growth

Fruit Fly Population Growth	
Days	Number of Fruit Flies
5	10
10	50
15	100
20	200
25	300
30	310
35	320
40	320



Analysis Questions: *Answer in complete sentences!*


1. Discuss the results of your graph. What trends do you see?
2. What type of growth is exhibited by this population? How can you tell?
3. Did this population reach carrying capacity? Why or why not? If so, indicate WHEN the population reaches carrying capacity and indicate the maximum number of individuals that can be supported.
4. What factors are responsible for this type of growth pattern?
5. What factors would allow this population to exhibit the other type of growth pattern (hint: what things need to be present in the environment?)

Human Population Growth

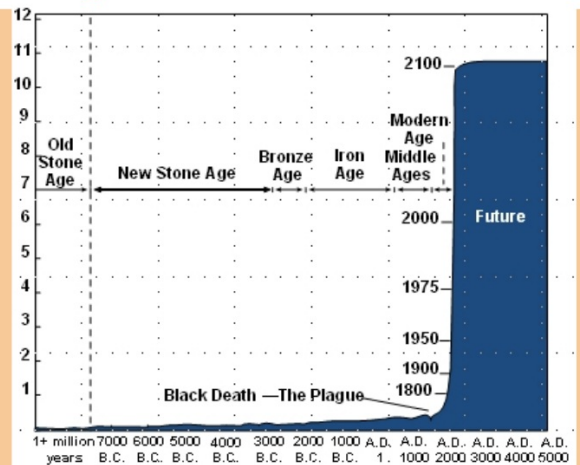
-Currently exponentially growth, but can't do that forever
 -We underwent an industrial revolution: Throughout history we've had ↓ birth rates and ↑ death rates, so populations remained steady. With advances in medicine, nutrition, and sanitation, we now have lower death rates so the world population is growing rapidly.

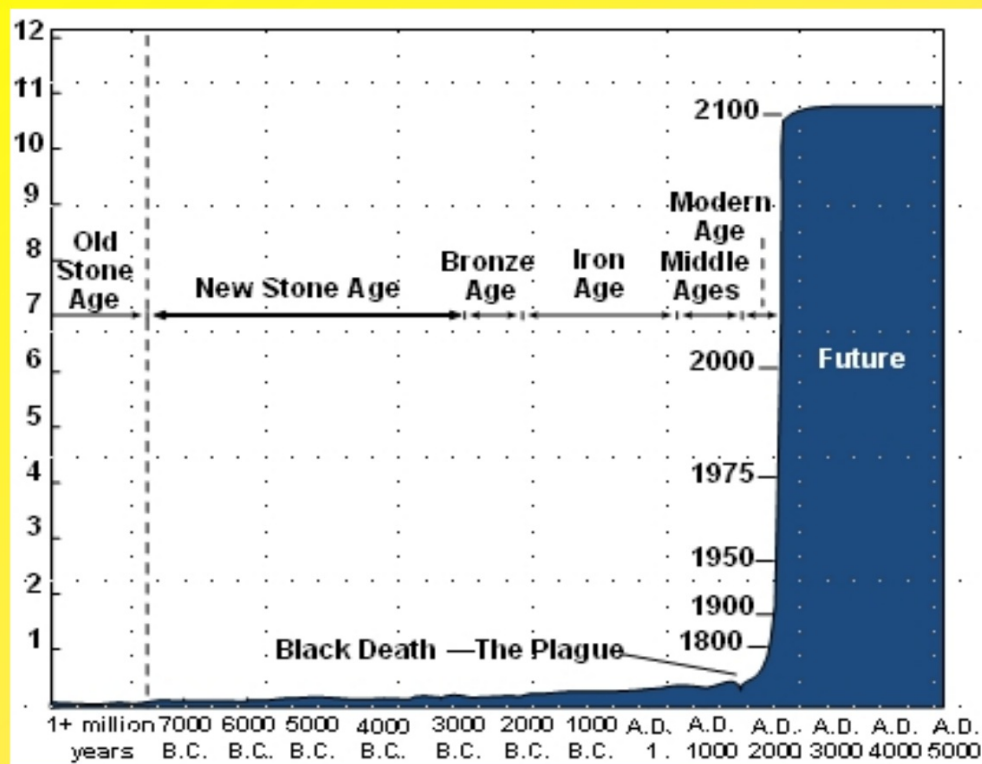
Four things can affect the size of a population:

1. Number of births
2. Number of deaths
3. Infant Mortality (# babies that die)
4. Number who enter (immigration) or leave (emigration) the population

 npr Human population growth

 Human history in numbers





Age Structure Diagrams:

Used to show how many people there are and if the population is \uparrow or \downarrow or stable.

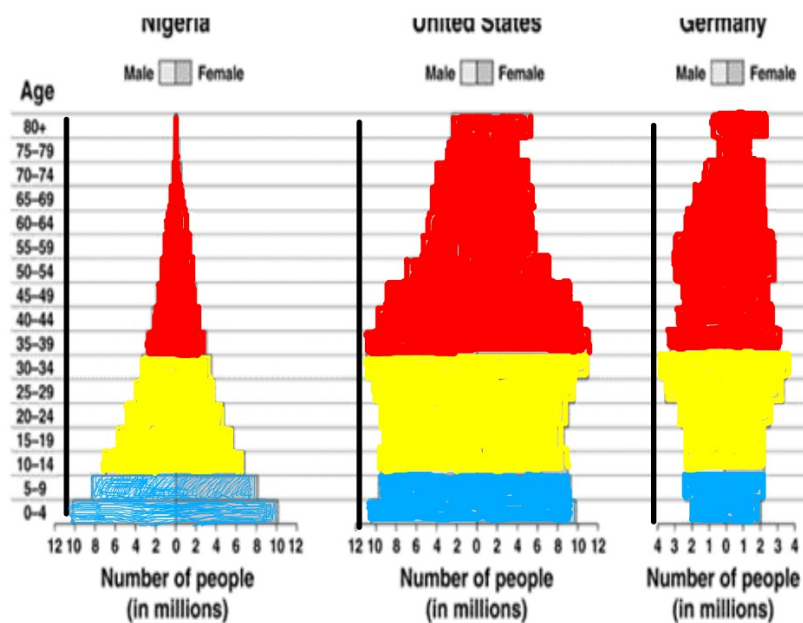
if the diagram shows:

- a **pyramid** shape, then one can expect a rapid

increase in population.

- a **straight up and down** shape except for the older age groups, the population is stable.

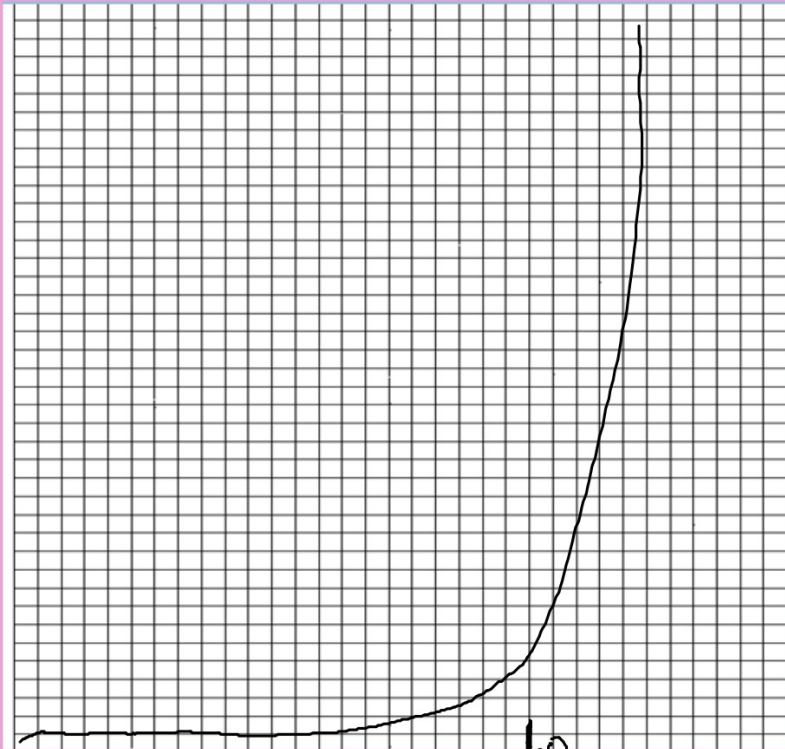
- a **top-heavy** shape, then a decrease is forecast for that population.



1. In which country will there be a population explosion? _____
2. In which country will there be a decrease in population? _____
3. In which country is the population relatively stable? _____

Statistics on Human Population

Year A.D.	Number of People (in billions)
1650	.50
1750	.70
1850	1.0
1925	2.0
1956	2.5
1966	3.3
1970	3.6
1974	3.9
1976	4.0
1980	4.4
1991	5.5
2000	6.0
2004	6.4



1850

Statistics on Human Population

Year A.D.	Number of People (in billions)
1650	.50
1750	.70
1850	1.0
1925	2.0
1956	2.5
1966	3.3
1970	3.6
1974	3.9
1976	4.0
1980	4.4
1991	5.5
2000	6.0
2004	6.4

Instructions for creating your graph.

Place time on the horizontal axis. Values should range from 1650 to 2020.

Place number of people on the vertical axis.

Values should range from 0 to 10 billion.

Make sure that you have the correct labels for the X and Y axis and a title for your graph.

Analysis

1. Based on your graph, in what year will the population reach 8 billion? _____

2. Based on your graph, how many years will it take for the population of 2004 to double?

Earth's Carrying Capacity

Analysis

1. What factors contributed to the world's overall population growth in the last 150 years.
2. Why does a population not level off during the same year it reaches zero population growth?
3. If the carrying capacity of the earth was 9 billion people, when would this number be reached (according to your graph)?
4. What will happen when the human population exceeds the earth's carrying capacity?
5. What changes do you believe the human population needs to make to ensure we don't reach carrying capacity?

Figure 6 Biological magnification of DDT

Because DDT accumulates in fatty tissue, DDT concentrations (in parts per million, ppm) increase as this chemical moves up the food chain.

