309/310 Biology

Name: Key

Unit One: Ecology

Review Guide

Learning Targets:

Place a checkmark next to the learning targets you feel confident on. Then go back and focus on the learning targets that are not checked .

Biosphere

- ❑ Distinguish between biotic and abiotic factors in the environment. (1.1A)
- ❑ Arrange the levels of organization within the biosphere. (1.1 B)
- ❑ Explain how energy flows through an ecosystem. (1.2A)
- ❑ Calculate the flow of energy from one trophic level to another. (1.2B)
- ❑ Interpret a food chain or food web. (1.2C)

Ecosystems

- ❑ Create a model describing how matter cycles through the biosphere. (1.3A)
- ❑ Distinguish between an organism's niche and habitat. (2.1A)
- ❑ Classify community members as a producer or type of consumer. (2.1B)
- ❑ Identify and contrast biological relationships (predator-prey and symbiotic). (2.1C)
- ❑ Describe biotic and abiotic factors of terrestrial biomes. (2.2A)

Populations

- ❑ Compare and contrast logistic and exponential growth models. (3.1A)
- ❑ Identify examples of populations that demonstrate different types of growth. (3.1B)
- ❑ Identify factors that affect population growth. (3.2A)
- ❑ Predict the effects of limiting factors on population growth. (3.2B)

Biodiversity

- ❑ Examine the importance of protecting and conserving biodiversity. (4.1A)
- ❑ Predict the impact of a specific threat to the biodiversity of an ecosystem. (4.1B)
- ❑ Describe how keystone species maintain biodiversity. (4.1C)

Textbook Sections:

Chapter 3	The Biosphere (3.1-3.4)
Chapter 4	Ecosystems and Communities (4.2, 4.4)
Chapter 5	Populations (5.1-5.3)
Chapter 6	Humans in the Biosphere (6.1-6.4)

Test Friday:
October 3rd, 2014

Name: _____

Distinguish between biotic and abiotic factors in the environment. (1.1A)

What is the difference between an abiotic factor and a biotic factor?

Biotic - any living organisms in an ecosystem

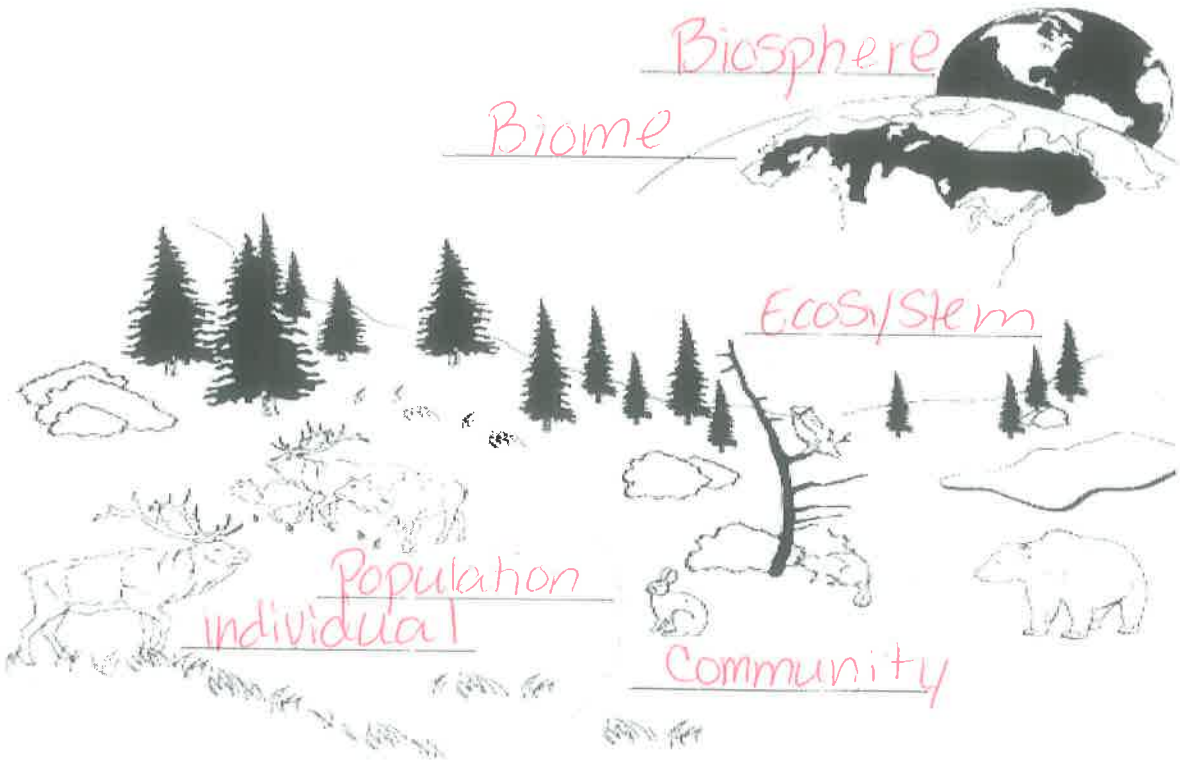
Abiotic - non-living "things" in an ecosystem

Look at the diagram to the right, list all the biotic and abiotic factors pictured.

Biotic	Abiotic
- Fox	- Rock
- Plants	- Air
- Birds	- water
- Rodent	- Sun
- Hare	- temperature

Arrange the levels of organization within the biosphere (1.1B)

Label the following diagram using the 6 levels of organization of the biosphere.



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Describe each of the levels of organization, pay special attention to what separates one level from the next.

Biosphere - our entire planet, with all its organisms and Physical environments.

Biome - a group of ecosystems that share similar climates and typical organisms.

Ecosystem - All the organisms that live in a place, together with their physical environment.

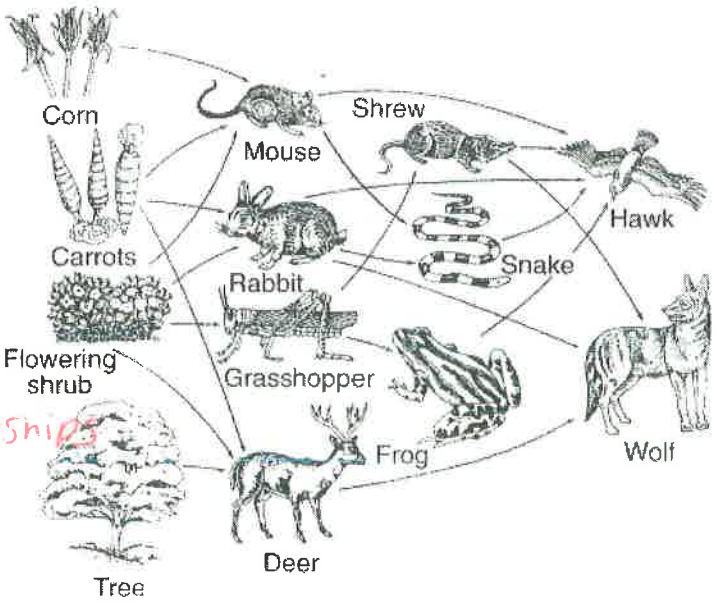
Community - an assemblage of different populations that live together in a different area.

Population - a group of individuals that belong to the same species and live in the same area.

Individual - individual organisms make up species, a species is a group of similar organisms that can breed and produce fertile offspring.

Explain how energy flows through an ecosystem (1.2A)

Use the figure to the right to answer the following questions.



Is this a food web or a food chain?

Food Web

As an Ecologist, which would be more useful to you in determining energy flow in an ecosystem, a food web or a food chain? Why? Food web, it gives you a better understanding of the complex feeding relationships in an ecosystem.

By what mechanism is energy transferred in an ecosystem?

One organism eating another.

What direction does energy flow in an ecosystem (use terms such as autotrophs, heterotrophs, producers, and consumers).

Autotrophs (producers) → Heterotrophs / primary consumers → Secondary consumers

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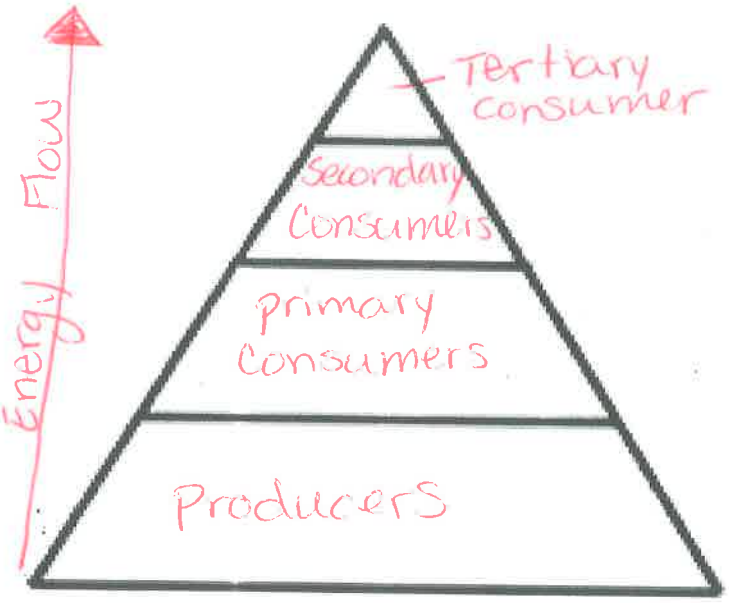
Calculate the flow of energy from one trophic level to another. (1.2B)

Fill in the energy pyramid below with the correct type of organisms you would expect to see at each level in any type of ecosystem.

Draw an arrow to represent how energy moves through the pyramid.



If an organism in tne lowest section has 200 energy units, how much energy would an organism in the next level have?

20 energy units (10% of the original energy)

What is the name of the rule that describes how energy moves through an ecosystem? Explain what is meant by this rule.

The 10% Rule. *only 10% of the energy available within one trophic level is transferred to the next trophic level.

Interpret a food chain or food web (1.2C)

Use the figure to the right to answer the following questions.

Based only on the information in this figure, is the deer a herbivore, omnivore, or a carnivore?

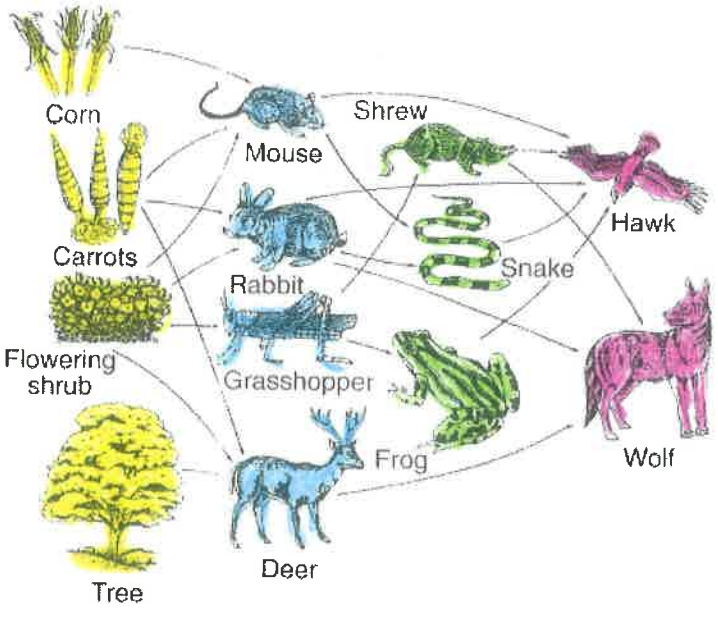
Herbivore

Based only on the information in this figure, is the snake a herbivore, omnivore, or carnivore?

Carnivore

Color all of the producers in this figure yellow, all of the primary consumers blue, and all of the secondary consumers green.

= Tertiary Consumers



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In what way are herbivores and carnivores alike?

Both are heterotrophs and must consume a producer to obtain energy.

What do the arrows represent in a food web or a food chain?

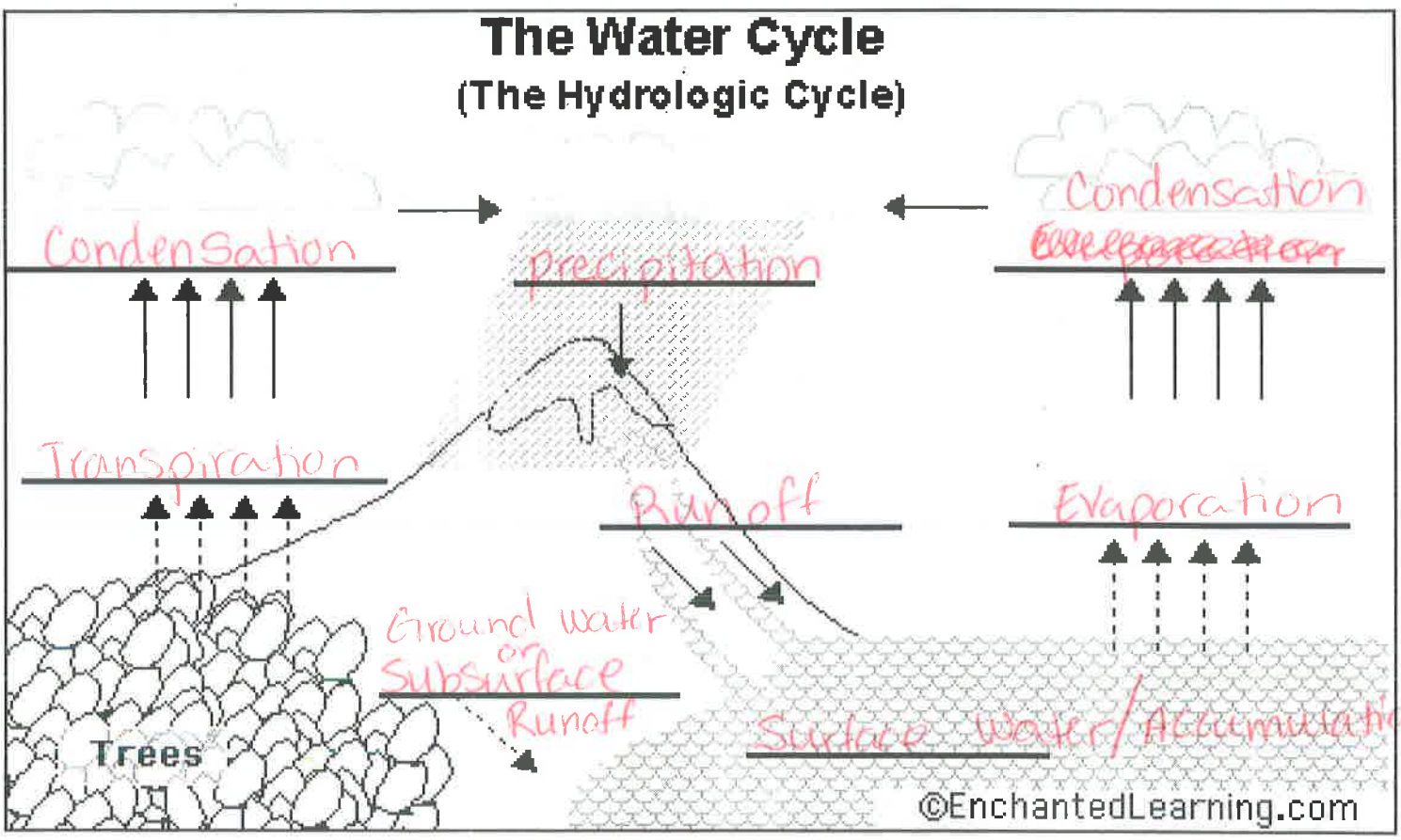
Flow of energy.

If grasshoppers were removed from the above food web what changes in the ecosystem would you expect to see?

Frog and Shrew populations would decrease, Flowering shrub populations would increase.

Create a model describing how matter cycles through the biosphere. (1.3A)

Label the following diagram using correct scientific terminology.



What is the difference between transpiration and evaporation?

Transpiration = evaporation of water from the surface of leaves.

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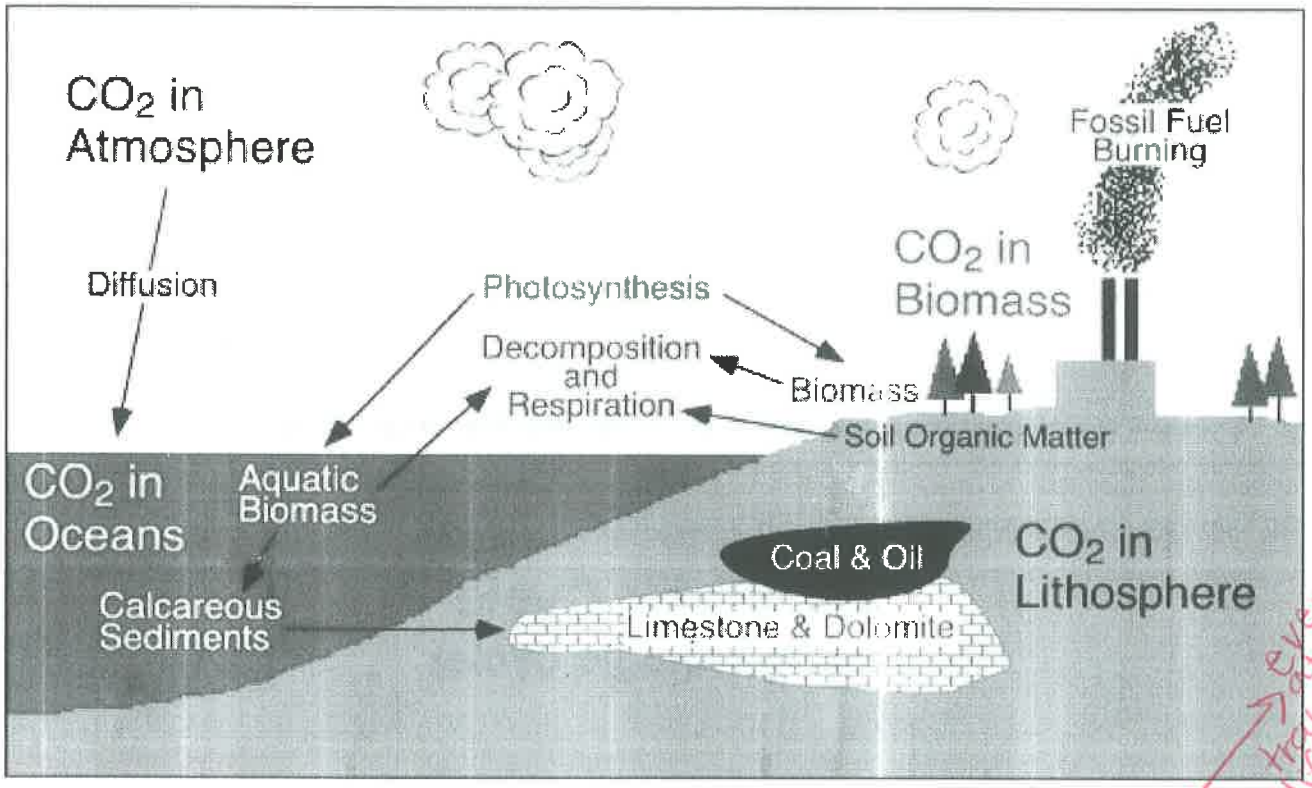

Using the diagram above to help you, describe how carbon is cycled throughout the biosphere.

Carbon is found in large reservoirs in the biosphere. CO_2 gas is found in the atmosphere, dissolved CO_2 is found in oceans, carbon is found on the land in organisms, rocks, and soil, and finally underground (coal, oil, limestone, dolomite, calcium carbonate).

How are the carbon cycle and water cycle similar?

Can water molecules or carbon atoms ever be destroyed?

No! Matter is never created nor destroyed!

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Distinguish between an organism's niche and habitat. (2.1A)

What is the difference between a niche and a habitat?

Habitat = place where an organism lives

Niche = The role a species plays in a community.

Pick two organisms- list their habitats and their niches.

Coyote

Habitat: Low valleys, High mesas, Mountains, Open plains, Grasslands

Niche: Live in packs, Build dens, Hunt at night and day.

Gartner Snake:

Habitat: Forests, Fields, Marshes

Niche: Eats frogs, small fish, mice + Bird eggs

Classify community members as a producer or type of consumer (2.1B)

Fill in the chart below

Type of Community Member	Definition	Example
Primary Producers	use energy from the sun to make their own food	Plants
Primary Consumers	Depends on autotophs for energy - Eat producers.	- Deer - cows - Herbivores
Secondary Consumers	Depends on autotophs for energy. - Eats primary consumers.	- wolves - polar bears - Carnivores
Decomposers	Breaks down complex compounds of decaying organisms so simple molecules can be absorbed	Bacteria fungi
Scavengers	Feeds on carrion or other dead organisms.	Vultures Hyenas

What is another term we can use to describe primary producers?

Autotrophs

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What is another term we can use to describe consumers?

Heterotrophs

Identify and contrast biological relationships (predator-prey and symbiotic). (2.1C)

What are the three types of symbiotic relationships that we discussed?

Commensalism, mutualism, parasitism

Put the letter (**M,C,P**) by the statement that best describes the type of symbiosis.

P 1. A tick living on a dog.

C 2. The honeyguide bird leading the honey badger to the bees hive, both eat the honey.

P 3. A tapeworm living in a person's intestines.

C 4. A bird building their nest in a tree.

C 5. The hermit crab carrying the sea anemone on its back.

M 6. The bristle worm living with the hermit crab.

P 7. Head lice living on a human scalp.

C 8. The egret, an insect eating bird, graze near some herbivores mouth.

C 9. Orchids growing in tall tropical trees, the trees are not harmed but the orchids get sunlight.

C 10. Bacteria living on a human's skin.

C 11. The remora hitching a ride on a shark.

C 12. Barnacles living on a whale.

M 13. Bees and a flower.

P 14. Bacteria living in the intestines of a cow to help it break down cellulose.

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Describe biotic and abiotic factors of terrestrial biomes. (2.2A)

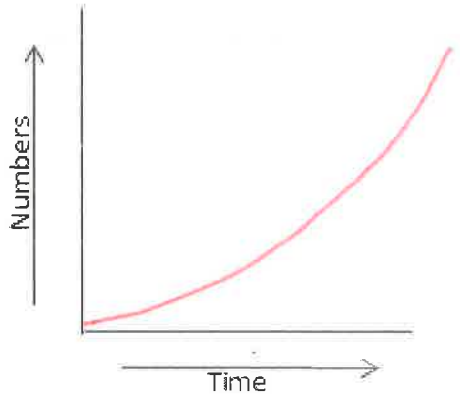
Biome	Precipitation and Temperature	Biotic Factors
Tundra * permafrost layer	Low precipitation Very Cold	* Artic foxes * owls
Taiga	cold with mild summers and adequate rainfall	* Evergreens, bears, moss
Temperate Deciduous Forest	Cool and warm seasons Adequate Rain fall	squirrels, oak trees, deer, maple trees * leaves fall off trees in the fall
Rainforest	Always warm + humid Rains almost daily, long wet season	large variety of species
Savannah	warm, distinct wet and dry season	* Zebras * Acacia Trees
Desert	Very hot, may be cold at night. Very dry year round	cactus, coyotes, rattlesnakes
Grassland	cool and warm season, adequate rainfall	lush grass, prairie dogs, buffalo, deer

Compare and contrast logistic and exponential growth models. (3.1A)

When does exponential population growth happen?

No limiting factors
ideal conditions

Complete the graph below by drawing the characteristic shape of exponential population growth.



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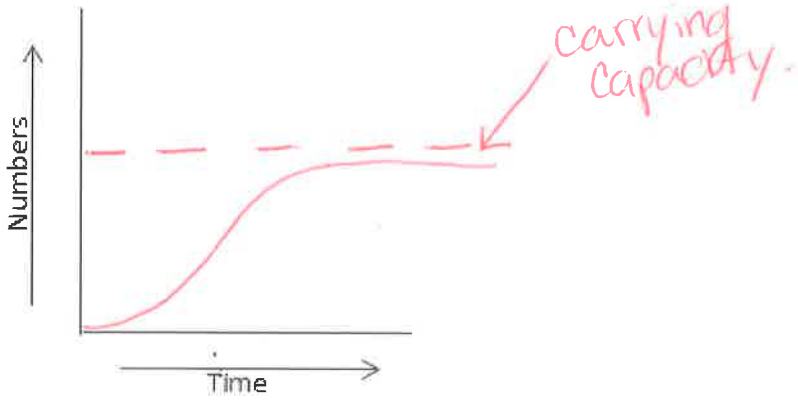
When does logistic population growth happen?

When a population reaches carrying capacity, and limiting factors take effect.

Complete the graph below by drawing the characteristic shape of logistic population growth.



Identify examples of populations that demonstrate different types of growth. (3.1B)

List one example of a population that may experience exponential growth.

A bacteria species that has an abundance of resources and no "predators".

What type of growth did you see in the Kaibab lab?

Exponential at first, then it dropped back down into a logistic growth.

If a species is introduced to a new environment, where food sources are readily available and there are no natural predators what type of growth would you expect to see? Explain your answer.

Exponential Growth.

- there would be nothing to limit the populations growth!

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What determines the carrying capacity of a specific environment?

Limiting factors / Limiting resources.

Examine the importance of protecting and conserving biodiversity. (4.1A)

What are the primary benefits of biodiversity on our society?

1) Wild species are the original source of many medicines.

2) Most crop plants have wild relatives that may carry genes we can use to transfer disease or pest resistance or other helpful traits.

3) The number and variety of species in an ecosystem can influence ecosystems stability, productivity and value to humans.

Predict the impact of a specific threat to the biodiversity of an ecosystem. (4.1B)

What is an invasive species?

An organism that is not native to a specific location, and has a tendency to spread which causes damage to its new environment.

List one example of an invasive species.

Asian Carp, Emerald Ash Borer, Zebra Muscles

Describe how keystone species maintain biodiversity. (4.1C)

What is a keystone species?

A species that has a disproportionately large effect on its environment relative to its abundance.

Explain why the wolves in Yellowstone National Park are considered a keystone species.

* Watch video about wolves in Yellowstone that is posted to the website.

Compare and contrast an invasive species to a keystone species (what are the similarities and differences?)

Invasive Species:
- Addition of species is detrimental to ecosystem.

Keystone Species:
- Removal of species is detrimental to ecosystem

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Identify Factors that affect population growth (3.2A)

Describe what a density-dependent limiting factor is.

As the population size increases, the greater the effect of the factor.

What are examples of density-dependent limiting factors?

Disease, competition, predators, parasites, and food.

Describe what a density-independent factor is.

Affects population size regardless of population size and dispersal.

What are examples of a density-independent factor?

Temperature, storms, flood, drought, pesticides, habitat destruction.

What are some examples of other limiting factors?

Abiotic: Sunlight, climate, temperature, water, fire, soil chemistry.

Biotic: predators, food availability.

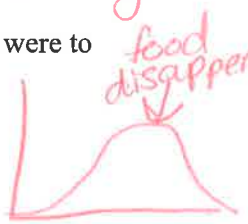
Predict the effects of limiting factors on population growth. (3.2B)

How can limiting factors impact population growth?

Limiting factors restrict the existence, reproduction, or distribution of organisms. Slows population growth

What would you expect to happen to the population growth of a particular organism if the food supply were to disappear?

Population growth would slow and eventually stop and decrease if there is no food.



Can limiting factors determine how many organisms an environment can hold? Explain.

Yes! There can only be as many individuals as the limiting factors can support.

What is carrying capacity?

The number of organisms of one species that an environment can support.

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Important Vocabulary Words:

Population
Keystone Species
Symbiosis
Omnivore
Community
Food Chain
Decomposer
Niche
Abiotic
Limiting Factor
Parasitism
Biosphere
Consumer
Biome
Food Web
Heterotrophs
Carrying Capacity
Autotroph
Scavenger
Mutualism
Herbivores
Habitat
Ecosystem
Biotic
Carnivore
Commensalism

**You will want to make sure that you go back through and look at all labs, practice worksheets, videos/video notes, class activities, and class notes.

**Test questions can come from anything we discussed or completed in class!