Biosphere

The biosphere is the area around the Earth where life can exist within the lithosphere, the atmosphere and the hydrosphere.The biosphere is a closed(nothing enters/leaves except light energy), self-regulated(maintains sustainable living conditions on it's own) system consisting of all life on Earth.The supply of resources for a living thing to survive(water, space and nutrients) is limited, thus it puts a limit on the number of individuals of a certain species that can live.

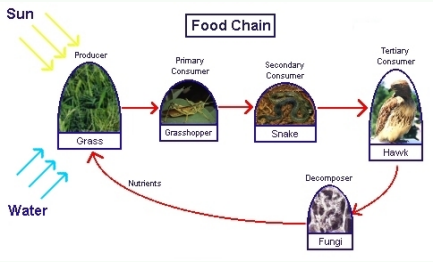
Ecosystems and their Variances

An ecosystem is all of the living organisms-(biotic) that share a region and interact with each other and their non-living(abiotic) environment. Ecosystems can vary in; size, location, climate, biotic and abiotic factors and whether they are terrestrial(on land) or aquatic(in water).Large ecosystems can include many smaller ecosystems.

Photosynthesis

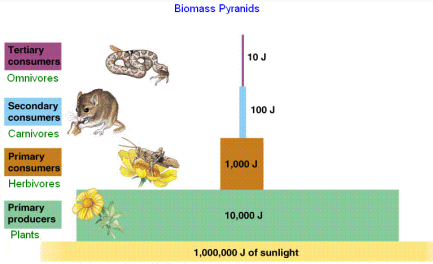
Photosynthesis is the process in which green plants convert light energy from the Sun into chemical energy(sugar).The cell in the plant that does this process is called the chloroplast and it contains a special, green chemical called chlorophyll that capture the light energy and turn it, along with water from the soil and carbon dioxide from the air, into energy for the plant as well as oxygen(O2).The formula for this is transformation is CO2 and H2O though light energy into C6H12O6+O2.

Food Chain



Food Chains illustrate who eats whom in an ecosystem.It also shows how energy passes through an ecosystem.All organisms continually use and release energy to their environment, meaning that energy is continuously lost from all levels of the food chain.Food chains are rarely longer than 4 organisms as energy available decreases quickly.Only 10% of the energy that is gained by the first organism is passed on to the second organism, and so on.

Pyramid of Energy



Illustrates energy loss and transfer between trophic levels.Species in the highest trophic levels have less energy available to them than the species near the bottom.

Water Cycle

The water cycle first starts off in the process of either evaporation or transpiration.Evaporation is the process where a liquid, in this case water, changes from a liquid state to a gaseous state.The gas then rises up and goes into the air.Transpiration is where a plant absorbs water from the soil and as the water reaches the leaves, some of it evaporates and goes into the air.The cycle moves on through condensation which is where the water vapour gained through evaporation or transpiration becomes cooler and turns back into a liquid.This liquid then falls to the earth as precipitation.Precipitation can be either snow, hail or rain.This precipitation then collects on either the surface soil and then flows to the lakes and oceans as rivers or it can collect underground as groundwater..

Biotic and Abiotic Limiting Factors and Influences

Limiting Factors	Any factors that limits the size of a population
Abiotic Limiting Factor	A non-living limiting factor-(ex:access to water)
Biotic Limiting Factor	A living limiting factor(ex:availability of food)
Abiotic Influences	Ability to survive(light, H2O, nutrients, O2, temperature, soil, acidity, salinity)
Biotic Influences	Interactions between species(food, light, space, mates)

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Biodiversity

Biodiversity is the variety of life found in an area.It is often measured by counting the number of species in a specific ecosystem.

Ex-situ and In-situ Conservation

Ex-situ Conservation	This conservation method is when we remove that species from their natural habitat.This method is used when a specie's habitat is threatened or no longer exists or if the existing population is extremely small.
In-situ Conservation	This conservation method is focused on conserving the species in their natural habitat.

Effects of Acid Rain

Soil	Burn skin of Earthworm and increases the soil's acidity(lowers the pH)
Vegetation	Damages the waxy coating that protects leaves from infection and affects plants roots' ability to absorb nutrients
Water	Makes bodies of water more acidic(lowers the pH)
Aquatic Animals	Dissolves the shells of shellfish

Stewardship

A good steward is someone who manages any sort of resource wisely.An environmental steward means taking care of our natural resources to ensure that they are used in sustainable way for current and future generations.This includes;
>Reducing the amount of resources we use
>Reusing items instead of throwing them away
>Recycling used items

Soil Types

Sandy Soil	Large sand particles, permit root growth and air pockets, permit water to drain away quickly, carrying essential nutrients away from roots, less fertile than loam soil
Loam Soil	Has rock particles, has pockets that hold air or water, lots of humus, drains well without drying out, most fertile soil
Clay Soil	Small particles packed tightly together, plant roots do not grow well, block root growth and trap water, making soil wet, least fertile soil

The 3 Spheres

Lithosphere:Is the Earth's solid, rocky outer shell.Consists of rocks and minerals that make up the mountains, oceans and all of Earth's solid landscape.Ranges from about 50 to 150 km in thickness down from the surface.

The 3 Spheres (cont)

Atmosphere:Is the layer of gases that surround the Earth.This layer is critical to life on Earth as it moderates surface temperatures by acting like a blanket, it blocks some incoming solar radiation, such as ultraviolet(UV) rays, and prevents excessive heating during the day and cooling during the night.

Hydrosphere:Is all of the water on Earth(both solid, liquid and gas form).It includes; Clouds, groundwater, ice, lakes and oceans.

Population, Community and Ecosystem.

A population is all individuals of the same species living in an ecosystem.A community is all individuals from all the populations.An ecosystem is made up of a community and it's interactions with abiotic features.

Cellular Respiration

Cellular Respiration is a process in which the plant uses the stored energy(sugar) and O2 produced in photosynthesis and it converts and releases it as CO2, H2O and energy.The plant is able to use this released energy for cellular functions such as; movement, growth and reproduction.The formula for this equation is C6H12O6+O2 into CO2, H20 and energy.Both plants and animals undergo cellular respiration.

Study Note:The Cellular Respiration formula is the exact reverse of the Photosynthesis formula.

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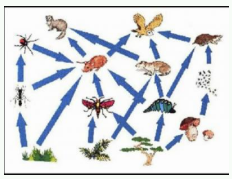
Food Webs

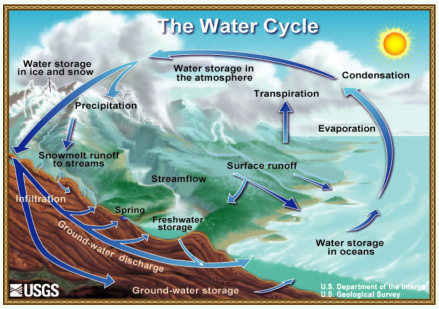


Food webs are more accurate, but still an incomplete way to illustrate interactions between organisms in an ecosystem.They are useful to figure what may happen when a species is removed from or added to an ecosystem.The arrows indicate the direction of energy flow in both a food web and food chain.Food webs are highly complex, with consumers feeding on many different species.

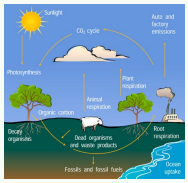
Pyramid of Numbers

Shows the number of individuals of all populations in each trophic level.

Water Cycle Example



Carbon Cycle Example



Nitrogen Cycle

The first step for the nitrogen cycle is for special bacteria in the soil to convert nitrogen from the atmosphere into forms that plants can use (nitrates, nitrites and ammonia).This process is called nitrogen fixation.The plants absorb the nitrates/nitrites through their roots and use it.When they die or, if they get eaten, the consumer dies, the nitrogen is released back into the atmosphere.The bacteria get the new nitrogen and the cycle continues.

Extinction

Extinction is a natural process, which involves an entire species to be wiped out.Only catastrophic events can cause extinction, such as an asteroid impact or a massive volcano eruption.These are very rare so the number of species that are extinct is low.

Invasive,Endemic and Indicator Species

An invasive species is a species which is not native to the ecosystem and causes harm to that ecosystem.An endemic species is a species whose habitat is restricted to a particular area or space on the globe.An indicator species is sensitive to slight environmental changes and therefore serves as an early warning indicator for things such as global warming or chemical changes.

Oil Spills

Happen when an oil tanker or rig leaks and releases oil into the body of water.Since oil is toxic and is slow to break down, takes a long time to clean up.Harms wildlife that lives in ocean and surrounding land.

Natural Resources

Natural Resources(wood, water, etc) are gained from ecosystems that have an abundance of that certain resource.

Urban Forests

They are forests growing in old buildings that are either natural or man-designed.They;
>Remove excess carbon from the atmosphere
>Reduce energy consumption by providing shade
>Help slow run-off of water from rainstorms
>Protect soils from erosion and filter chemicals from water and air
>Provide a tourist attraction and are enjoyable to look at and be around.

Biotic Factors

Biotic factors are the living components of an ecosystem.They include; organisms, organism remains (decomposing remains) and waste produces (feces).Abiotic factors are the nonliving components of an ecosystem.They include; air, minerals, sun, temperature, water, wind, etc.

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Abiotic vs Biotic

Abiotic:	Biotic:
Non-living	Living
Have never lived	Have lived before
Are not dead	Can be dead
Are not parts of living things	Can be parts of living things

Sustainability

Most ecosystems are self-regulating or sustainable.Sustainability is the ability to maintain natural ecological conditionswithout interruption, weakening or loss of value.

Producers and Consumers

A producer is a name given to an organism that photosynthesize.These organisms are critical to ecosystems as most energy that organisms other than producers(consumers) comes from producers.A consumer is a name given to an organism that cannot photosynthesize and therefore must eat other organisms (producers or other consumers) to survive.

Energies

Thermal Energy:keeps the Earth's surface warm, but it cannot provide organisms with the energy they need to grow and function.

Light Energy:Can be used by some organisms, but it cannot be stored and is not available in the night.

Chemical Energy:Is used by all organisms to perform functions, including movement, growth and reproduction.

Niches

Every species uniquely interacts with other species and with it's own environment.These interactions define the ecological job or niche of a species.A species niche includes;what it eats, what eats it and how it behaves.

Trophic Levels

Trophic Level or feeding level describes the position of an organism along a food chain.

Pyramid of Biomass

Shows the total mass of organisms in each trophic level(normally producers have the greatest biomass).

Basics of Biochemical Cycles

The particles that make up matter cannot be created nor destroyed, only cycled.This means that all water and nutrients must be produced or obtained from chemicals that already exist in the environment.This happens in a series of cycles in which chemicals are continuously consumed, rearranged, stored and used.Since these cycles involve organisms (bio) and occur as Earth (geo) processes, they are called biogeochemical cycles.These cycles are the Water, Carbon and Nitrogen cycles.

The Carbon Cycle

Carbon moves through both the biotic and abiotic parts of an ecosystem.The first step in this process is when plants pull carbon from the atmosphere through photosynthesis.These plants are then eaten by consumers.The plant's carbon is passed to the consumer when it eats the plant.The consumer, after time, dies and gets decomposed.The carbon is released back into the atmosphere.Another way for carbon to get released is through cellular respiration.

Nitrogen Cycle Example

Biomes

A biome is a large region defined by climate(precipitation and temperature) with a specific set of abiotic/biotic features.

Level of Risk

Extinct	No longer exists on Earth
Extirpated	No longer exists in a specific area
Endangered	May become extirpated or extinct
Threatened	May become endangered
Special Concern	May become threatened or endangered

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Keystone Species

A keystone species is a species that when added or removed from an ecosystem leads to major changes in abundance or occurrence of at least one other species.

Acid Rain

Emissions and pollutants coming from factories and cars are combining with water vapour to form acid rain.We can reduce acid rain by putting limits on emissions and install special scrubbers, which cleanse the emissions to remove most of the nitrogen and sulphur, which causes acid rain.

Protecting Endangered Species

The plans to protect endangered species involves;
>Governments, industries and communities working together
>Identifying the specific causes of the problem.
>Developing specific plans to fix the problems.
>Monitoring conditions to check that the actions taken are working.

Soil Profile

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