



## B9: Ecosystems and Material Cycles

### 1. Ecosystems

<b>Resources</b>	Something that an organism needs to stay alive such as food, water and space.
<b>Ecosystem</b>	An area in which all the living organisms and non-living factors in an area form a stable relationship.
<b>Population</b>	A group of one species living in the same area.
<b>Community</b>	All the different organisms living and interacting with one another in a particular area.
<b>Interdependent</b>	When organisms in an area need each other for resources (such as food and shelter).
<b>Habitat</b>	The place in which an organisms lives.
<b>Abundance</b>	A measure of how common something is.
<b>Quadrat</b>	A square frame used to take a sample of organisms in a given area.
<b>Population Size</b>	<p>number of organisms in all quadrats <math>\times</math> total size of area where organism lives            total area of quadrats</p>
<b>Food Chain</b>	A diagram that uses arrows to show the flow of energy through organisms that depend on each other for food.
<b>Food Web</b>	A diagram of interlinked food chains showing the feeding relationships in a community.

### 2. Abiotic Factors and Communities

<b>Distribution</b>	The places in which a certain organism can be found in an area.
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<b>Abiotic Factors</b>	Non-living components in an ecosystem that can influence where organisms live e.g. temperature , light
<b>Adaptations</b>	The features of an organism that enable it to do a certain function.
<b>Drought</b>	A lack of water. Most organisms cannot survive in a drought.
<b>Temperature</b>	Affects the distribution of organisms. All organisms have adaptations that suit them to life at specific temperatures.
<b>Temperature Changes</b>	Long-term rises or falls may change the distribution of organisms.
<b>Light</b>	Essential for plants and algae to grow- limited 30m below the ocean surface and in dense forests.
<b>Pollutants</b>	A substance that harms living organisms when released into their environment.
<b>Pollution</b>	Harm caused to the environment, such as by adding poisonous substances or abnormally high amounts of substances into the air.
<b>Belt Transect</b>	A line in an environment along which samples are taken to measure the effect of an abiotic factor on the distribution of organisms.

### 3. Core Practical

<b>Key Question</b>	How do abiotic factors affect the abundance of low-growing plants?
<b>Method</b>	Use a quadrat to measure the abundance of plants at different distances along a belt transect as an abiotic factor changes (such as from the shaded area under a tree to the open unshaded area).
<b>Dependent Variable</b>	The abundance of plants.
<b>Independent Variable</b>	Distance along belt transect / named abiotic factor (light)

<b>Control Variables</b>	Time/day of sampling to control other abiotic factors. Quadrat size used. Person measuring abundance.
<b>Results</b>	Moving from the shaded area into the unshaded area the abundance of plants would increase.
<b>Explanation</b>	In the shaded area there is more competition for light, decreasing the abundance of the plants.

### 4. Biotic Factors and Communities

<b>Biotic Factors</b>	Living components (the organisms) in an ecosystem.																														
<b>Competition</b>	When organisms need the same resources as each other so they struggle against each other to get those resources.																														
<b>Predation</b>	When one animal species kills and eats another animal species.																														
<b>Predator-Prey Cycle</b>	<table border="1"> <caption>Data for Predator-Prey Cycle Graph</caption> <thead> <tr> <th>Year</th> <th>Snowshoe Hare (thousands)</th> <th>Lynx (thousands)</th> </tr> </thead> <tbody> <tr><td>1895</td><td>80</td><td>10</td></tr> <tr><td>1900</td><td>60</td><td>15</td></tr> <tr><td>1905</td><td>85</td><td>25</td></tr> <tr><td>1910</td><td>40</td><td>30</td></tr> <tr><td>1915</td><td>20</td><td>20</td></tr> <tr><td>1920</td><td>75</td><td>35</td></tr> <tr><td>1925</td><td>50</td><td>25</td></tr> <tr><td>1930</td><td>10</td><td>10</td></tr> <tr><td>1935</td><td>80</td><td>20</td></tr> </tbody> </table>	Year	Snowshoe Hare (thousands)	Lynx (thousands)	1895	80	10	1900	60	15	1905	85	25	1910	40	30	1915	20	20	1920	75	35	1925	50	25	1930	10	10	1935	80	20
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<b>Biodiversity</b>	The variety of species in an area.																														
<b>Yellowstone National Park</b>	<ul style="list-style-type: none"> <li>• 1926 wolves became extinct</li> <li>• Then the number of elk increased rapidly (due to reduced predation)</li> <li>• Reduced food for other herbivores such as beavers</li> <li>• 1995 wolves reintroduced</li> <li>• Reduced elk numbers</li> <li>• Increased beaver numbers who change ecosystems and increase biodiversity</li> </ul>																														

### 5. Parasitism and Mutualism

<b>Parasitism</b>	A feeding relationship in which a parasite benefits and its host is harmed.
<b>Parasite</b>	An organism that lives on or in a host and takes food from it while it is alive.

<b>Host</b>	The individual that is being lived on/in by a parasite.
<b>Parasitism examples</b>	Tapeworms and humans Head lice and humans
<b>Mutualism</b>	A relationship between individuals of different species where they both benefit.
<b>Mutualism examples</b>	Flowers and insects (flowers get pollinated, insects get food). Coral polyps and algae (algae get a place to live safely and the polyps get food from the algae who can photosynthesise).

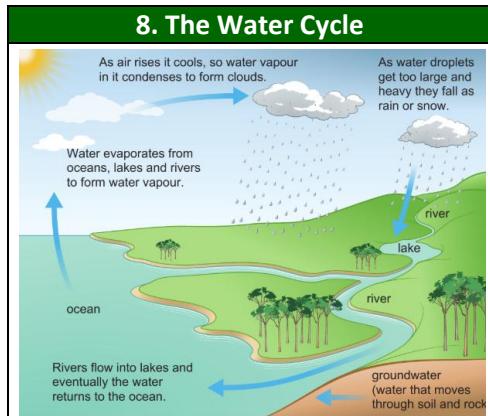
### 6. Biodiversity and Humans

<b>Overfishing</b>	Taking more fish from a population than are replaced by the fish reproducing so that the population falls over time.
<b>Fish Farming</b>	Growing fish in a contained area, usually to supply humans with food.
<b>Indigenous / Native</b>	Species that have always been in an area.
<b>Non-Indigenous</b>	Species that have been introduced to an area where they haven't been before.
<b>Eutrophication</b>	

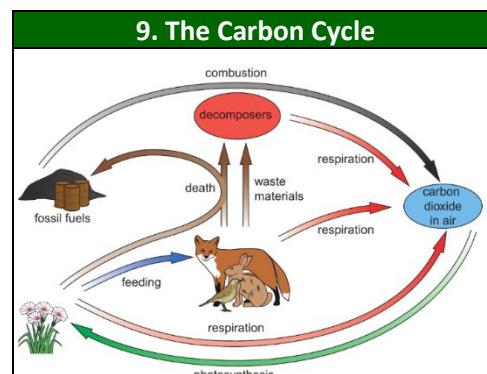
### 7. Preserving Biodiversity

<b>Reforestation</b>	Planting new forests where old forests have been cut down.
<b>Conservation</b>	The protection of an area or species to prevent damage.

<b>Endangered</b>	An area or species that is at great risk of destruction / extinction.
<b>Kielder Forest Conservation</b>	<ul style="list-style-type: none"> <li>• Reforestation of conifer and broad leaved trees (with areas of open space left).</li> <li>• Nesting platforms built for the ospreys.</li> <li>• Grey squirrels caught and killed, to help protect the indigenous red squirrels.</li> </ul>
<b>Captivity</b>	Keeping something in unnatural surroundings, such as animals in a zoo.
<b>Threats to Tigers</b>	The dense forest they live in is being cut down and people hunt tigers for fur and other body parts.
<b>Conservation of Tigers</b>	They are being bred in captivity to increase population numbers. Their habitats are being rebuilt and protected too.
<b>Importance of Biodiversity</b>	<p>Areas with higher biodiversity can recover faster from natural disasters.</p> <p>We use plants and animals for food and as a major source of medicines- it is important we try to preserve as many species as we can.</p>

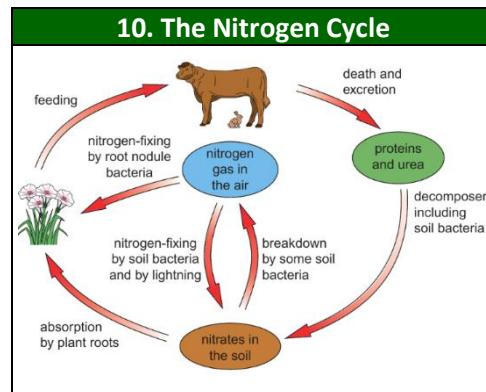


<b>Water Cycle</b>	A sequence of processes by which water moves through abiotic and biotic parts of an ecosystem.
<b>Potable</b>	Suitable for drinking.
<b>Desalination</b>	A process that produces potable water by removing the salt from sea water.
<b>Distillation</b>	A process that separates a liquid from a mixture by evaporating it and then condensing it.



<b>Carbon Cycle</b>	A sequence of processes by which carbon moves from the atmosphere, through living and dead organisms, into sediments and into the atmosphere again.
<b>Decay</b>	A process in which complex substances in dead plant and animal biomass are broken down by decomposers into simpler substances.
<b>Decomposers</b>	An organism that feeds on dead material, causing decay.
<b>Fossil Fuels</b>	A fuel formed from the dead remains of organisms over millions of years. Coal, oil, natural gas
<b>Respiration</b>	$\text{Glucose} + \text{Oxygen} \rightarrow \text{Carbon dioxide} + \text{Water}$ $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$

<b>Photosynthesis</b>	$6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ carbon dioxide + water → glucose + oxygen
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<b>Nitrogen Cycle</b>	A sequence of processes by which nitrogen moves from the atmosphere through living and dead organisms, into the soil and back to the atmosphere.
<b>Nitrates</b>	A compound that contains nitrogen in the form of a nitrate ion.
<b>Nitrogen-Fixing Bacteria</b>	Bacteria that can take nitrogen from the atmosphere and convert it into more complex nitrogen compounds such as ammonia.

Lesson	Memorised?
<b>1. Ecosystems</b>	
<b>2. Abiotic Factors and Communities</b>	
<b>3. Core Practical</b>	
<b>4. Biotic Factors and Communities</b>	
<b>5. Parasitism and Mutualism</b>	
<b>6. Biodiversity and Humans</b>	
<b>7. Preserving Biodiversity</b>	
<b>8. The Water Cycle</b>	
<b>9. The Carbon Cycle</b>	
<b>10. The Nitrogen Cycle</b>	