**B7 Ecology Learning Journey**

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| 1C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Organisms** were classified into groups the hierarchy of which is **Kingdom**, **Phylum**, **Class**, **Order**, **Family**, **Genus** and **Species** after **Linnaeus** based on characteristics. Later work on internal structures and biochemical processes allowed new processes of classification to be out forward.  **Carl Woese** put forward three **domain** system (**Archaea**, **Prokaryote** and **Eukaryote**).  Named using **binomial** system – Genus and species to international standard. |
| 2C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | Organisms living in a **habitat**, **population** and/or **community** all **compete** for **limited natural resources** (animals – space, mates, food; plants – light, water, space to grow).  Organisms in a **community** depend on other organisms for resources (shelter, food etc) and so we see **interdependence** – one change in an **ecosystem** can have massive effects throughout.  Factors which affect ecosystems can be **abiotic** (non-living such as temp, oxygen etc.)or **biotic** (living predators, competition etc.). |
| 3C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | A **Quadrat** is a frame of known area which is used for **sampling**. Placed **randomly** (thrown over shoulder, placed using number generator and grid) to avoid bias and the more collected the more reliable.  **Percentage cover** or a species count can be made using quadrat.  **Total number = ave.number per m2 X total area of site.**  **Transects** are **quadrats** placed at regular intervals along a line to show changing **distribution** of organisms. |
| 4  C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | Required Practical.  Application of sampling knowledge to collect valid results.  Understand how to calculate **mean**, **mode**, **median** and **range**. |
| 5C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Adaptations** are features or characteristics that allow organisms to survive in their habitats.  Three types – **behavioural**, **structural** (of the body) and **functional** (inside the body).  **Extremophiles** are organisms that are adapted to extremely harsh environments (hydrothermal vents, very salty lagoons). |
| 6C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Food chains** show what eats what in an **ecosystem**.  Order is **Producer** (plants – do photosynthesis), **Primary consumer** (eat)/**Herbivore** (eat only plants), Secondary consumer (eat primary)/**Carnivore** (eat only meat), **Tertiary** consumer/Top **Predator**.  Arrows indicate the transfer of energy.  **Predator/prey relationships** show similar rises and falls but with a **lag-time**. |
| 7C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Food chains** are divided into stages called **Trophic Levels** which have organisms which perform **a specific role**.  Level 1 – Producers  Level 2 – Primary Consumers  Level 3 – Secondary Consumers  Level 4 – Tertiary Consumers (Carnivores that eat other carnivores)  **Apex Predator** isn’t eaten  **Decomposers** break down uneaten remains and waste. |
| 8C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Pyramids of Biomass** show the relative mass of each **Trophic Level**.  Number bars = number of links in chain  Size of bars is to scale  Producers on bottom  Label bars  Almost always pyramid shaped as material/energy is **wasted** between each level (heat, waste, movement, uneaten parts etc.)  **Efficiency = (biomass transferred/biomass available at previous level) X 100** |
| 9C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | Water is constantly **recycled**.  It passes through the cycle as **precipitation**, then **evaporation** and/or **transpiration**, **condensation** into clouds etc. |
| 10C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | Materials are **recycled** through the process of **Decay**.  Living things take in materials from the **environment**, fix them into **complex molecules** which are passed through the food chain.  The materials are returned to the environment as waste or decay.  **Decomposers decay** materials – these are **bacteria** and **fung**i and so rate of decay is affected by temperature, oxygen concentration and moisture levels which affect **respiration** and **enzyme** function. |
| 11C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | The **Carbon Cycle** is an example of recycling.  Carbon is fixed by **photosynthesis** into **carbohydrates**.  This is passed onto other organisms when they eat plants and is returned as CO2 by **respiration** of **consumers** or **decomposers**.  We are affecting this by adding CO2 from the burning of **fossil fuels.** |
| 12C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Compost** is produced by the decay of **organic** materials such as garden and food waste.  It is produced by **aerobic decomposition** (hence need to vent compost bins) and is used as a form of **fertiliser**.  **Biogas** is made by **anaerobic respiration** in a biogas **generator** either as a batch (small scale) or continuous (industrial) line.  Biogas is a mixture of Carbon Dioxide and **Methane** which can be burnt as a fuel. |
| 13  C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | Pupils will be aware of the effect of temperature on decay.  They can apply knowledge to explain that this is related to enzyme function. |
| 14C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Biodiversity** is the variety of different species of organisms on Earth or within an **ecosystem**.  Biodiversity ensures **stability** of ecosystems and our future relies on maintaining a good level.  Humans reduce biodiversity by **deforestation**, **global warming** and waste production.  We try and maintain biodiversity by breeding **endangered** animals, **regeneration**, protection, **reintroduction** and reduction of water/deforestation. |
| 15C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | Humans produce **waste** and now this is a problem because now the impacts are massive and **global** as there are over 7billion people in the world.  Human impacts include **pollution** (atmospheric, land and water). Global dimming and acid rain. |
| 16C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | Humans use **land** for dumping waste, **quarrying**, farming and building so there is less land for wildlife.  **Deforestation** is removal of forests for timber or more land removing other organisms food and shelter.  Other problems include:  Less CO2 taken in, more CO2 in the atmosphere, reduced biodiversity.  **Peat bogs** are formed form the **incomplete decomposition** of plants.  Humans drain the bogs or cut the peat out for fuel or **horticulture** releasing lots of CO2. |
| 17C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Greenhouse gases** (CO2 and methane) build up as **insulating** layers in the atmosphere.  **Radiant** energy is absorbed by these gases and **re-radiated** in all directions increasing the temperature of the earth.  This can cause melting of **polar ice caps**, **rising sea levels**, unpredictable weather which means some species will change their **distribution** and others could become extinct. |
| 18C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Food security** is having enough food to feed a **population**.  Factors that affect it include:  Increasing human population,  Changing diets,  New pests and pathogens,  Environmental conditions,  Expense of agriculture,  War. |
| 19C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Factory farming** is controlling conditions to **optimise** production of food as efficiently as possible and a vast scale.  Factory farmed organisms are reared in small pens/cages to restrict movement and the temperature and food is controlled (eg high protein diet).  Humans get more food produced from the same input of resources.  Is this **ethical**? Also disease is a big problem leading to overuse of **antibiotics**. |
| 20C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Overfishing** has led to there being less fish for us to eat and disruption of **aquatic ecosystems**.  To tackle overfishing we need to **sustainably** fish maintaining fish stocks at levels where they can continue to breed.  Fishing **quotas** (limits on number and type of fish caught) and Net size (reducing waste catch and allowing younger fish to escape) are ways to sustainably fish. |
| 21C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Mycoprotein** is food form fungi  **Fusarium** (makes Quorn) is produced in **aerobic** conditions using glucose syrup to produce fugal biomass which can be **purified** to produce a **vegetarian** protein source. |
| 22C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\B51B5BCD.tmp | **Genetic Engineering** is transferring one useful gene to another.  **Human insulin** is produced by isolating the gene in a human, cutting it out using **restriction enzymes**, using the same restriction enzyme to cut **bacterial plasmids**, attaching the gene using **DNA Ligase** enzyme and then the inserting back into a bacteria. The bacteria will now produce human insulin.  Advantages of GM (crops) are:  Increased yield due to resistance to pests and diseases and ability to grow in drought conditions.  Increased **nutritiona**l value (extra vitamins produced eg golden rice).  Disadvantages/Concerns:  Reduction in **biodiversity**,  Genes escaping and forming superweeds,  **Allergies**,  Dependency on large corporations for **patented** seeds,  Poverty – can’t afford expensive seed stock. |