3.3 Threats to Biodiversity

In this activity you will:
- be allocated a question to answer with a partner
- you will use the textbook (Oxford or Kognity) to support you with this
- have 20 minutes for the question
- Move after the 20 minutes finishes, read the next question and then contribute to it
- again you will have 20 minutes for this
- do this for three of the questions

At the end of this you will then read the answers to the two questions you have not read and you will ask a question about each using the comments function.

1. **Discuss** how human activity threatens species and causes species extinction.

Humans threaten species and cause their extinction due to many reasons including the increase of hunting and destruction of habitats, leaving animals helpless and vulnerable. Some of these reasons include: Use of pollutants, Overexploitation, Deforestation, Habitat loss, and the Fashion and Food Industry.

People tend to use many pollutants such as pesticides (like DDT), antibiotics and medicines used for livestock (Diclofenac) and mercury poisoning (Ocean/Sea). Waste disposal results in leaching into groundwater, leftover ash from incineration, and plastic and other non-biodegradable waste illegally dumped in the ocean.

On the other hand, overexploitation is another major cause of extinction. It occurs when the increase of human populations leads to an increase of demand for natural resources, which then causes us humans to turn to those resources once again.There are different forms of overexploitation including: Overfishing and bycatch, Over harvesting and Over hunting For skins, fur or food. These are all factors that are contributing to the endangerment of species.

The other great factor is deforestation. It is happening at an exponential rate; every five seconds a space the size of a football pitch, every year a chunk the size of Switzerland, is removed from the Amazon rainforest. The main cause of deforestation is intensive agriculture to meet the world's growing demand for food, but also for firewood, construction materials, exotic furniture, and medicine. Many animals, especially in Africa and Asia, are at risk of poaching for the pet trade and for traditional Chinese medicine. Deforestation is causing a great decline in species because it leads to habitat loss.

Habitat loss is caused by The development of infrastructure such as roads or new cities that break apart a habitat. It is also caused by humans moving species to different locations for their own good, or accidental or intentional introduction of Invasive species that unbalance the ecosystem and bring in new diseases and threats that the species in a habitat weren't made for. Habitat Loss is considered to be one of the most damaging consequence of human activity.

Food and Fashion industry involves humans slaughtering animals for fur, leather, cashmere etc. This not only causes a significant decrease in that species but leads to further pollution because of machinery involved in the making process of the materials, and of waste disposal. Usually when leather is made, the rest of the animal is used for food, but not in the case of fur.

Case study: The rusty patched bumble bee

2. **Explain** the criteria used by the IUCN Red List to determine conservation status of a species.

The IUCN red list utilizes a range of criteria to evaluate whether a certain species is under threat and it's designated a specific category according to that particular level. The conservation status categories span from 'least concern' at one end of the scale to 'extinct' at the other end. The criteria used to determine the conservations status of species are as follows; population size (number of mature individuals), population size reduction, geographical range (extent of occurrence and and area of occupancy), number of locations and the quality of their habitats, the extent as to how fragmented the habitat is, the probability of the species extinction, and lastly, the additional factors contributing to the species' vulnerability. When an assessment is being placed for or with the IUCN Red List, one has to ensure that the "taxon being assessed follows the taxonomic standards.

Species that have been kept in the hands of the IUCN are divided in the following groups: Least Concern (LC), Near threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), Extinct (EX)

The first factor the IUCN lists in their criteria is the number of mature individuals in a population. Using the amount of mature individuals can determine the opportunity for their population to reproduce. If a species had a smaller population, the chances of successful breeding is lower and therefore increases the risk of extinction. However, inbreeding is also more likely to occur within a smaller population but it increases the probability of offspring suffering from genetic abnormalities.

The second factor which the IUCN Red List recognises is population size reduction. The loss of individuals within a population is calculated for either three generations of the species or a period of 10 years. If the rate of decline in population size is greater, the risk that the species will become extinct is higher.

Geographical range is a very important component to take into account, since knowing the range in which a species is present makes it easier to control and protect it. The IUCN Red List does this by also analysing the extent of the occurrence (seeing the species), and the area of occupancy of the specie. "The extent of occurrence includes the area of occupancy and may also contain habitats within the boundary not used by the species." (*Kognity, section 3.3.3*).

Area of occupancy → Where the species can normally be found
Area of occurrences → The boundary that can be drawn around the site of the species area of occupancy.

3. **Evaluate** the role of the IUCN Red List.

The IUCN Red List is greatly beneficial towards researching the conservation status of species, with records of around of these being threatened with extinction. It is a database that provides important information about the trends, habitats and threats of certain species, which is available to the public. The IUCN Red List has criteria which determines how threatened a species is, these include the size of its population, the population decrease, its geographical range, and the amount of locations it's found in. Furthermore, the extent of fragmentation of a species habitat, quality of habitat and probability of extinction is also considered when categorized by the IUCN. The IUCN red list plays a prominent role in guiding conservation activities of governments; it works toward spreading awareness of species conservation, which is the first step to helping to conserve the animals.

On the other hand, it has been suggested that IUCN red list can be prone to misuse by governments and groups that draw possibly inappropriate conclusions on the state of the environment or to effect exploitation of natural resources. There are 8.7 million species worldwide, thus the IUCN Red List only provides information on a fraction of all existing species. Therefore, species that are unlisted could still potentially be threatened, especially new species that haven't been discovered yet, however the fact that not enough research has been done leaves this to be unknown. If people are unaware of the threats that certain species face, it may not improve their vulnerability and these species may go extinct before we know or realise it. However, prevention of this can come from overall awareness of respecting our environment, regardless of whether or not a species is near extinction, endangered, vulnerable, or even just least concern.

Another role the IUCN plays is to promote and encourage societies to throughout the world to conserve nature and that our natural resources are being used sustainably to maintain the equilibrium of the world's many ecosystems. They try to influence the actions of governments and businesses by providing advice and information. They also work with WWF and the international conservation monitoring center.

4. **Define** a biological hotspot and **explain** the importance using an example.

A biological hotspot is a region that fulfils two criteria: it must contain over 1,500 endemic species and there must be more than 70% of the original habitat lost. It is an area in which there is a high percentage of plant life and threatened by the loss of habitat. Only around 2.3% of the earth's land is occupied by these hotspots, compared to 15.7 percent formerly. They contain around 50% of plant species as well as 42% of terrestrial vertebrates in the world.

Biological hotspots are extremely significant, because it informs conservationists of the areas that require the most focus and efforts due to the large amounts of threatened species. Additionally, these hotspots are important because they have a vast amount of species, including endemic species, which are species only found in one specific area. This makes them more worthy of protection, as there is a higher level of threatened biodiversity. Only a location that has lost 70 percent of its surface area can be designated as a biodiversity hotspot, which makes them even more important in that most of the species in a biodiversity hotspot are endangered or critically endangered.

There are 34 biodiversity hotspots; The Caribbean islands are threatened by rising sea levels, the Cerrado woodland in Brazil is threatened by intensive agriculture, and the Polynesia-Micronesia hotspot in the Pacific Ocean is threatened by introduction of invasive species. An example of a biological hotspot is Papua New Guinea, which is threatened by several human causes; these include commercial logging, mining activity, agriculture, and population growth. Papua New Guinea is a less economically developed country in which welcomed certain human activities in order to grow their economy.
They are important because their presence has a high concentration of habitats that are vulnerable as well as species found in these geographical regions.

5. **Discuss** the conflict between exploitation, sustainable development and conservation in tropical biomes.

There are a series of different perspectives within
Exploitation of resources is an idea that stems from the viewpoint of a technocentrist, with the belief that natural resources can be taken for our benefit and that technological advances will help humans solve the issues that arise from doing so. Sustainable development stems from the viewpoint of an anthropocentrist, and is the concept of managing resources using policies and regulations to manage natural resources and prevent damage towards the environment. Conservation is supported by conservationists - similar to an ecocentric viewpoint - who believe in the intrinsic value of the tropical forests and are attempting to create minimum disturbance to the forests and ecosystems. Many Less Economically Developed Countries accept multinational logging and mining companies, since it means they receive economic growth. Some people believe habitat loss is what must happen for development to take place, and these views conflict with the ideas of conservationists and ecocentrics. Tropical biomes are mostly threatened by the high level of deforestation that takes place, for the sake of using materials such as wood for economic growth within society.

An organization that works on conserving biodiversity is the International Plant Protection Convention, which is ratified by more than 180 nations. The organizations strives to prevent the spread of disease that could affect food security, especially in Less Economically Developed Countries, and infected plants and thus disrupt the ecosystems equilibrium. Another organisation is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES has been ratified by more than 180 nations and aims to make sure that international trade does not have adverse effects on biodiversity. Aims to combat the exotic pet and wildlife trade. Focuses on legislation.