



Ecology and Biodiversity

With Dr. Declan McGlade



Let's review!

Ecology

Eco – Means “house”

Ology – at the end of a word means the study of something

So when we are studying ecology we are studying everyone's house – The whole planet

Not just the planet but everyone and everything living on it

But saying that we're studying **LITERALLY** everything is a bit silly



We can't try to study the whole planet all at one time, we'll never get anywhere

B.B.E.C.P.O

- B: Biosphere
- B: Biome
- E: Ecosystem
- C: Community
- P: Population
- O: Organism

BIG

Small



B.B.E.C.P.O: Organism

- Let's start at the bottom – The smallest thing is the organism
- An **Organism** is a single living thing: A wolf, A deer, An ant, A tree... a bacteria?
- Even micro-organisms, they are included in Ecology
 - They're super important actually!
- In B.B.E.C.P.O the **O** stands for one **organism** or **one type** of organism



B.B.E.C.**P**.O: Population

- What if we have a group of wolves or a group of deer?
- Now we have a population
- Ecologists can look at whole populations and how the size can affect the organism
- In B.B.E.C.**P**.O the **P** stands for **Population** or a group of organisms of the same type



B.B.E.C.P.O: Community

- What if we have different populations of organisms
 - Like... deer and wolves
- Now we have a **community**
- The community can have lots of **interactions**
 - Deer eat leaves and grass – The plants are interacting with the deer
 - Wolves eat deer and the deer run away – The wolves are interacting with the deer but this affects how they interact with the plants too!
 - Wolves and deer both make poo! – This helps the plants grow, they are both interacting with the plants!
- In B.B.E.C.P.O the **C** stands for **Community** or different groups of organisms **interacting**



B.B.E.C.P.O: Ecosystem

- Now we start to think **BIG**, we think about the **Ecosystem**
- We don't just think about living things without thinking about **WHERE** they live
- This is when we start to think about **non-living** things like temperature, rain, rivers and dirt
 - The word we use for non-living things is **abiotic**
 - So the word we use for living things is **biotic**
- In B.B.E.C.P.O the **E** stands for **Ecosystem** or how the **living and non-living** things affect each other



B.**B**.E.C.P.O: Biome

- Biomes are parts of the world that have a similar **climate**
- Difference between weather and climate
 - Weather – It's sunny or it's raining
 - Climate – How often it rains and how often it is sunny
- Lots of different types of biomes
 - Desert
 - Rainforest
 - Grasslands
- In B.B.E.C.P.O the **B** stands for **Biome** or the type of climate that an area



B.B.E.C.P.O: Biosphere

- The biggest one is the Biosphere
- **The biosphere is anywhere you can find life on earth (Basically everywhere!)**
- The biosphere can change and does change all the time
- In B.B.E.C.P.O the first **B** stands for **Biosphere** or anywhere you can find life on earth

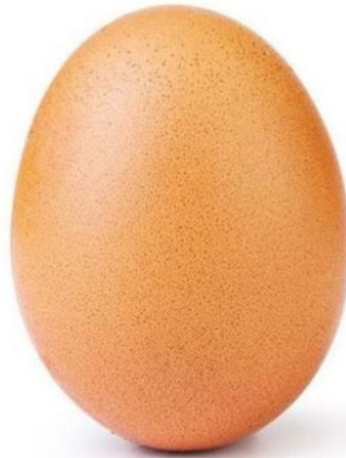


Loss of Biodiversity – H.I.C.O.P.



The five main things that can cause loss of biodiversity

Cascade effects - BAD



Cascade effects - GOOD



What we learned from this

“The powerful negative effects that human actions can have on the world”

Even though they might not seem obvious at first!



“The powerful ~~negative~~ effects that human actions can have on the world”

Loss of Biodiversity – H.I.C.O.P.



The five main things that can cause loss of biodiversity

What is biodiversity?

- Biodiversity is the *variety and variability* of life on earth
- Or *how much variety of life* is on earth or in an ecosystem

Think back to our wolves in the park

Did the biodiversity increase?

Biodiversity is important in an ecosystem and in the whole world because it ***maintains the balance in an ecosystem!***

H.I.C.O.P

- H - Habitat Loss
- I - Invasive Species
- C - Climate change
- O - Overharvesting
- P - Pollution

Some times these things can occur *naturally*

Secondary Succession



Established
climax
community

Human impacts

Anthropogenic



H – Habitat Loss



- This is probably the worst threat to organisms and the biggest threat to biodiversity caused by humans
- There are 25,000 endangered species and almost all (85%) of them are endangered because of their habitats being destroyed
- Humans will destroy habitats for all sorts of reasons – farming, mining, building, making dams
- For the Orangutans in Borneo, a lot of the deforestation is done to grow palm trees to make palm oil

Some real criminals for habitat loss...



Desertification



Do you think biodiversity and climate change are the first thing this man is thinking about?

Desertification can happen because of **overgrazing**

After deforestation, farmers bring in lots of animals that graze on grass and other small plants

They never give the ecosystem a chance to grow or **regenerate**

It will eventually become a desert - **Desertification**

I - Invasive Species



Grey squirrel in Ireland



Niche – Ecological Space

European rabbits in Australia



C – Climate Change



Climate change is a bigger problem for some parts of the world than others...

In parts of east Africa we are seeing more and more droughts which is a huge threat to Biodiversity

The animals there can't cope with ***how fast the environment is changing***

Polar bears in particular are suffering a lot... we are starting to find polar bear that have drowned because ***the ice is melting*** and they have to swim farther and farther...

O - Overharvesting



Overharvesting is a huge problem too!

Humans have been harvesting or hunting and killing A LOT of animals for a long time

The problem is that for the longest time we didn't think about how much of an effect we were having in such a short time

We never gave species / populations / ecosystems a chance to regenerate

Think about the predator-prey relationship! It's based on balance. Humans didn't do this for the longest time

Ecosystems are all about balance

P - Pollution



P - Pollution



Sometimes humans cause damage to ecosystems and the environment without even thinking about or or by making mistakes

One of the worst pollution events happened when the “Deep water horizon” oil rig exploded and spread oil all over the gulf of mexico in 2010

Deep water horizon oil spill



- 176,000 km²
- How big is Ireland?
- 84,000 km²
- It covered more than twice the size of Ireland in oil

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Mass extinctions

