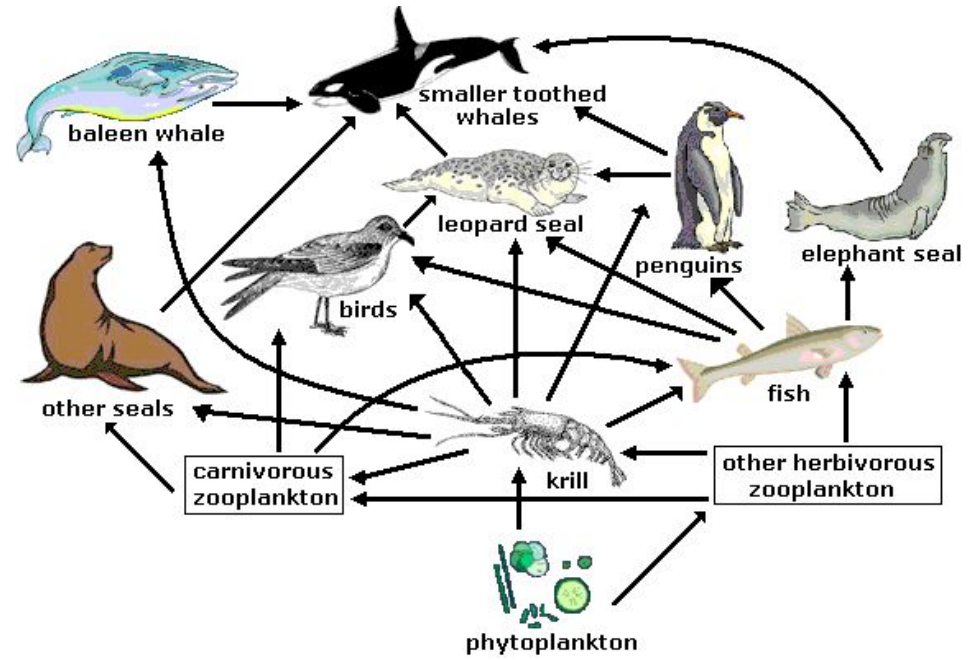
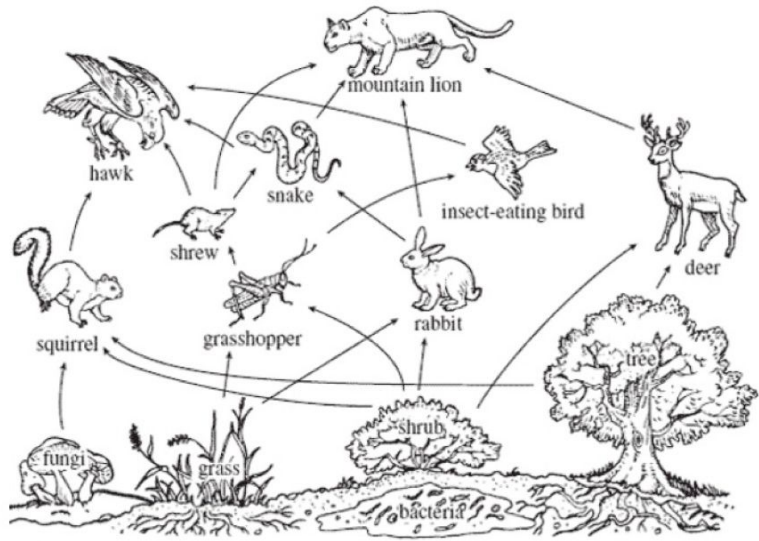


The 4 Laws of Ecology

Commoner's Laws

1. Everything is connected to everything else



- The essence of life begins with light from the sun
- Each species is a link in a food web
- If one species in a web is removed, many other parts of the web are changed
- Maintaining these complex food relationships and interdependencies is crucial for a healthy, biodiverse community; no one species can be managed without considering many other species in the ecosystem
- Competition between species can be beneficial as well as detrimental in the welfare of plant and animal species
- Alterations in prey populations directly alter predator populations, and vice versa. Predator-prey relationships must be in balance

2. Everything has to go somewhere

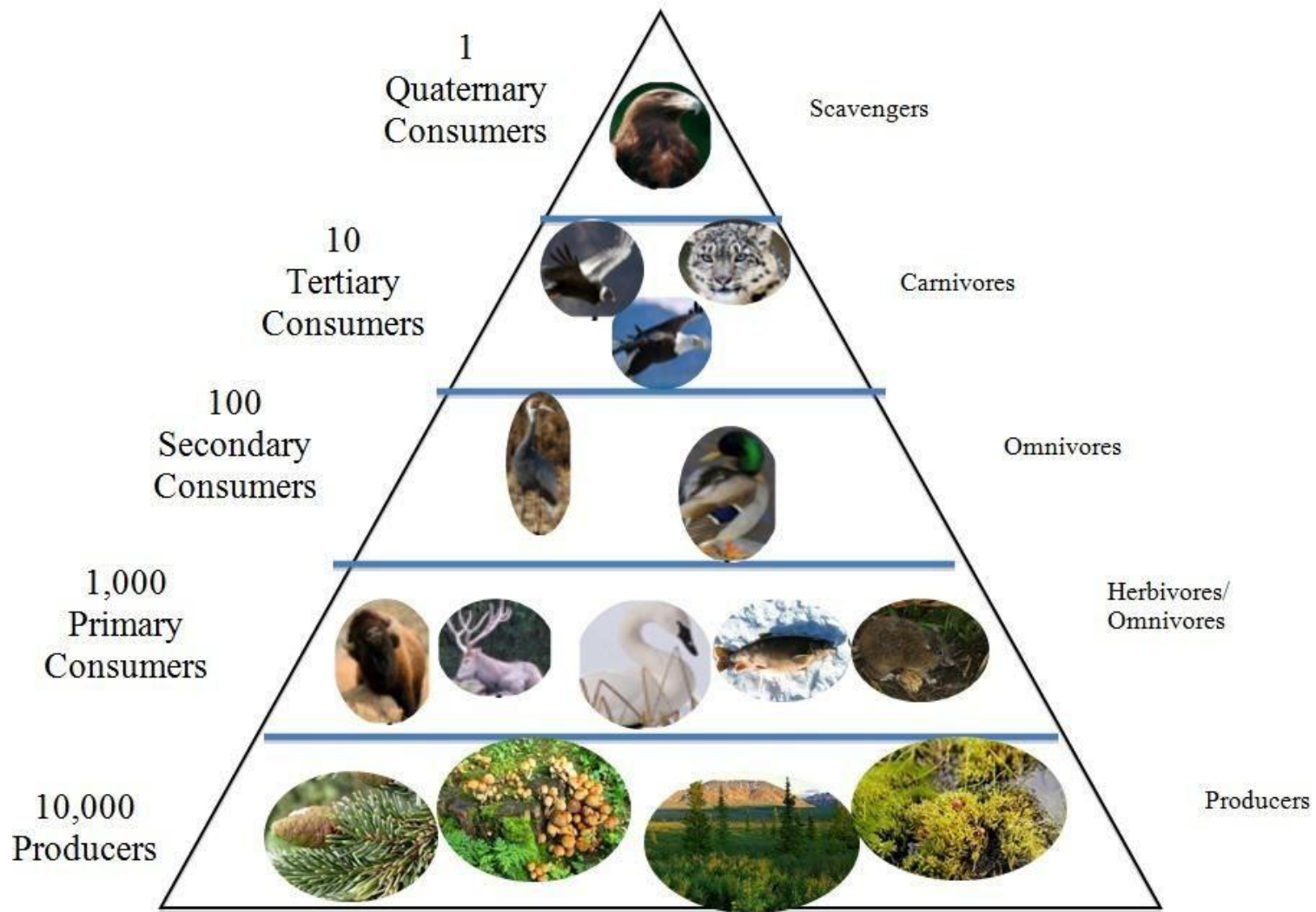
The earth is a closed system containing all the minerals, water, soil and air that we will ever have

There is a continuous cycle and flow of energy, nutrients, water and gases essential to all members of an ecosystem

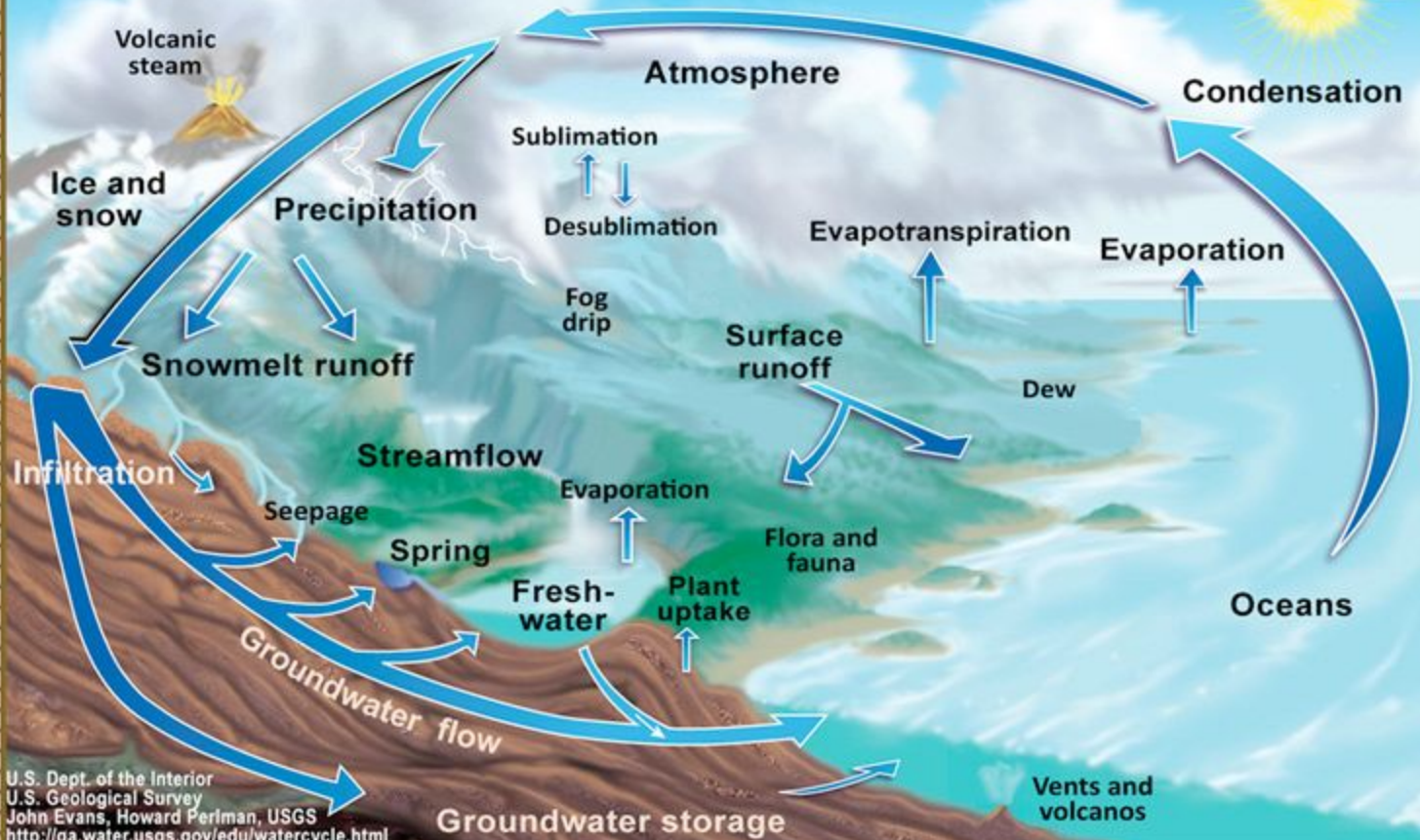
Each individual plays a specific role in assuring the continuation of these cycles

Energy moves in one direction in the ecosystem, dissipating heat as it moves up a food pyramid

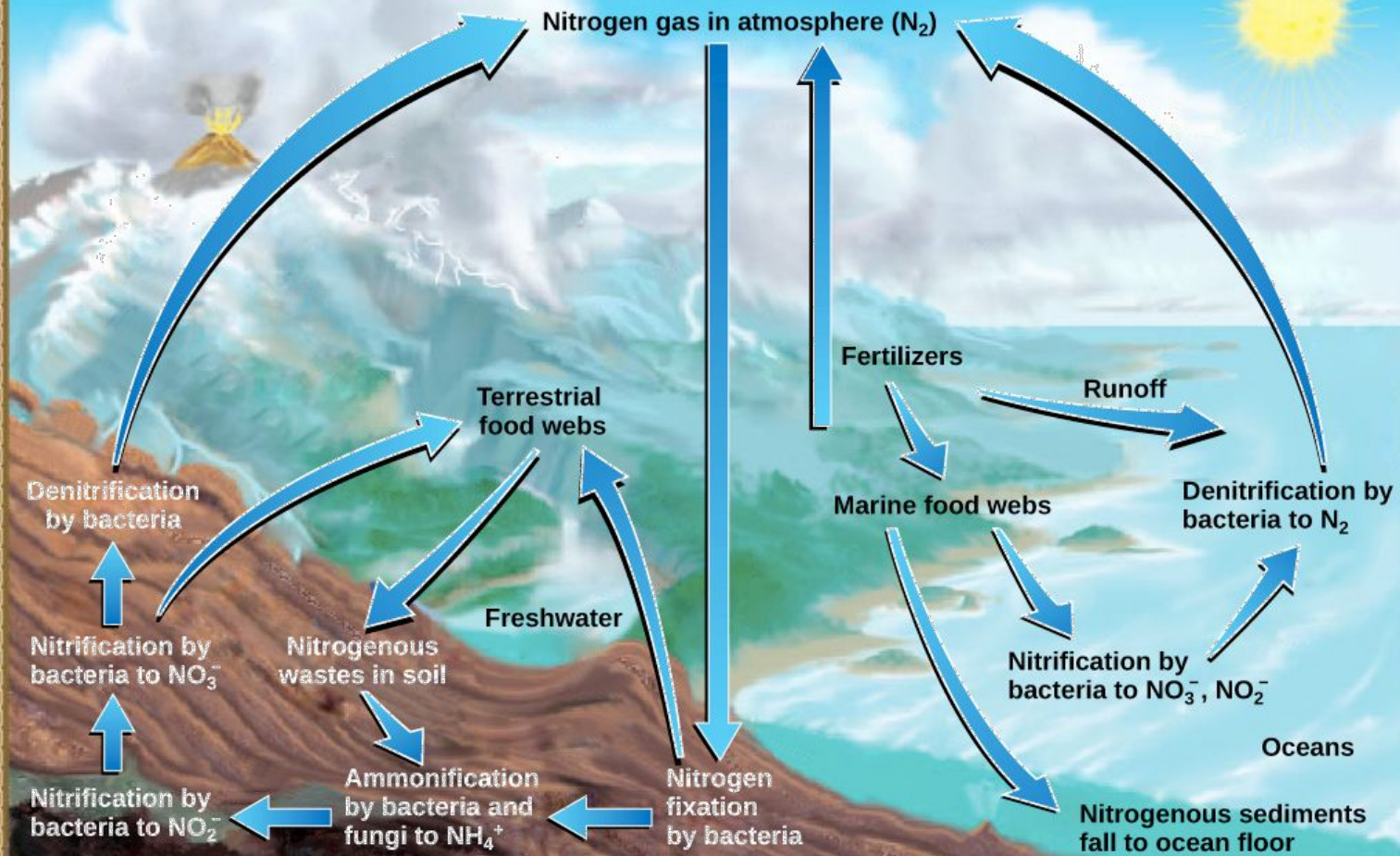
This law also applies to chemicals, pollutants and hazardous materials. As these harmful materials recycle, they lodge in many organisms including humans.



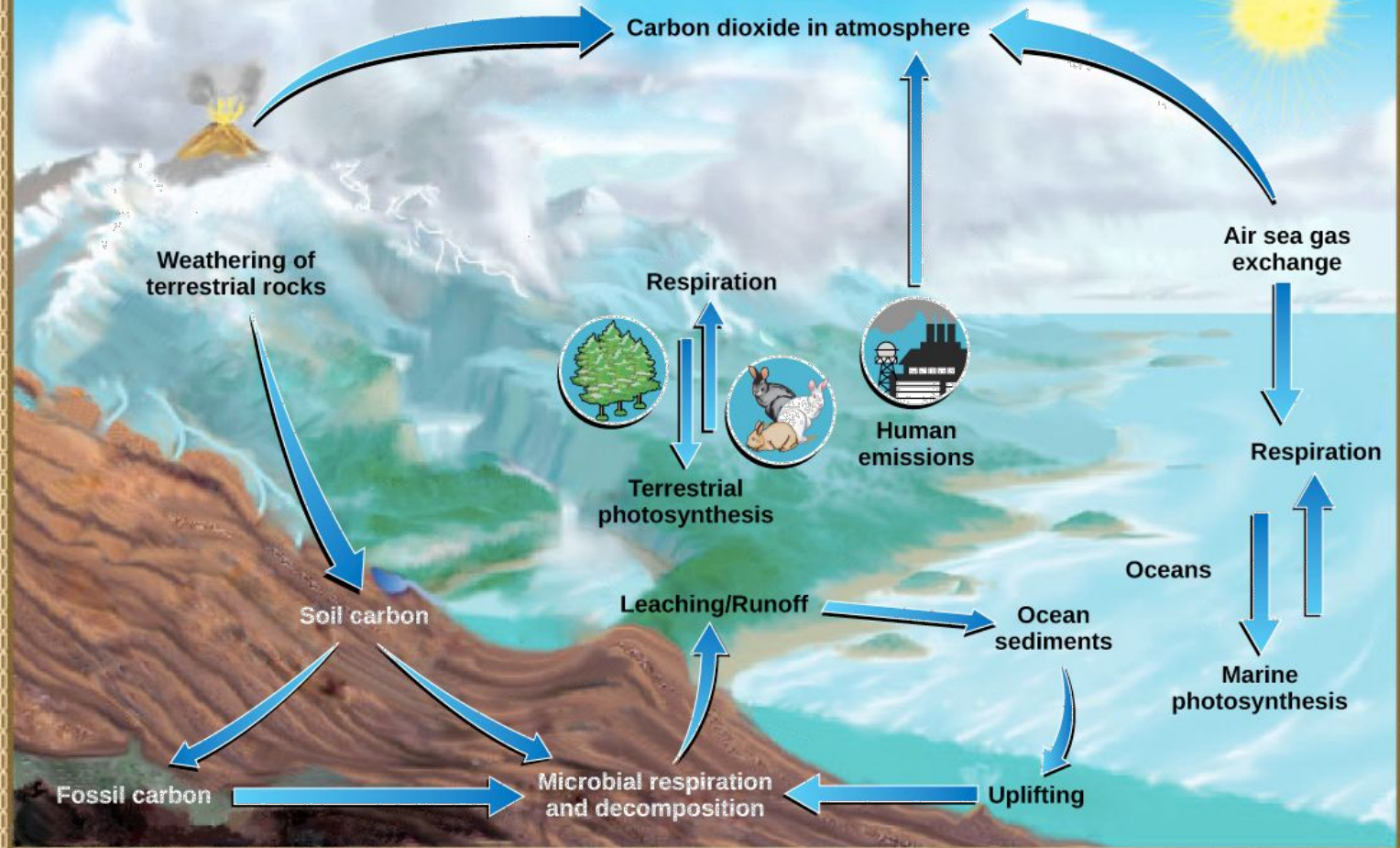
The Water Cycle



The Nitrogen Cycle



The Carbon Cycle



3. Everything is always changing

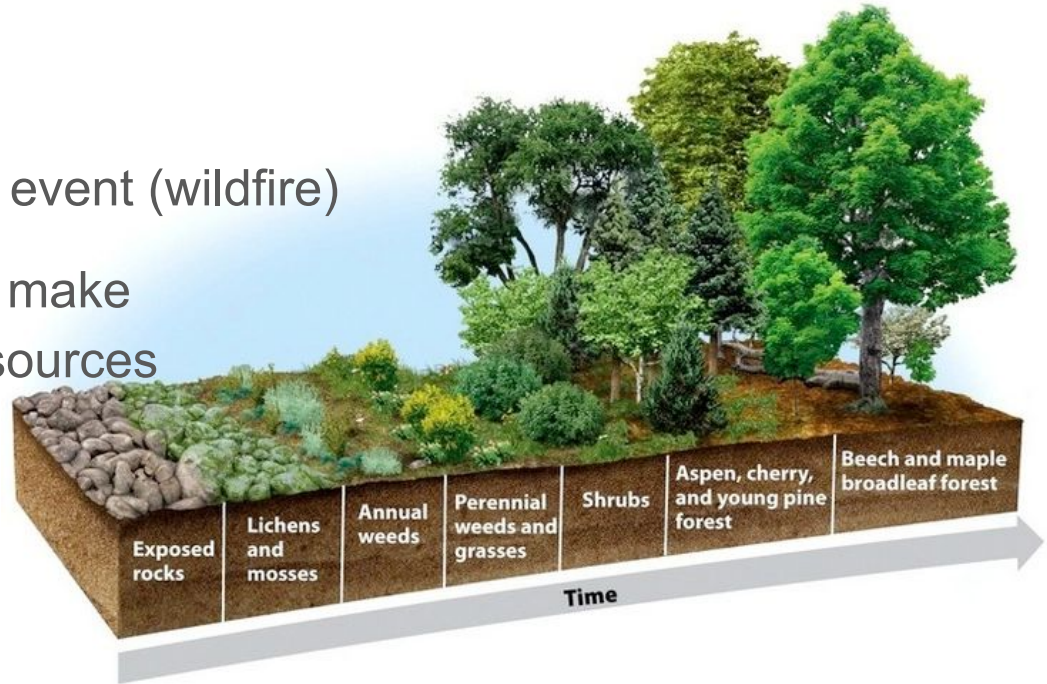
Ecological succession - The plant and animal species of a community change over long periods of time

Primary - no life previously

Secondary - after a catastrophic event (wildfire)

Organisms adapt to survive and make better use of an ecosystem's resources

Stable, mature forest is the goal



Adaptation and natural selection

- Physical change - camouflage, coloration, specialization
- Behavioural change - migration, feeding behaviour, symbiosis
- Metabolic change - hibernation, estivation



The Choluteca Bridge in Honduras



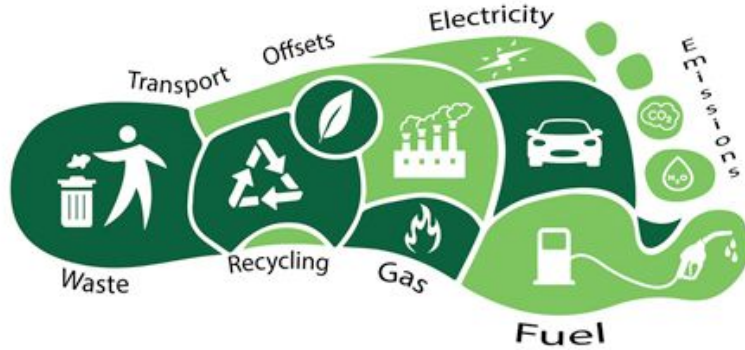
4. There is no such thing as a free lunch

Everything we eat, wear and use during our lives involves an environmental cost

We must balance consumption and natural resources for the benefits of all life on earth

Our individual actions can have great impacts on the environment, both negative and positive

4. There is no such thing as a free lunch



Carbon Footprint



Ecological Footprint

4. There is no such thing as a free lunch

Carbon vs. Ecological Footprints

Carbon Footprint	Ecological Footprint
Measures CO2 generated by activities	Measures renewable and non-renewable resources used
Only includes carbon emission numbers	Includes both carbon emissions and environmental impact
Can be used for Carbon Credit Marketplace	Used to gauge global consumption
Directly impacts climate change	Directly impacts continuing life on Earth

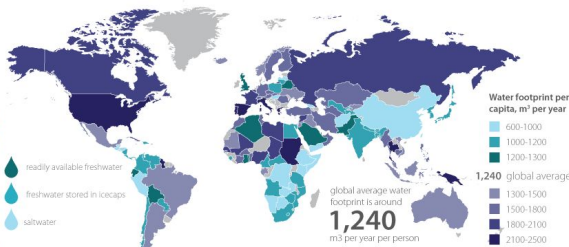
4. There is no such thing as a free lunch

the global water footprint



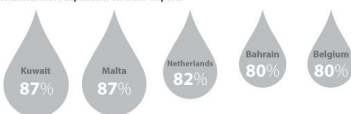
The 'water footprint' of a country is defined as the volume of water needed for the production of goods and services consumed by the inhabitants of the country.

amount of freshwater available



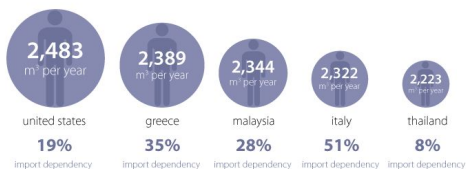
global average water footprint is around **1,240** m³ per year per person

countries most dependent on water imports

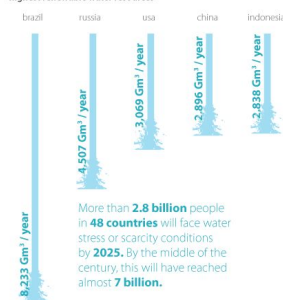


70% of existing freshwater is withdrawn for irrigation in agriculture

the highest water footprints per capita



highest renewable water resources

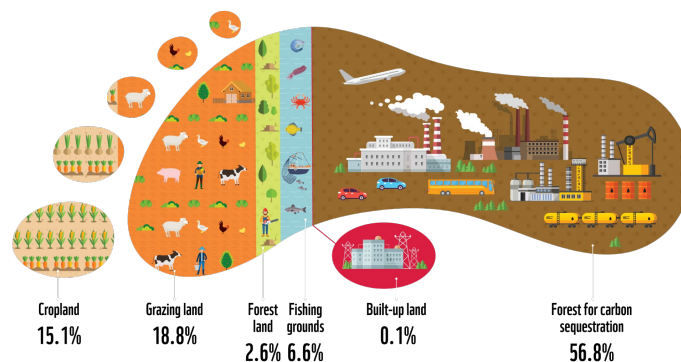


More than **2.8 billion** people in **48 countries** will face water stress or scarcity conditions by **2025**. By the middle of the century, this will have reached almost **7 billion**.

water footprint of different foods



Water Footprint



Land Use and Sustainability

Source: WaterFootprint.org and WWF

THE APPAREL INDUSTRY

By the Numbers



68

POUNDS

The amount of clothing that the average American discards each year, 85% of which ends up in landfills or incinerators.



4%

The percentage of global landfills that are filled with clothing and textiles.

700
GALLONS

The amount of water it takes to produce a single cotton T-shirt.



2.6%

The percentage of global water used for growing cotton.

99%



The estimated percentage of used clothing that is recyclable.

Conclusion:

The costs of our changes and alterations to the environment must not be greater than the benefits.

Ecosystems are complex and maintain a delicate balance, and understanding the finer points of how ecosystems work helps us to make better decisions about the choices we make and how we live our lives and use the earth's resources.