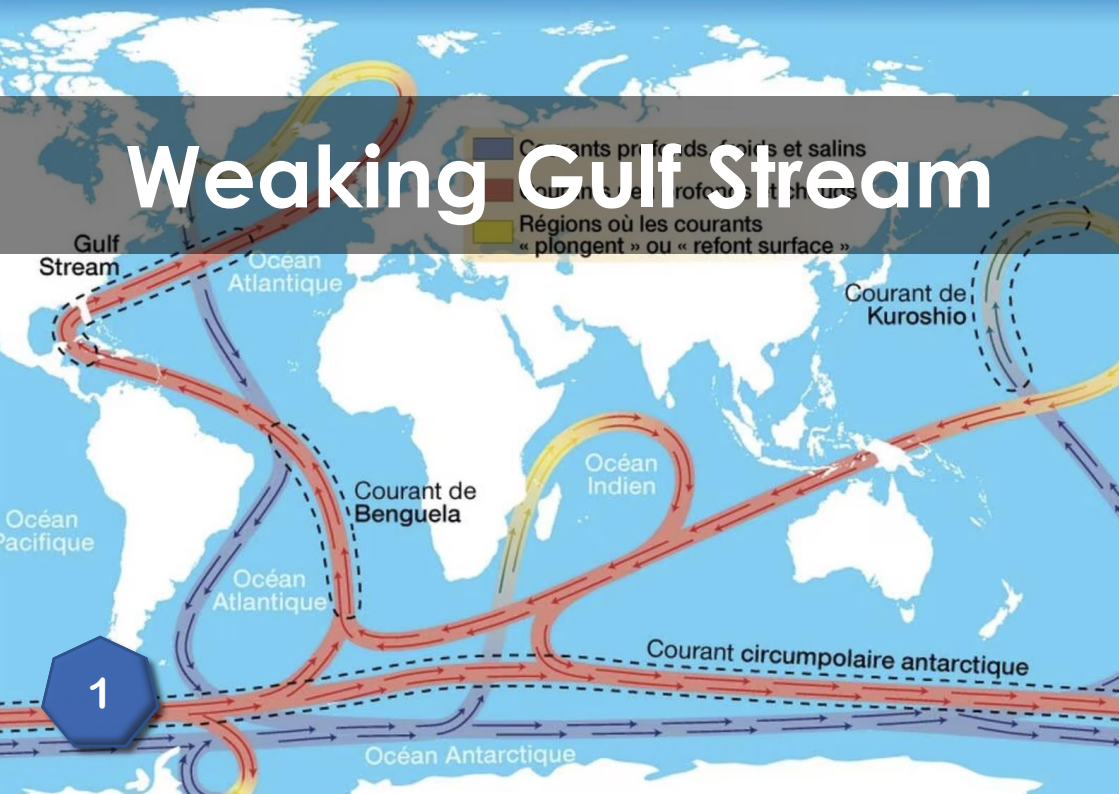
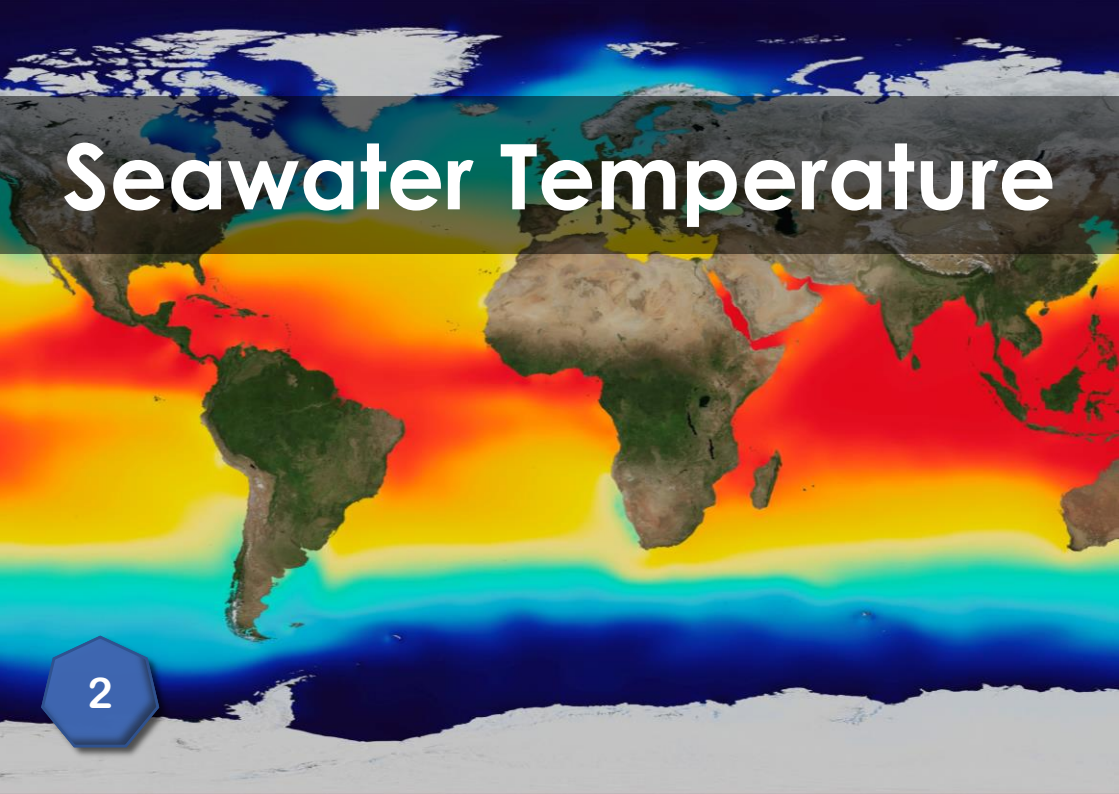
Weaking Gulf Stream



This is where it all begins…

Set 1

Seawater Temperature

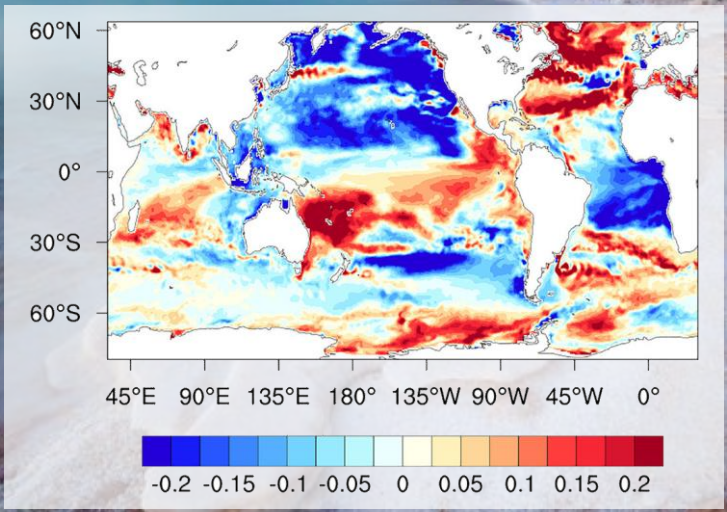


2

Ocean currents carry heat from the equator to the poles and bring cold from the poles back to the equator, ensuring that the world's oceans are constantly mixing.

Set 1

Ocean Salinity



12

As water moves towards the North Pole, it gets colder. It also has a higher concentration of salt, because the ice crystals that form trap water while leaving salt behind.

Set 1

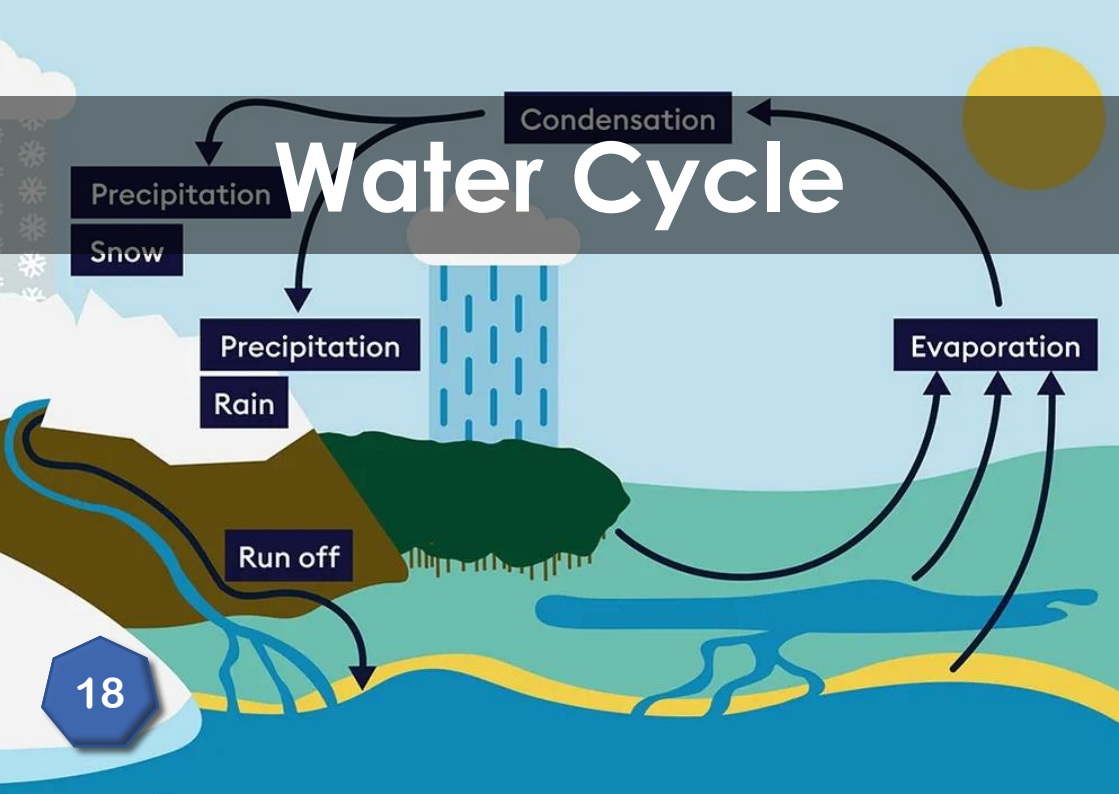
Seawater Evaporation

13

13

Seawater evaporation is the process by which water from the ocean or other bodies of saltwater is converted to water vapor through heat and atmospheric pressure changes. Evaporation is a key component of the global water cycle, as it is the primary way that water is transferred from the ocean to the atmosphere.

Set 1


Water Cycle
Condensation
Precipitation
Snow
Precipitation
Rain
Evaporation
Run off
18

18

The water cycle, also known as the hydrologic cycle, is the continuous process by which water is circulated between the Earth's surface and the atmosphere.

Set 1

Air Humidity

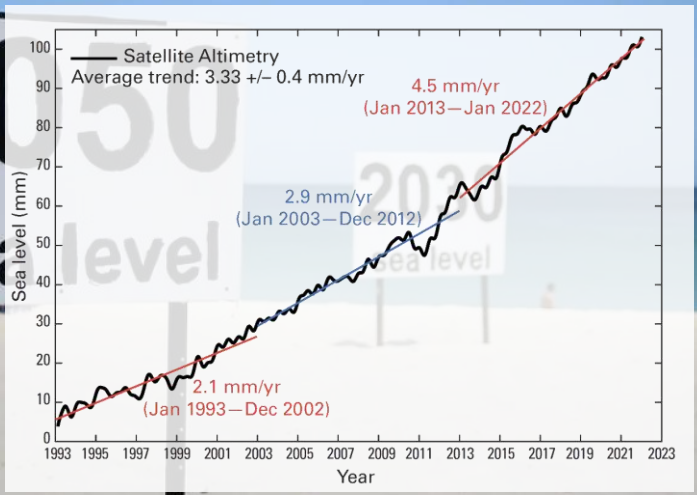
19

Air humidity refers to the amount of moisture or water vapor present in the air.

The amount of water vapor that the air can hold depends on the temperature and pressure of the air.

Set 1

Rising Sea Level

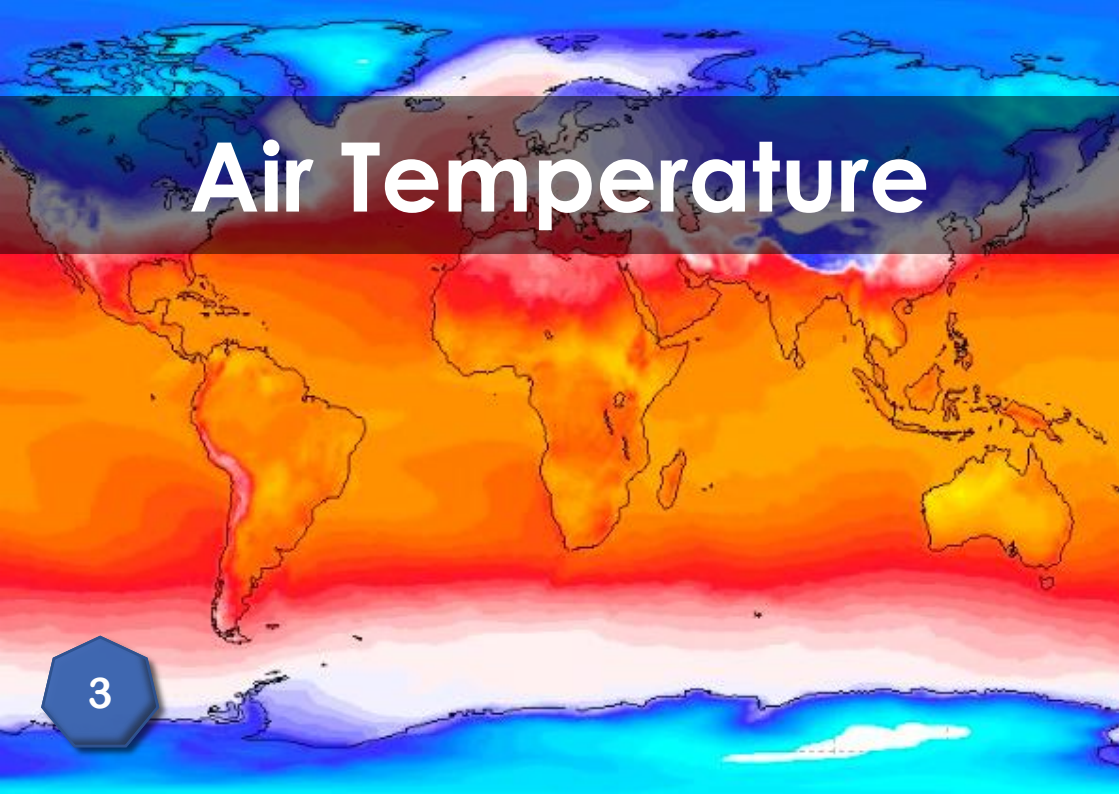


20

Sea level has been rising year by year. This is caused by the thermal expansion of ocean waters and the melting of glaciers and ice sheets.

Set 1

Air Temperature



3

Ocean currents transport heat from low latitudes to high latitudes, and transport cold from high latitudes to low latitudes, maintaining the global heat balance. Warm currents transport heat to the air, and cold currents transport cold to the air.

A weakening of the Gulf Stream will reduce this heat exchange.

Set 2

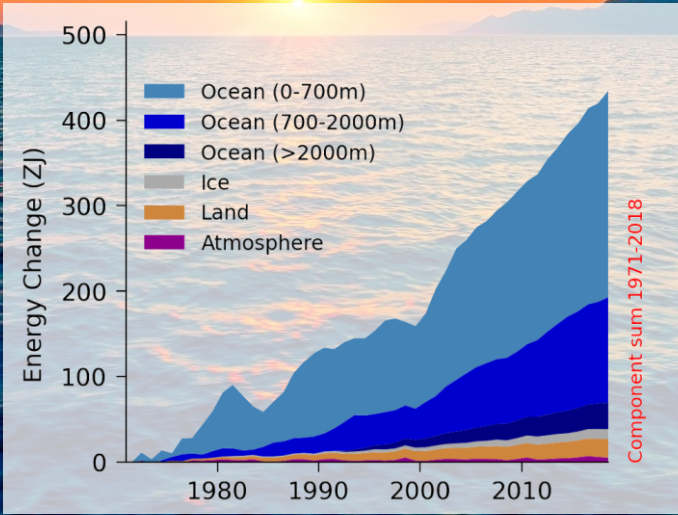
Climate Change

4

Climate change refers to long-term changes in the Earth's climate system, including changes in Earth's surface temperature, precipitation patterns, sea levels, and polar ice caps.

Set 2

Energy Budget



5

This graph explains where the energy accumulated on Earth due to radiative forcing goes. It warms up the ocean, melts ice, dissipates into the ground and warms up the atmosphere.

Set 2

Radiative Forcing

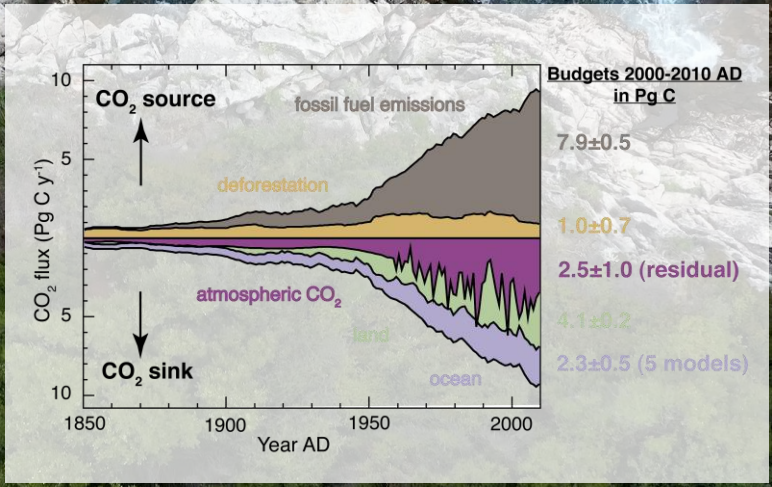
6

6

Atmospheric greenhouse gases such as carbon dioxide, methane and nitrous oxide trap radiation emanating from the Earth's surface, resulting in less energy being radiated back into space.

Set 2

Carbon Cycle



7

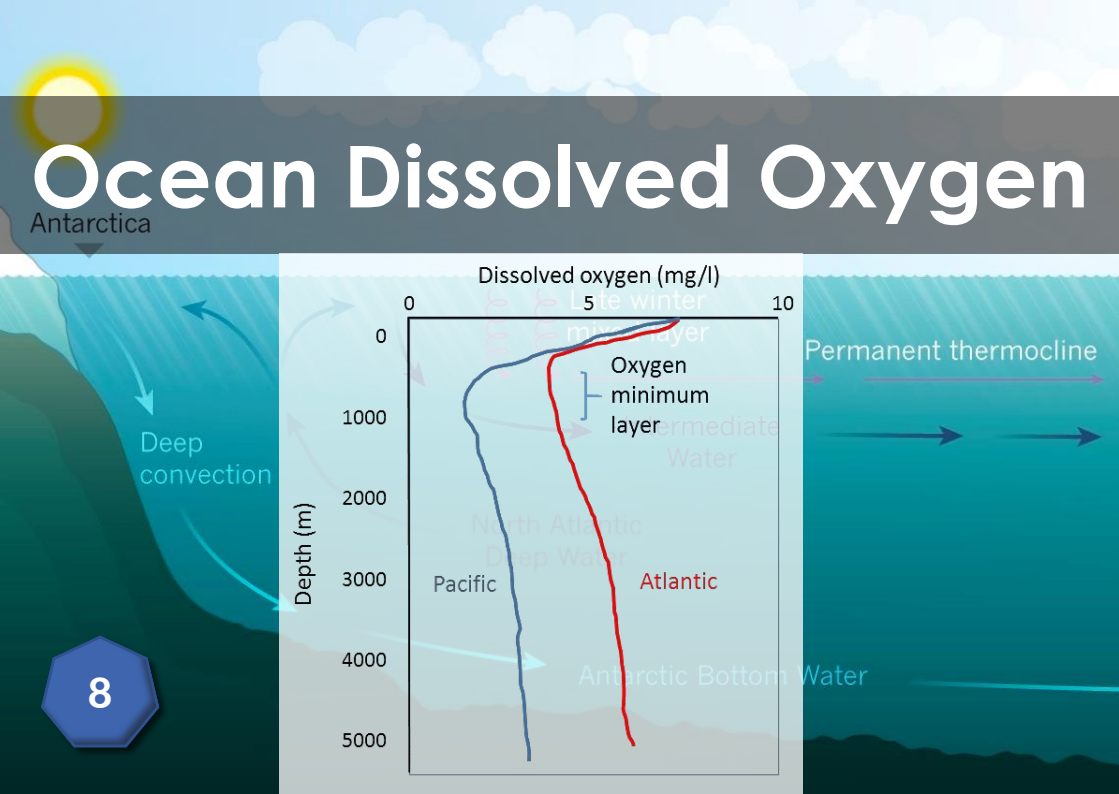
Half of the CO_2 we emit every year is absorbed by carbon sinks:

- 1/4 by vegetation via photosynthesis
- - 1/4 by the oceans

The remaining half stays in the atmosphere.

Set 2

Ocean Dissolved Oxygen

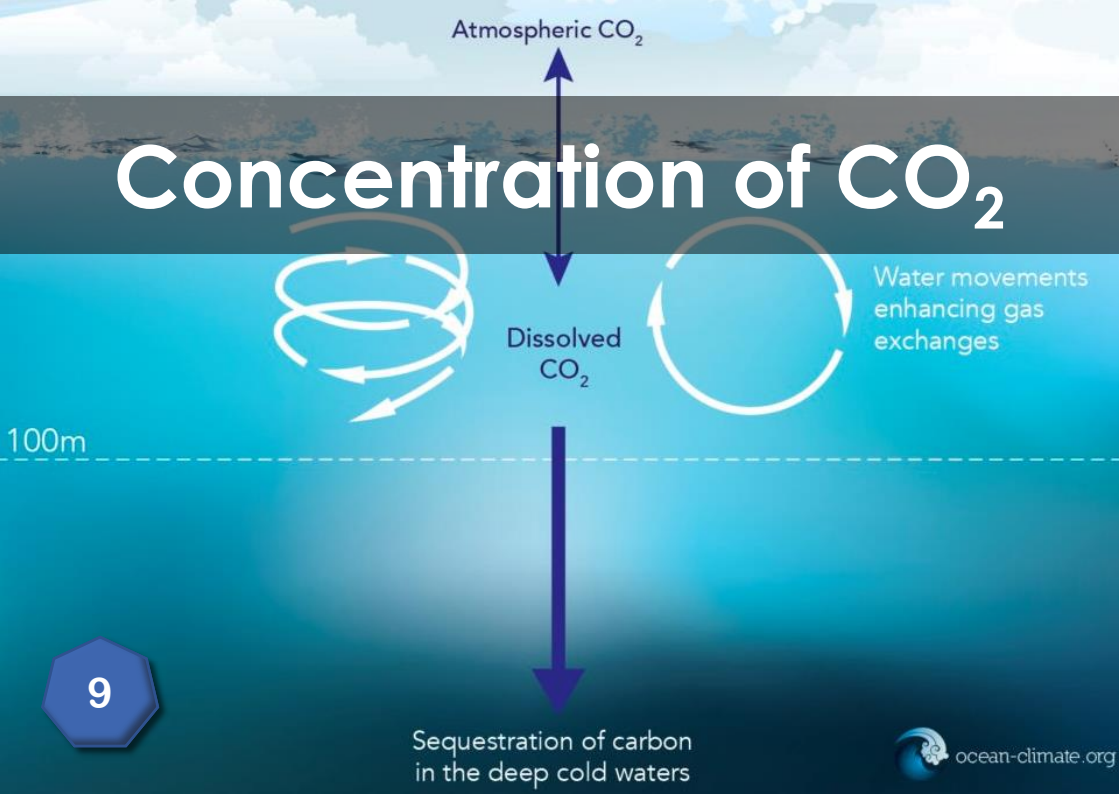


8

Ocean dissolved oxygen refers to the amount of oxygen that is dissolved in seawater. Like most living organisms, marine life needs oxygen to survive.

The level of dissolved oxygen in the ocean is influenced by a variety of factors, including temperature, salinity, and the amount of photosynthesis that occurs in the water.

Set 2

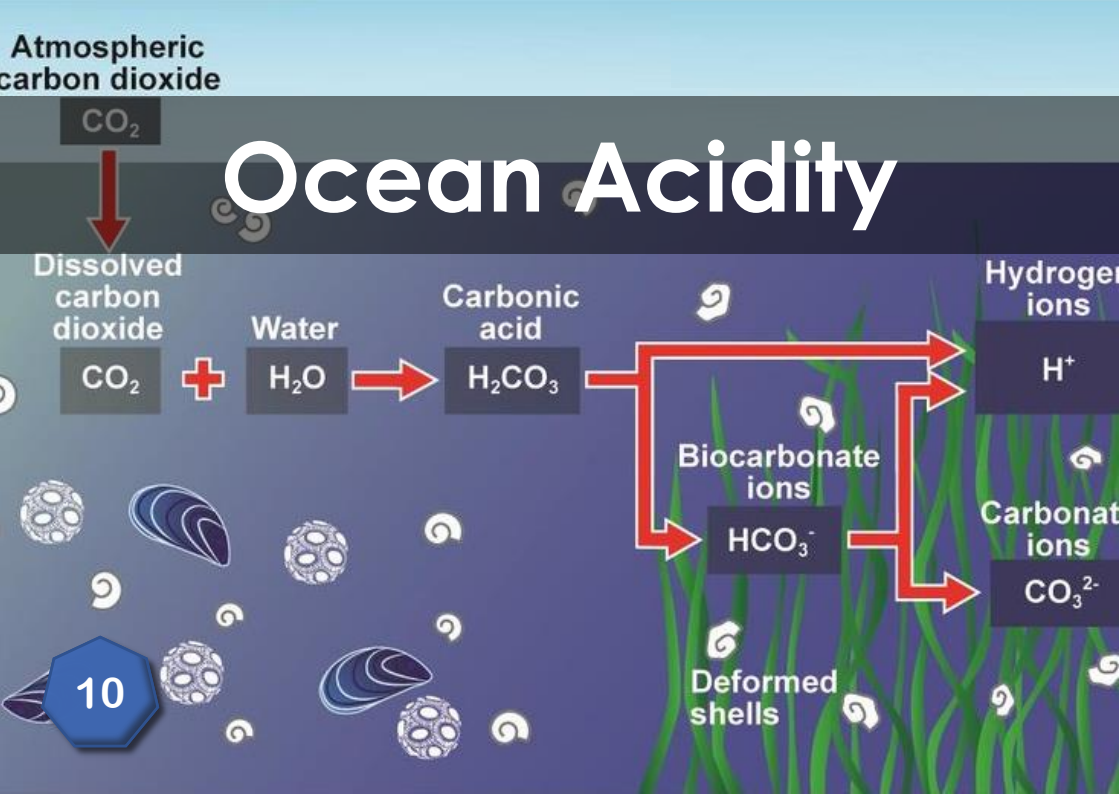


Concentration of CO_2

9

Seawater can absorb carbon dioxide (CO_2) from the atmosphere.
This occurs primarily at the surface of the ocean, where CO_2 in the air above the water dissolves into the uppermost layer of seawater.

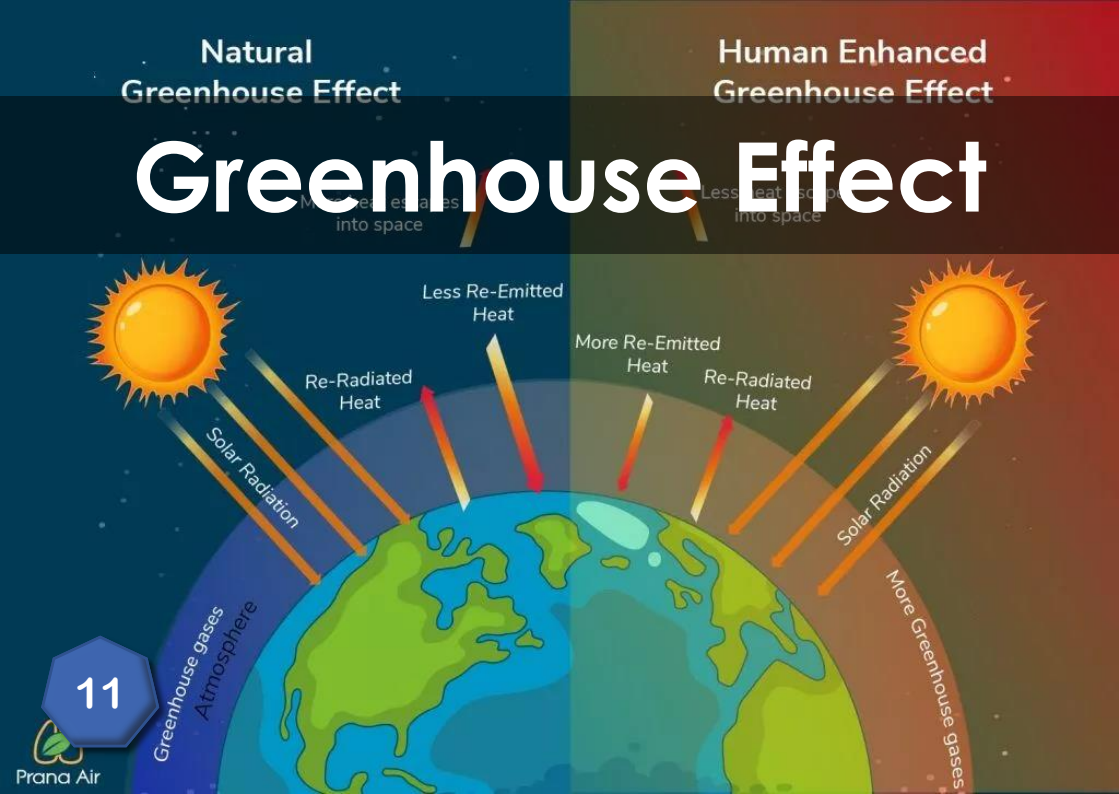
Set 2


Atmospheric carbon dioxide
CO_2
Ocean Acidity
Dissolved carbon dioxide
CO_2
Water
H_2O
Carbonic acid
H_2CO_3
Hydrogen ions
H^+
Biocarbonate ions
HCO_3^-
Carbonat ions
CO_3^{2-}
Deformed shells
10

9

The amount of CO_2 absorbed by the ocean affects the pH value of seawater.

Set 2


Natural
Greenhouse Effect
Human Enhanced
Greenhouse Effect
Greenhouse Effect
into space
into space
Less Re-Emitted
Heat
Re-Radiated
Heat
Solar Radiation
Greenhouse gases
Atmosphere
More Re-Emitted
Heat
Re-Radiated
Heat
Solar Radiation
More Greenhouse gases

Prana Air

11

The greenhouse effect is a natural phenomenon. Without the greenhouse effect, the Earth would be 33°C cooler and life as we know it would not be possible.

But carbon dioxide and other greenhouse gases in atmospheric increases can exacerbate the greenhouse effect and throw the climate off balance.

Set 2

Cyclone

14

Cyclones draw their energy from warm water at the surface of the ocean. They are getting stronger because of global warming.

Set 3

Melting Sea Ice

15

Sea ice melting does not make the sea level rise (just as a melting ice cube does not make a glass overflow).

When it melts, the white ice gives way to much darker sea, which absorbs more sun rays.

Set 3

Melting Glaciers

16

Melting glaciers refer to the process by which glaciers, large masses of ice and snow, are reduced in size and volume due to rising temperatures and changing climate patterns.

Set 3

Rainfall

17

Rainfall refers to the amount of precipitation in the form of rain that falls to the ground from the atmosphere. Rainfall is a crucial component of the water cycle, which describes the continuous movement of water between the atmosphere, oceans, land, and living organisms.

Set 3

Freshwater Resources

21

21

Freshwater resources are affected by changes in rainfall and by the melting of glaciers that regulate the flow of rivers.

Set 3

Terrestrial Ecosystem

23

Terrestrial ecosystem refers to a community of living organisms and their physical environment that exists on land.

Set 3

Marine Ecosystem

24

Marine ecosystem refers to a community of living organisms and their physical environment that exists in the ocean or other saltwater environments, such as estuaries and coral reefs.

Set 3

Agriculture

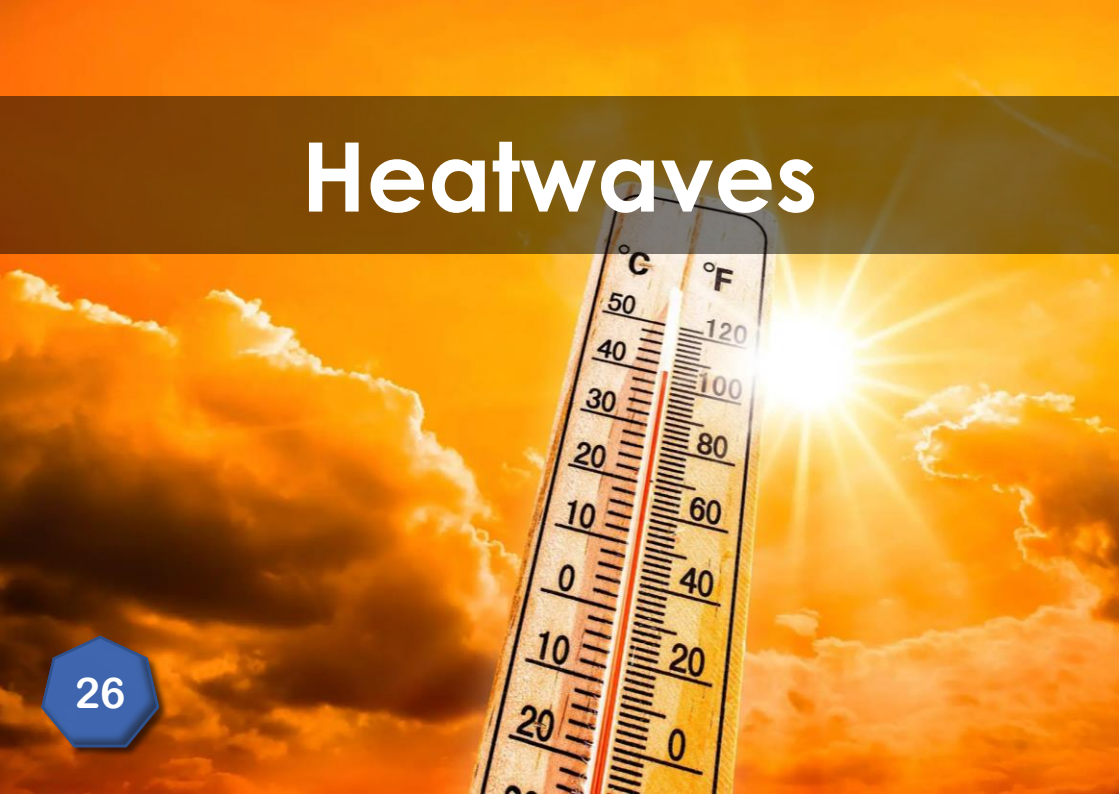
25

25

Food production can be affected by temperature, droughts, extreme weather events, floods and marine submersion (e.g. the Nile Delta).

Set 4

Heatwaves



26

One consequence of higher temperatures is more frequent heatwaves.

Set 4

Extremely Cold Weather

27

One of consequences of lower temperatures is more extreme cold.

Set 4

Drought

28

The disruption of the water cycle can both increase and decrease rainfall. A lack of rain can cause drought. Droughts are likely to become more frequent in the future.

Set 4

River Flood

29

The disruption of the water cycle can both increase and decrease rainfall. More rain can lead to river flooding. If the soil is very dry, it makes matters worse because the water runs off it.

Set 4

Marine Submersion

30

Marine submersion, also known as coastal or tidal flooding, refers to the temporary inundation of coastal areas by seawater.
This can occur as a result of a combination of factors, including high tides, storm surges, and sea level rise.

Set 4

Fishery

31

Fishery refers to the activity of catching, harvesting, processing, and selling fish and other aquatic organisms for food or other purposes.

Set 4

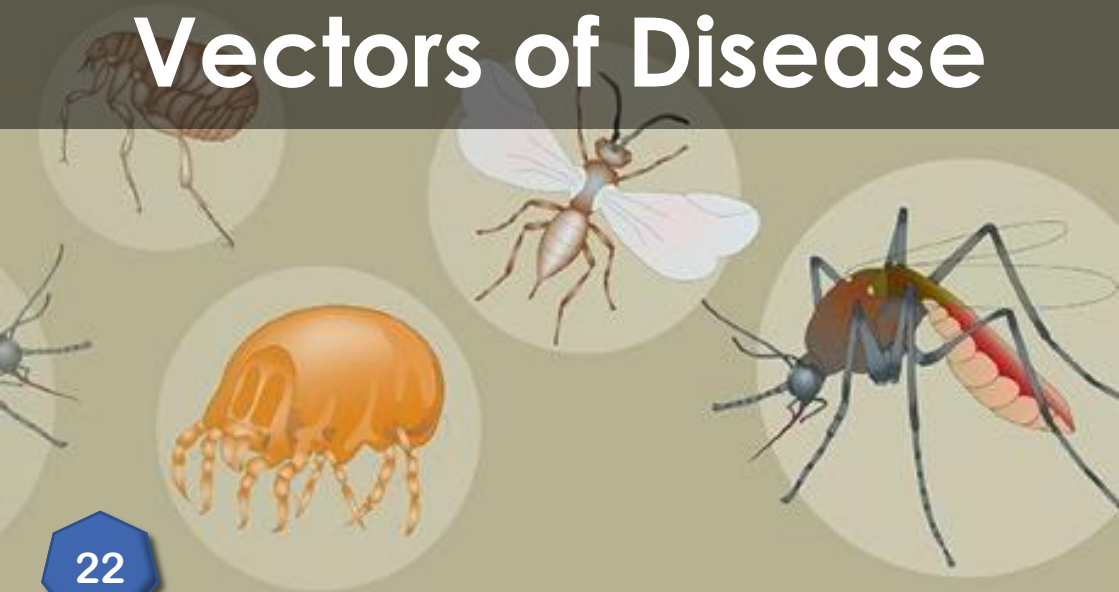
Economy Decrease

32

Economic decreases can occur for a variety of reasons, including economic recessions, financial crises, natural disasters, or other external shocks to the economy.

Set 4

Vectors of Disease



22

Some animals carry diseases. Global warming causes them to migrate, possibly reaching human populations that have no immunity against these diseases.

Set 5

Infrastructure

33

Cold weather may cause damage or paralysis of pipelines, roads, bridges, utility poles and other infrastructure, resulting in traffic paralysis, interruption of water and electricity supply, etc.

Set 5

Forest Fires

34

Forest fires start and spread more easily during droughts and heatwaves.

Set 5

Climate Refugees

35

Climate change can lead to a range of environmental and social impacts, including sea level rise, drought, flooding, and extreme weather events, which can in turn lead to displacement of populations.

Set 5

Human Health

36

Hunger, new vectors of disease, heatwaves and armed conflicts can have a negative effect on human health.

Set 5

Food Crisis

37

Food crises can be caused by natural disasters, conflict and violence, economic shocks, and environmental degradation.

Set 5

Famine

38

Famines are mainly caused by natural and human factors, such as climatic causes, natural disasters, wars and conflicts, poverty and economic problems, etc.

Set 5

Conflict

39

We shouldn't let it come to this…

Set 5