

Galway Atlantaquaria

Ocean Literacy Principles



Welcome to Galway Atlantaquaria, Ireland's largest native species aquarium

Is mian le Galway Atlantaquaria léargas cuimsitheach ar an saol faoi uisce a sholáthar i dtaispeántais atá soiléir agus suimiúil, le cúnamh foirne atá eolach cuiditheach agus beoléirithe spreagúla.

Galway Atlantaquaria, National Aquarium of Ireland seeks to present a comprehensive view of the world of water through clear and interesting displays, informed helpful staff and exciting live presentations and animal interaction sessions.

This is achieved through accurately displaying aquatic life in a manner that reflects their natural habitats, providing an enjoyable and educational environment to learn about the diverse marine ecosystem of Ireland.

As Ireland's largest aquarium we strive to ensure that a visit to the aquarium is original and full of wonder for visitors of all ages.



Ocean literacy informs our ethos.

Ocean literacy Framework

Our interpretation of the ocean principles is a work in progress. Initially the project was only supposed to be a weekly post on social media, but as the series grew it makes sense to combine all the ‘interpretations’ into one ocean principle document.

We hope you enjoy our interpretation of the **Ocean Principles¹**; you may use these in any classroom or education setting.

Ocean literacy is defined as an understanding of the ocean’s influence on you and your influence on the ocean. An ocean-literate person understands:

- The essential principles and fundamental concepts;
- Can communicate about the ocean in a meaningful way; and
- Is able to make informed and responsible decisions regarding the ocean and its resources.

There are seven main principles, with a number of concepts and underlying principles to show how they are connected.

Ocean Literacy Principle #1: The Earth has one big ocean with many features.

Ocean Literacy Principle #2: The ocean and life in the ocean shape the features of Earth.

Ocean Literacy Principle #3: The ocean is a major influence on weather and climate.

Ocean Literacy Principle #4: The ocean made the Earth habitable.

Ocean Literacy Principle #5: The ocean supports a great diversity of life and ecosystems.

Ocean Literacy Principle #6: The ocean and humans are inextricably interconnected.

Ocean Literacy Principle #7: The ocean is largely unexplored.

Credit: All of the Ocean Principles were sourced from

<http://oceanliteracy.wp2.coexploration.org/>

¹ NOTICE: The first principle of each category is the main principle. The rest are sub-principles until you get to primary principle 2,3,4 etc.

PRINCIPLE ONE;

The ocean is the defining physical feature on our planet Earth—covering approximately 70% of the planet's surface. There is one ocean with many ocean basins, such as the North Pacific, South Pacific, North Atlantic, South Atlantic, Indian, Southern and Arctic.

<http://oceanliteracy.wp2.coexploration.org/ocean-literacy-framework>

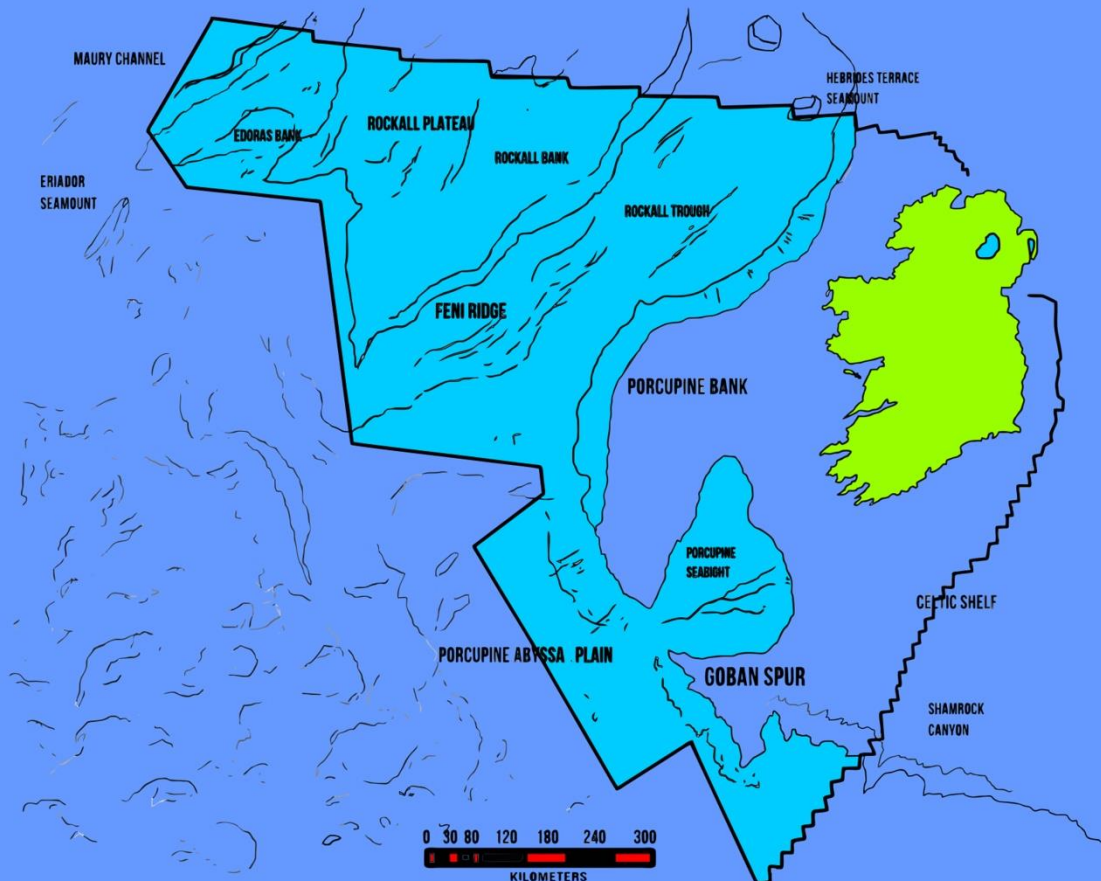


Ocean Principles

PRINCIPLE ONE;

B: Ocean basins are composed of the seafloor and all of its geological features (such as islands, trenches, mid-ocean ridges and rift valleys) and vary in size, shape and features due to the movement of Earth's crust (lithosphere). Earth's highest peaks, deepest valleys and flattest vast plains are all in the ocean.

THE REAL MAP OF IRELAND



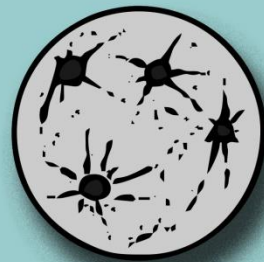
Ocean Principles

Recently
featured in
BIAZA
Member
Newsletter,
2016



PRINCIPLE ONE;

C: Throughout the ocean there is one interconnected circulation system powered by wind, tides, the force of the Earth's rotation (Coriolis effect), the Sun, and water density differences. The shape of ocean basins and adjacent land masses influence the path of circulation. This 'global ocean conveyor belt' moves water throughout all of the ocean's basins, transporting energy (heat), matter, and organisms around the ocean. Changes in ocean circulation have a large impact on the climate and cause changes in ecosystems.



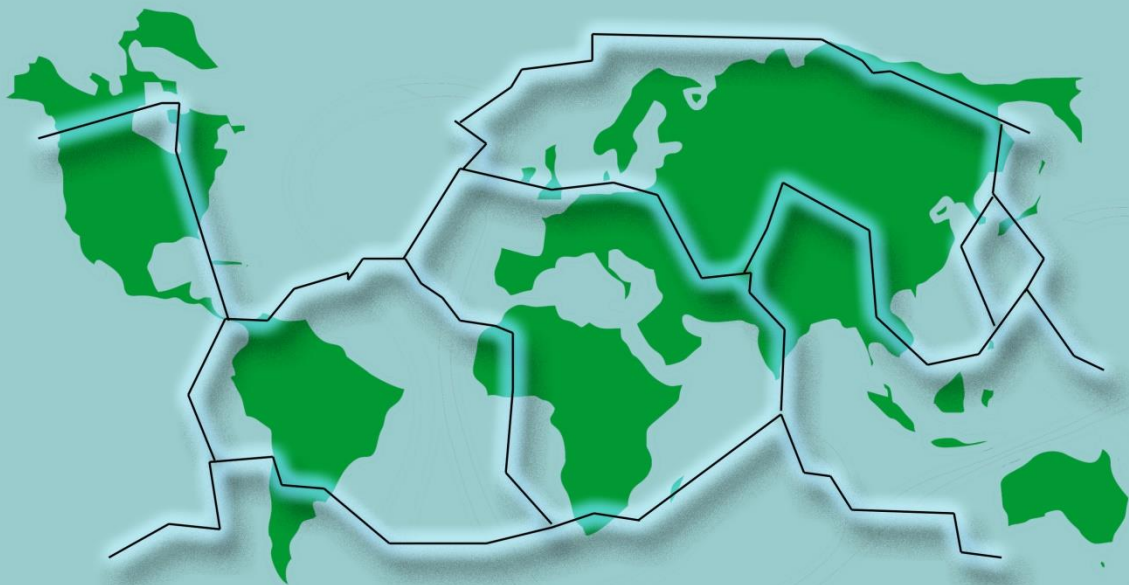
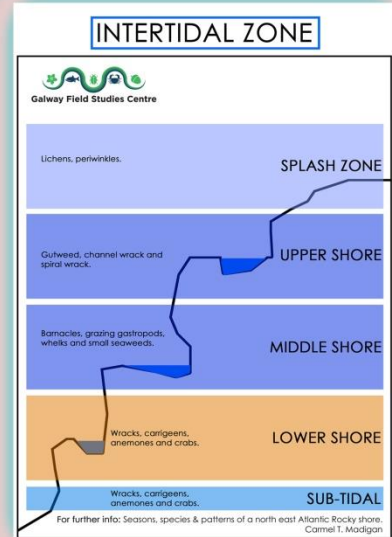
The Oceans Circulation System



Ocean Principles

PRINCIPLE ONE;

D: Sea level is the average height of the ocean relative to the land, taking into account the differences caused by tides. Sea level changes as plate tectonics cause the volume of ocean basins and the height of the land to change. It changes as ice caps on land melt or grow. It also changes as sea water expands and contracts when ocean water warms and cools.



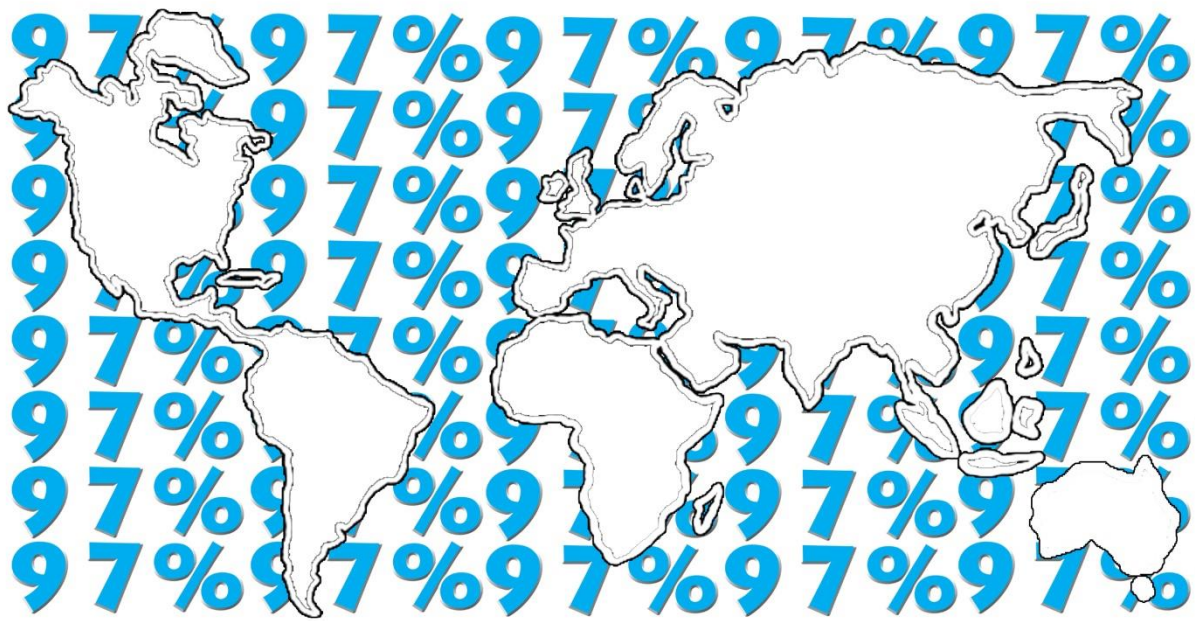
Ocean Principles

PRINCIPLE ONE;

E: Most of Earth's water (97%) is in the ocean. Seawater has unique properties: it is saline, its freezing point is slightly lower than fresh water, its density is slightly higher, its electrical conductivity is much higher, and it is slightly basic. The salt in seawater comes from eroding land, volcanic emissions, reactions at the seafloor, and atmospheric

97%

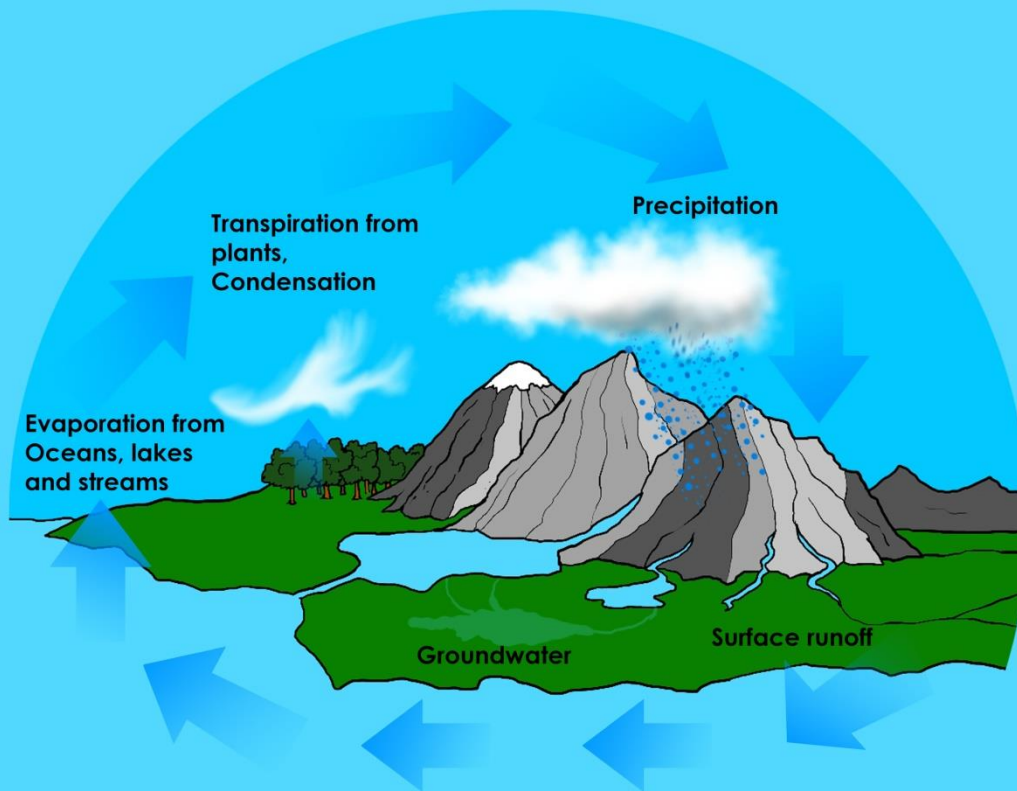
OF THE EARTH'S WATER IS IN THE OCEAN



Ocean Principles

PRINCIPLE ONE;

F: The ocean is an integral part of the water cycle and is connected to all of the earth's water reservoirs via evaporation and precipitation processes.



THE WATER CYCLE

Ocean Principles

**PRINCIPLE
TWO;**

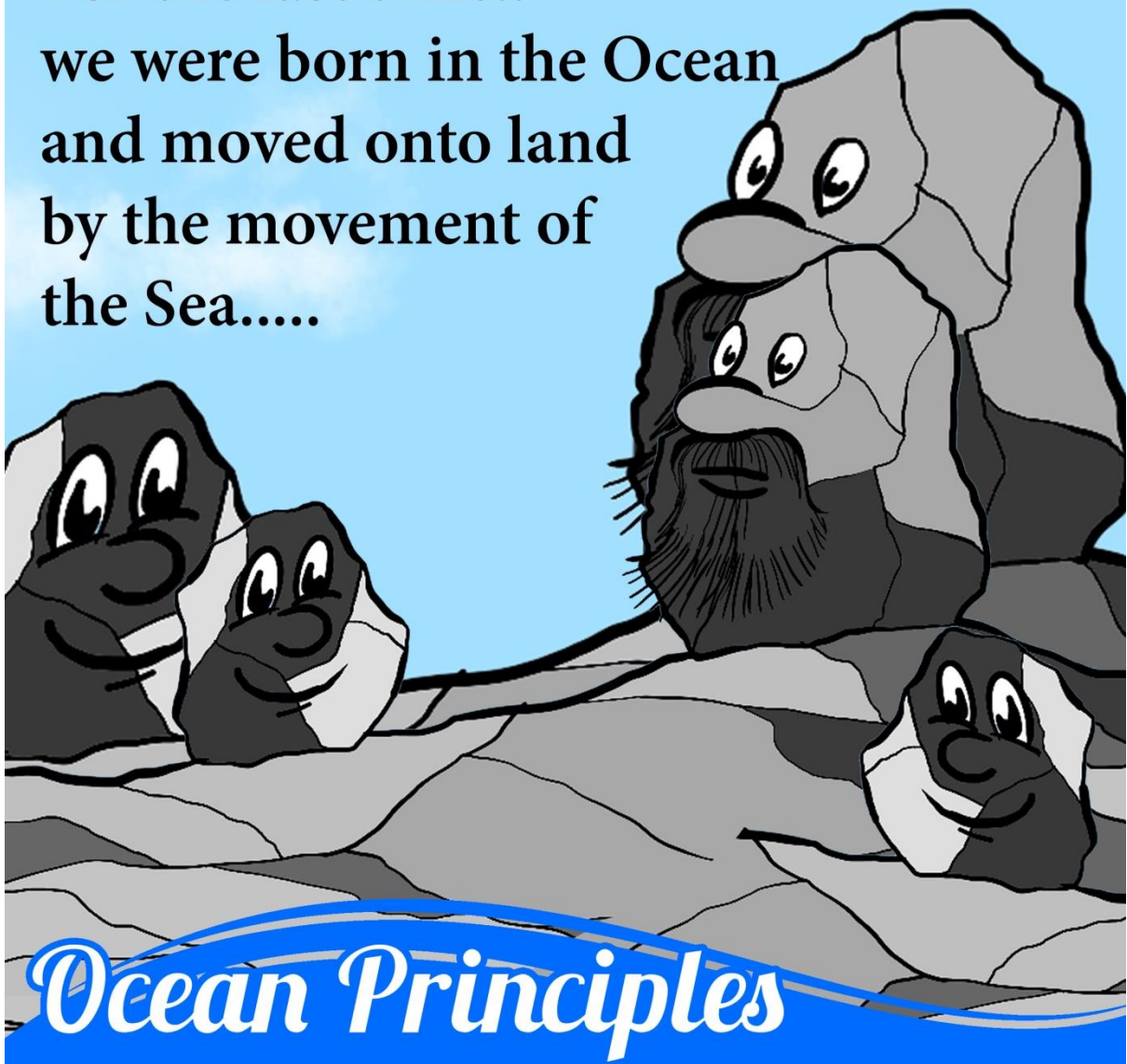
**The ocean and life in the
ocean shape the features of
Earth.**



PRINCIPLE TWO;

A: Many earth materials and geochemical cycles originate in the ocean. Many of the sedimentary rocks now exposed on land were formed in the ocean. Ocean life laid down the vast volume of siliceous and carbonate rocks.

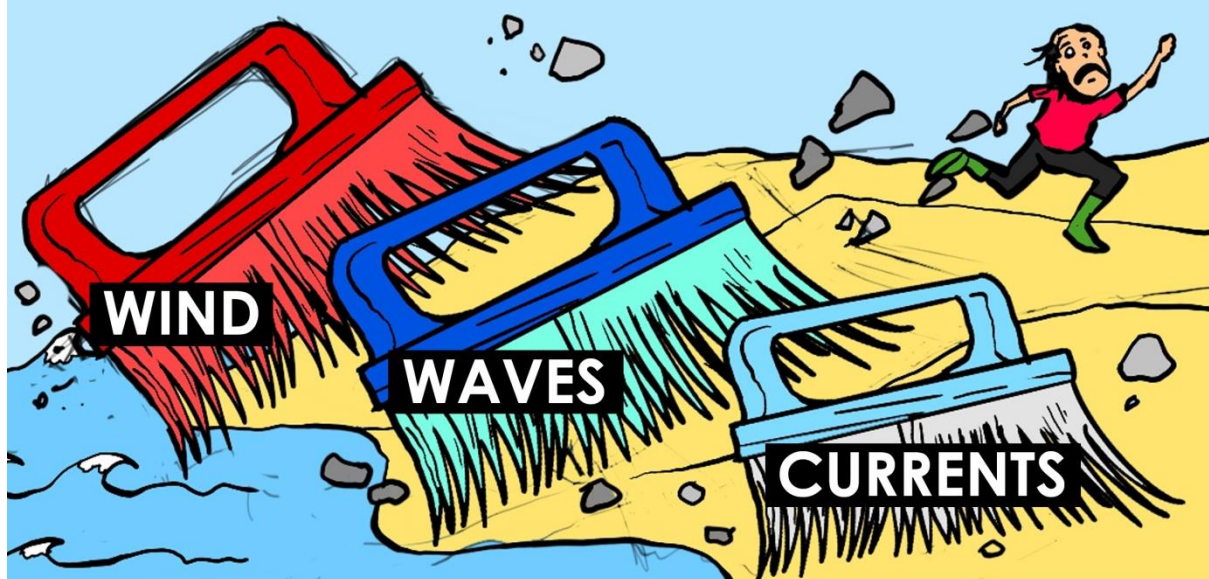
For the last time..
we were born in the Ocean
and moved onto land
by the movement of
the Sea.....



PRINCIPLE TWO;

Erosion—the wearing away of rock, soil and other biotic and abiotic earth materials—occurs in coastal areas as wind, waves, and currents in rivers and the ocean move sediments.

How you would react if Erosion was speeded up...



Ocean Principles

PRINCIPLE TWO;

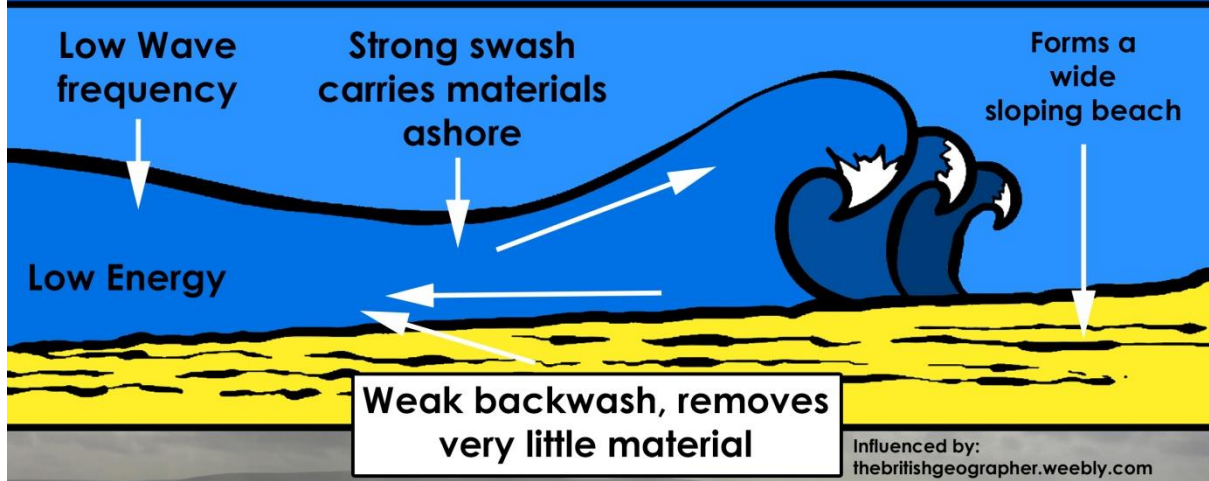
D: Sand consists of tiny bits of animals, plants, rocks and minerals. Most beach sand is eroded from land sources and carried to the coast by rivers, but sand is also eroded from coastal sources by surf. Sand is redistributed by waves and coastal currents seasonally.



Ocean Principles

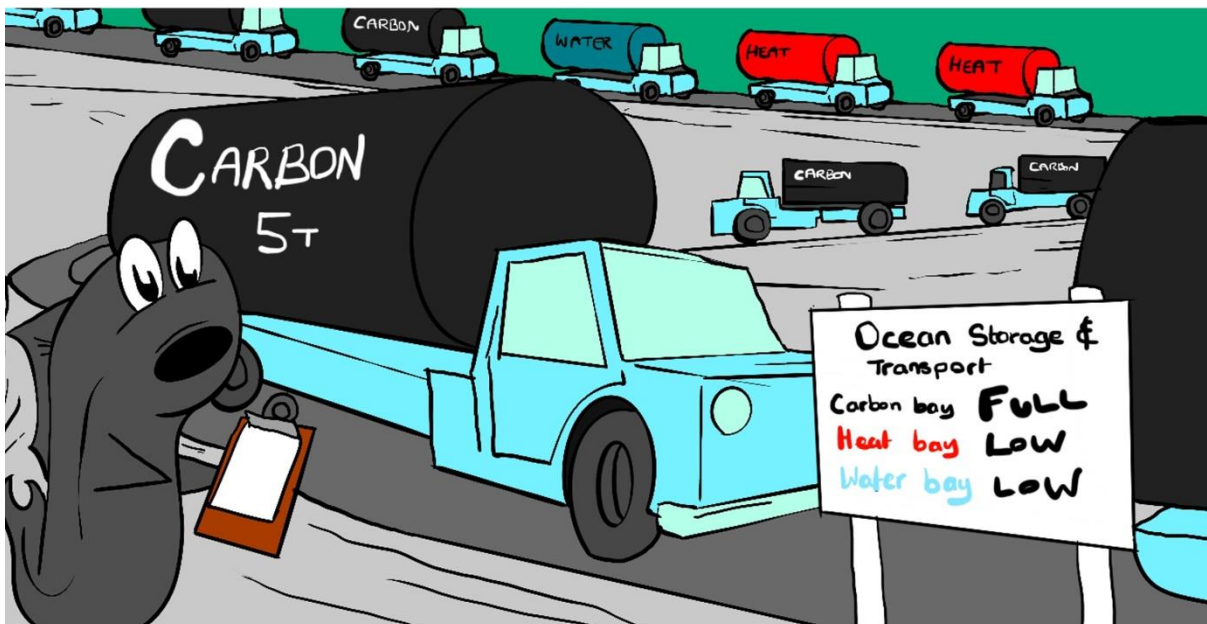
PRINCIPLE TWO;

E: Tectonic activity, sea level changes, and force of waves influence the physical structure and landforms of the coast.



PRINCIPLE THREE;

The ocean has had, and will continue to have, a significant influence on climate change by absorbing, storing, and moving heat, carbon and water. Changes in the ocean's circulation have produced large, abrupt changes in climate during the last 50,000 years. dioxide added to the atmosphere



Like any system, it can become 'unsustainable' if there is a negative impact on its natural flow....

Ocean Principles

PRINCIPLE THREE;

Changes in the ocean-atmosphere system can result in changes to the climate that in turn, cause further changes to the ocean and atmosphere. These interactions have dramatic physical, chemical, biological, economic, and social consequences.

Unusual changes in weather patterns can cause dramatic effects across the world...

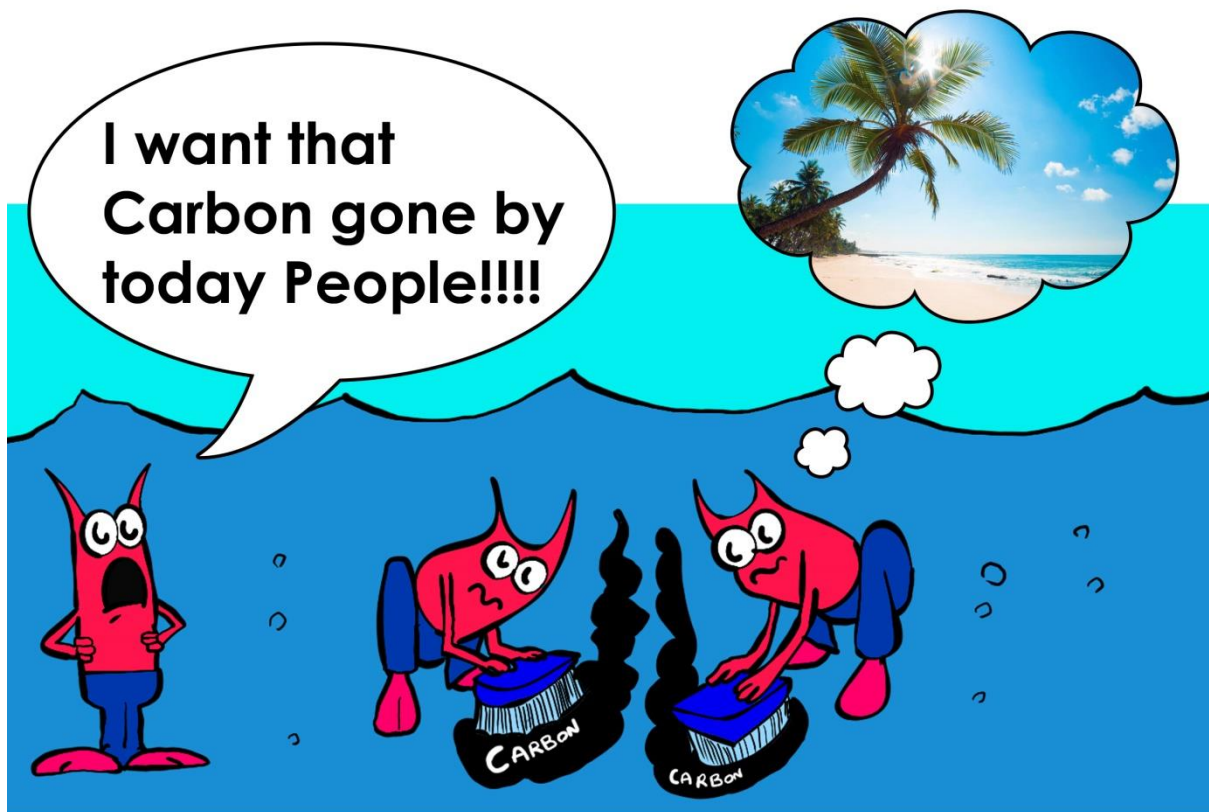


Photo credit Irish Mirror

Ocean Principles

PRINCIPLE THREE;

The ocean dominates the Earth's carbon cycle. Half the primary productivity on Earth takes place in the sunlit layers of the ocean and the ocean absorbs roughly half of all carbon



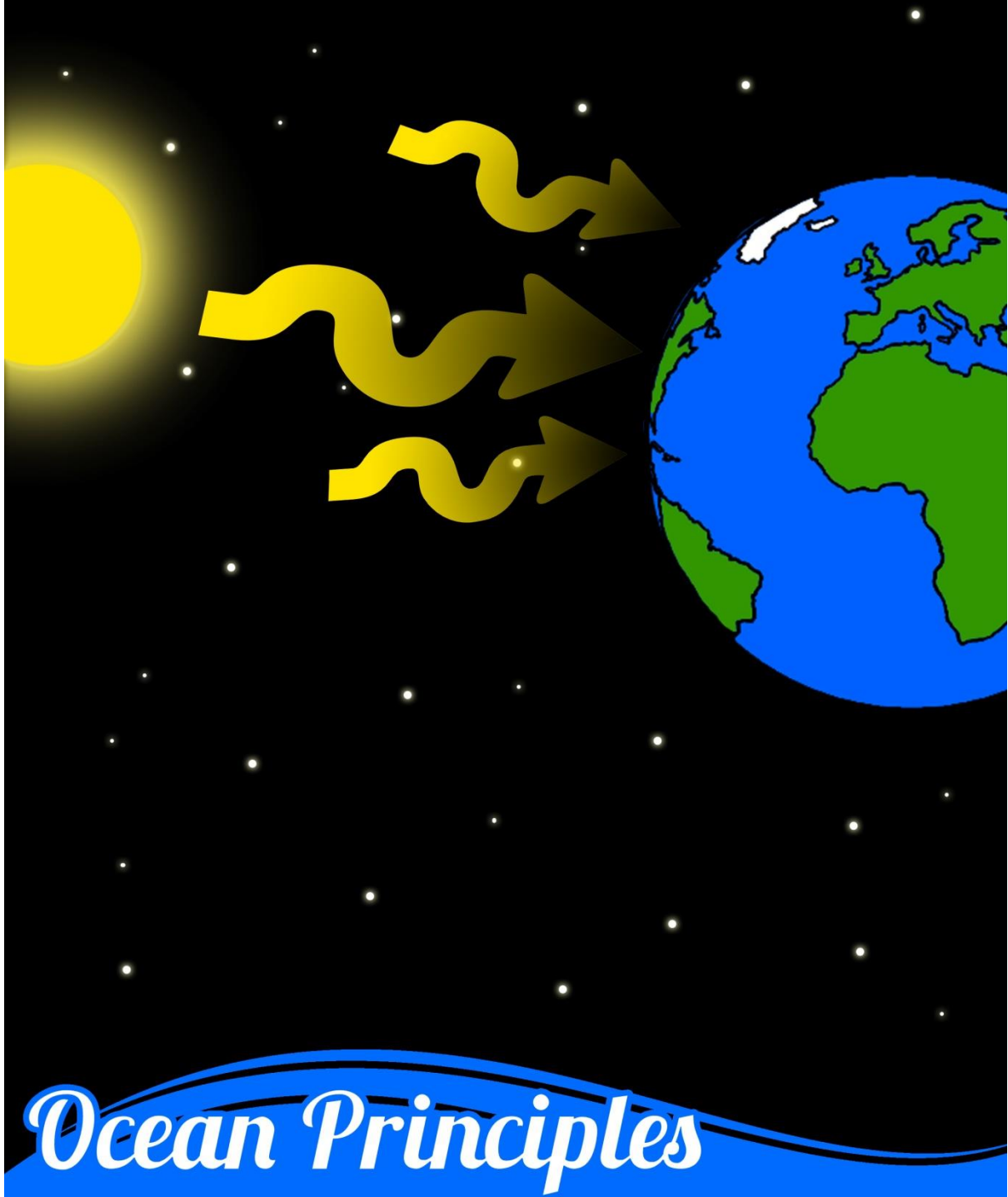
The Sunlit Zone

warning visitors should understand that this may not be a good thing!

Ocean Principles

PRINCIPLE THREE;

B: The ocean moderates global weather and climate by absorbing most of the solar radiation reaching Earth. Heat exchange between the ocean and atmosphere drives the water cycle and oceanic and atmospheric circulation.



PRINCIPLE FOUR;

The Ocean made the earth
habitable.



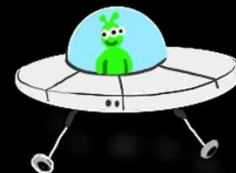
Over 50% Of The World's
Oxygen Comes From The
Ocean.



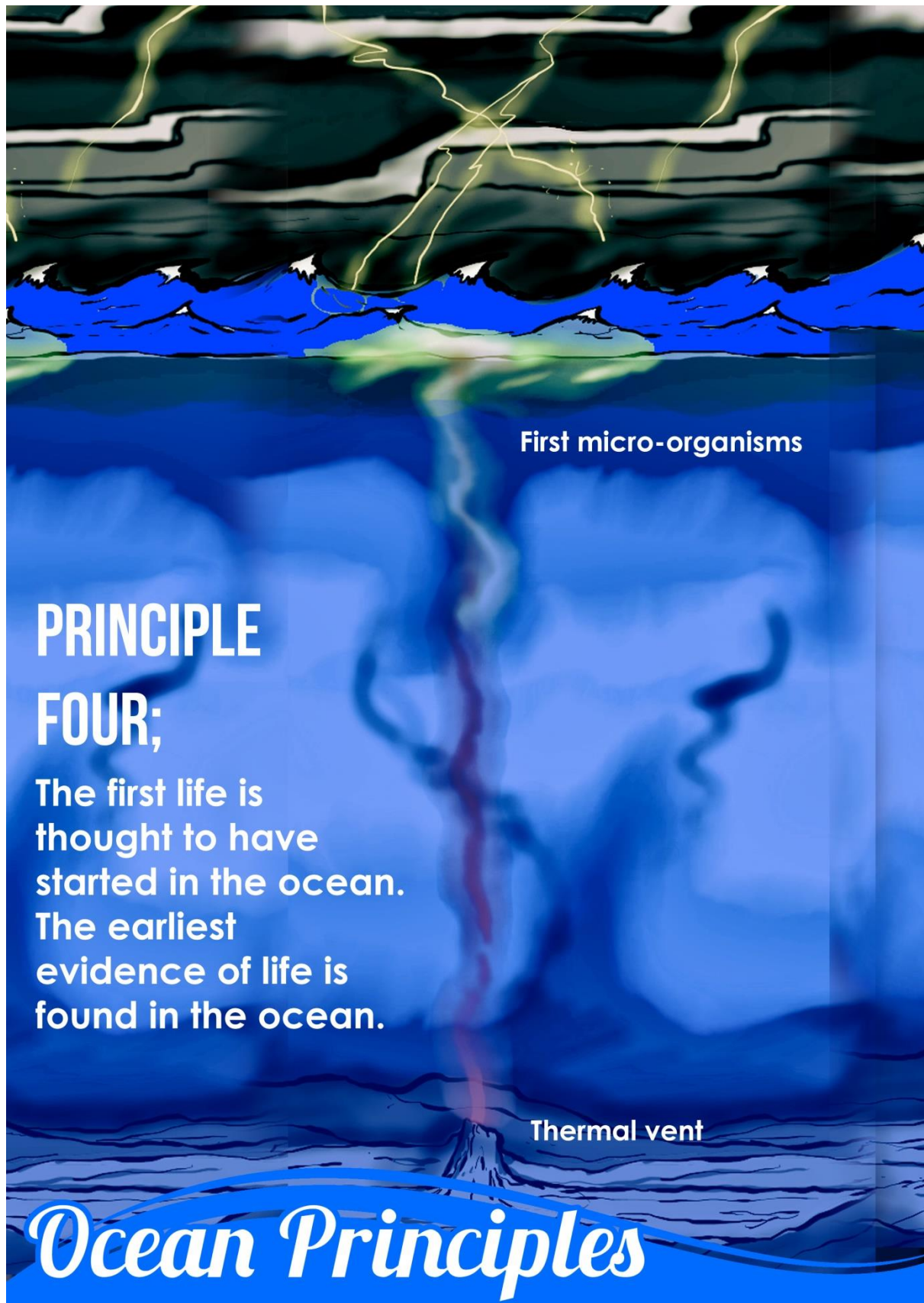
15 to 20% Of The
World's Oxygen
Comes From Trees.

**NO OCEAN
NO LIFE!**

**NO OCEAN
NO LIFE!**



Ocean Principles



First micro-organisms

PRINCIPLE FOUR;

The first life is
thought to have
started in the ocean.
The earliest
evidence of life is
found in the ocean.

Thermal vent

Ocean Principles

PRINCIPLE FIVE;

The ocean supports a great
diversity of life and ecosystems.



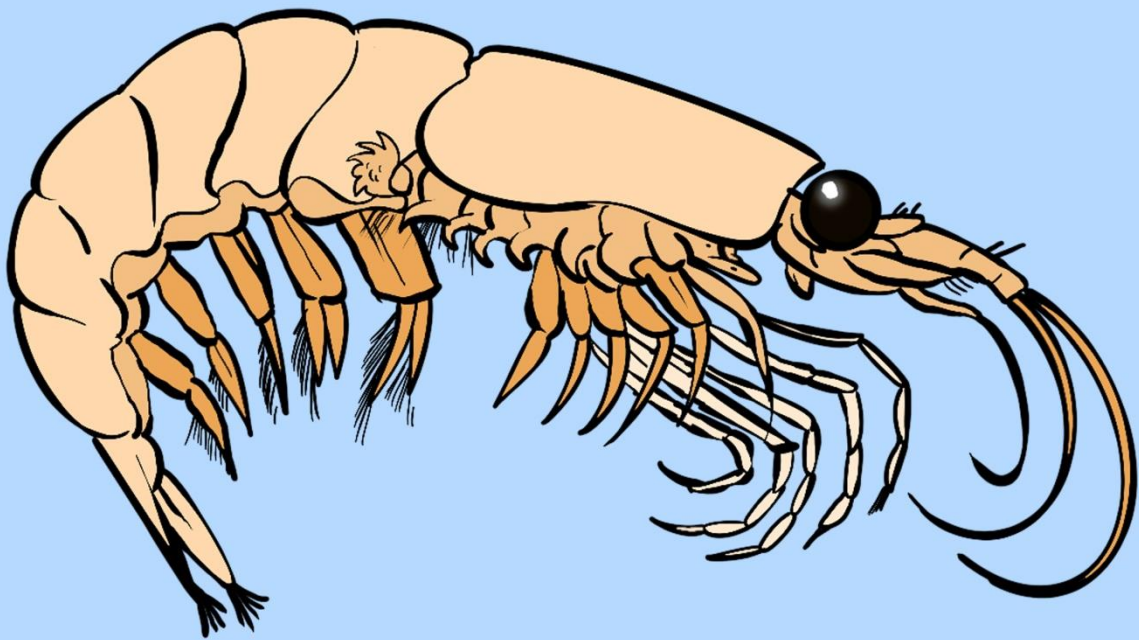
Ocean Principles

PRINCIPLE FIVE;

Most of the organisms and biomass in the ocean are microbes, which are the basis of all ocean food webs. Microbes are the most important primary producers in the ocean. They have extremely fast growth rates and life cycles, and produce a huge amount of the carbon and oxygen on Earth.



Est. Population 10000,00000,00000,00000^{N45}



Ocean Principles

PRINCIPLE FIVE;

Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (symbiosis, predator-prey dynamics, and energy transfer) that do not occur on land.

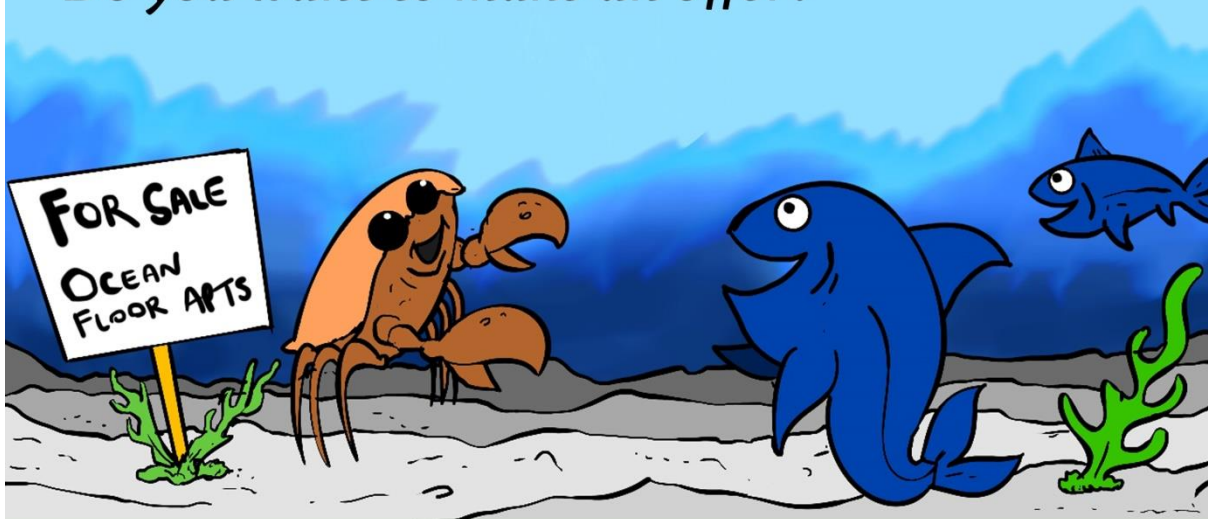


Ocean Principles

PRINCIPLE FIVE;

The ocean provides a vast living space with diverse and unique ecosystems from the surface through the water column and down to, and below, the seafloor. Most of the living space on Earth is in the ocean.

*So, its a large living area exactly
360,000,000 km² (140,000,000
sq mi)...give or take an inch!
Do you want to make an offer?*

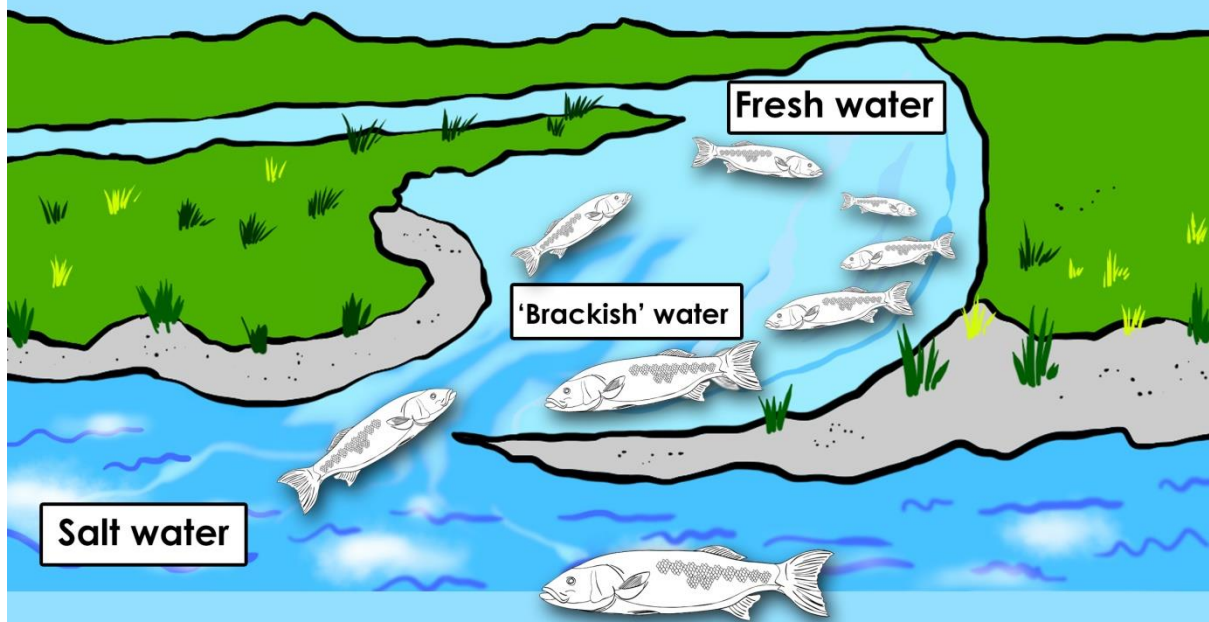


Ocean Principles

PRINCIPLE FIVE;

Estuaries provide important and productive nursery areas for many marine and aquatic species.

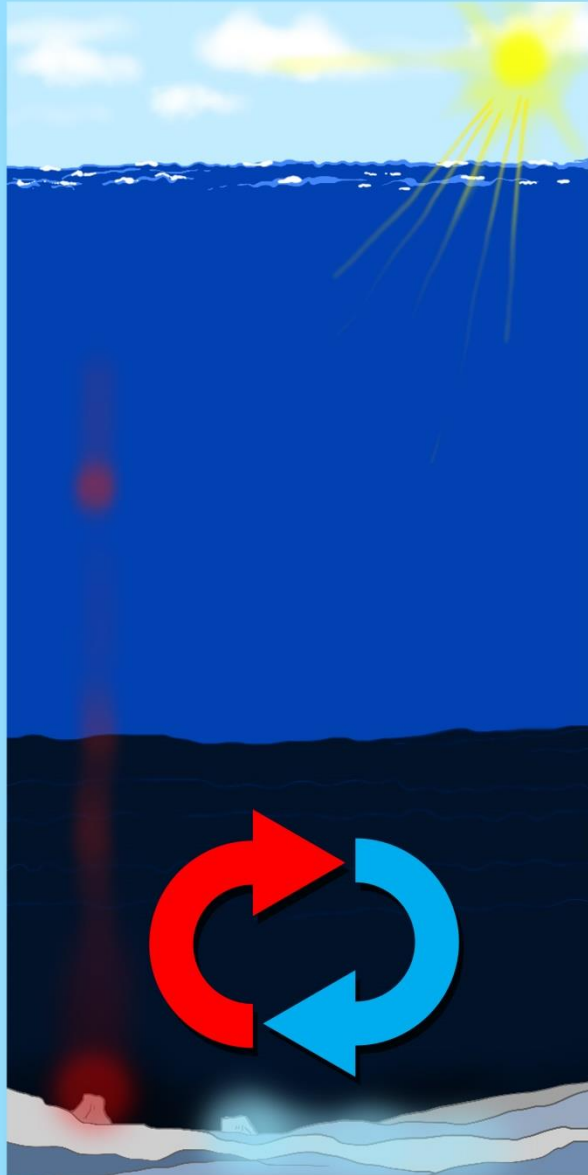
Estuary example



Ocean Principles

PRINCIPLE FIVE;

There are deep ocean ecosystems that are independent of energy from sunlight and photosynthetic organisms. Hydrothermal vents, submarine hot springs, and methane cold seeps rely only on chemical energy and chemosynthetic organisms to support life.



Ocean Principles

PRINCIPLE SIX: The ocean and humans are inextricably connected.

EDUCATION, MENTAL, PHYSICAL ,
ECONOMIC, RECREATIONAL, SOCIAL,
TRADE.....RELATIONSHIPS

*Thousands have lived without love,
not one without water.*
- W. H. Auden

Ocean Principles

PRINCIPLE SIX;

The ocean provides foods, medicines, and mineral and energy resources. It supports jobs and national economies, serves as a highway for transportation of goods and people, and plays a role in national security.



Ocean Principles

PRINCIPLE SIX;

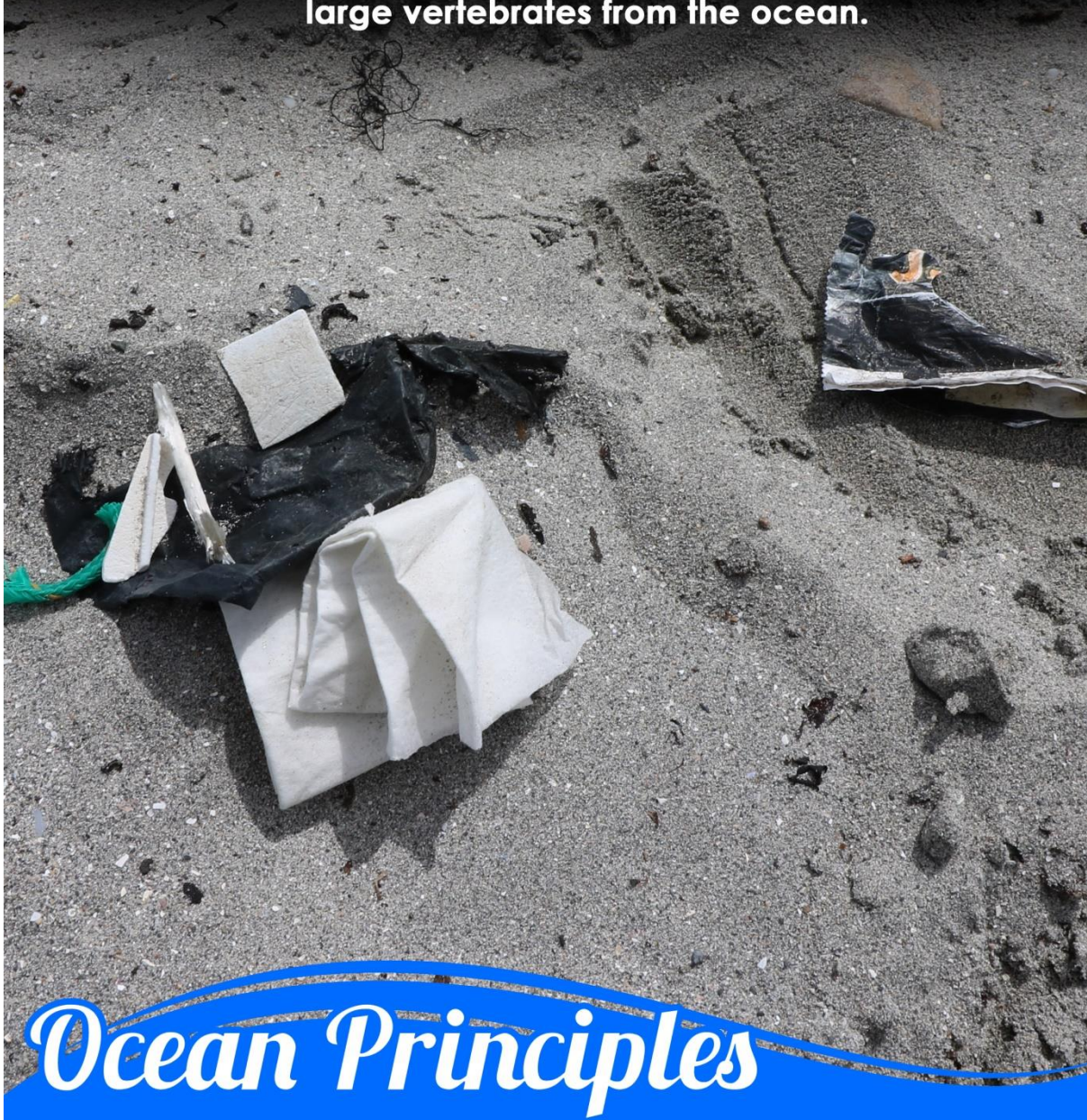
The ocean is a source of inspiration, recreation, rejuvenation and discovery. It is also an important element in the heritage of many cultures.



Ocean Principles

PRINCIPLE SIX;

Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollution (point source, non-point source, and noise pollution), changes to ocean chemistry (ocean acidification) and physical modifications (changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.



Ocean Principles

PRINCIPLE SIX;

Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.



We have to stop destroying the planet!
Duncan Stewart, ECO EYE

#ConvertToCompostables



We need to care for Our Ocean.
Duncan Stewart, ECO EYE

#ConvertToCompostables

Ocean Principles

PRINCIPLE SEVEN;

The Ocean is largely **UNEXPLORED!**

The ocean is the largest unexplored place on Earth—less than 5% of it has been explored. The next generation of explorers and researchers will find great opportunities for discovery, innovation and investigation.



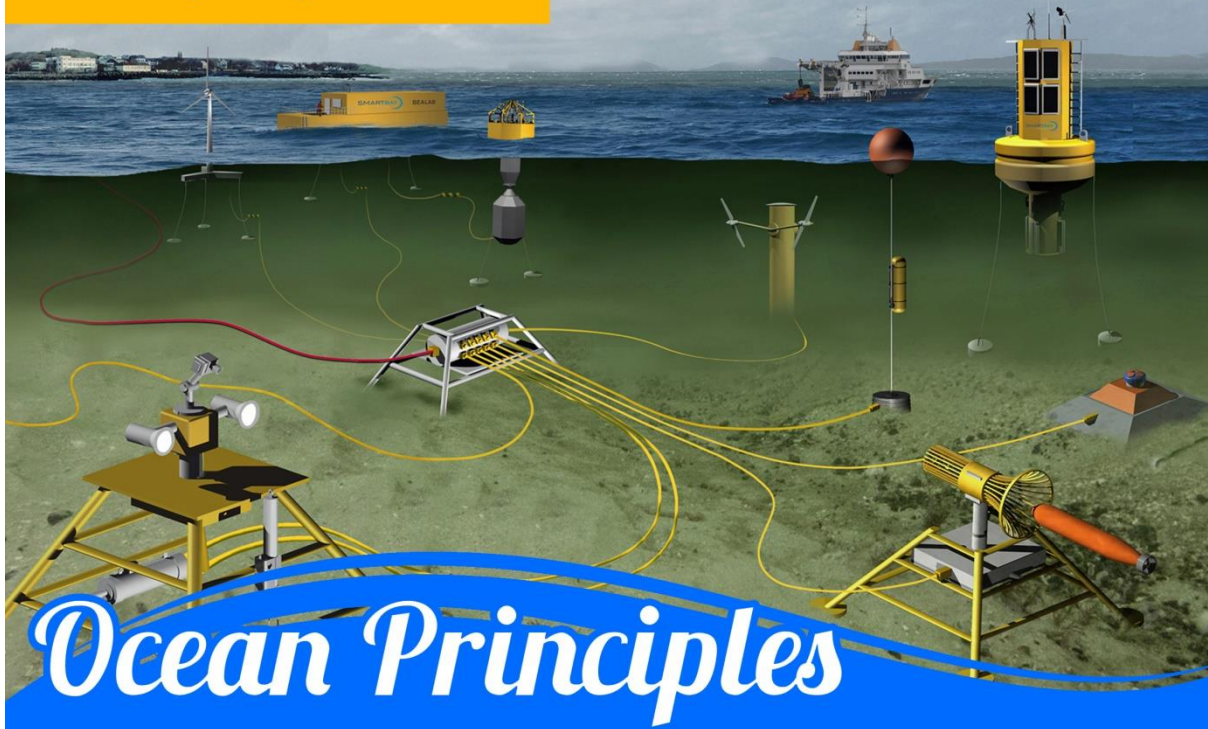
Ocean Principles

PRINCIPLE SEVEN;

New technologies, sensors and tools are expanding our ability to explore the ocean system. Scientists are relying more and more on satellites, drifters, buoys, subsea observatories and unmanned submersibles.

ROV HOLLAND 1

Galway bay TEST Site



PRINCIPLE SEVEN;

Ocean exploration is truly interdisciplinary. It requires close collaboration among biologists, chemists, climatologists, computer programmers, engineers, geologists, meteorologists, meteorologists, physicists, animators and illustrators. And these interactions foster new ideas and new perspectives for inquiries.





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