GREENDIVING

Project Green Diving

Module 6: Ocean Literacy boosting green and sustainable VET maritime schools

INOVA+

Funded by the European Union

INDEX OF THE COURSE

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LEARNING OUTCOMES

- Comprehend the impact and influence of the ocean in society.
- Improve research skills concerning European deals, projects and funding opportunities.
- Learn about Blue Economy concept and Blue Careers opportunities related to different Maritime fields.
- Met the impact of green and sustainable skills in the improvement of the public perception and attractiveness of maritime sector.

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Importance and Impacts of the ocean

Importance of the Ocean

•The Ocean covers 70% of the planet Earth and it is the Earth support system. Also, the ocean has an important **role in human existence and substance by regulating the climate, generating oxygen, feeding human beings and providing means of living.**

•Therefore, its vitality is crucial for life in general as we will see in the next slides.

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Important impacts and products produced by the ocean:

Energy:

Tides, waves, currents and salinity gradients can produce provide reliable, sustainable and cost-competitive energy. According to Ocean Energy Systems (OES), "**The energy in the ocean waves is a form of concentrated solar energy that is transferred through complex wind-wave interactions. The effects of the earth's temperature variation due to solar heating, combined with a multitude of atmospheric phenomena, generate wind currents on a global scale. Ocean wave generation, propagation and direction are directly related to these wind currents".**

However, scientific progress is still needed in the design and validation of ocean energy devices, the balance of plant, logistics, marine operations, integration in the energy system, and modelling tools. **Also, there's a lack of knowledge about the real consequences of the devices on the environment (European Commission, nd).**

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Important impacts and products produced by the ocean:

Energy - The main sources of energy of the ocean are:

(Source of the image: OES – Ocean Energy Systems)

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Important impacts and products produced by the ocean:

Subsistence:

With a wide range of seafood, fish, crustacea and other edible species, the ocean provides 16% of all animal protein consumed worldwide. According to UN Food and Agriculture Organization, sodium, calcium, iodine and magnesium are part of the most important nutrients found in the food provided by the ocean.

The World Economic Forum (2019) affirms that if the ocean is properly managed it could be the most sustainable approach to feeding the planet's growing human population.

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Important impacts and products produced by the ocean:

Regulation of the weather

The ocean has an important role as the biggest solar energy collector. By occupying more than 70% can absorb large amounts of heat without increasing its temperature, and that is why the ocean is crucial for the stabilization of Earth's climate system. Furthermore, clouds, water vapor and greenhouse gases send heat that they have absorbed, and some of that heat energy enters the ocean. Waves, tides, and currents constantly mix the ocean, moving heat from warmer to cooler latitudes and deeper levels. Nonetheless, the heat does not disappear from the ocean and the collected energy, eventually, returns to earth throughout ice sheaves, evaporating water, reheating the atmosphere, etc**.**

It is important to emphasize that if the ocean absorbs more heat than it releases, its heat content increases, which can affect the global climate (Fleming, 2019).

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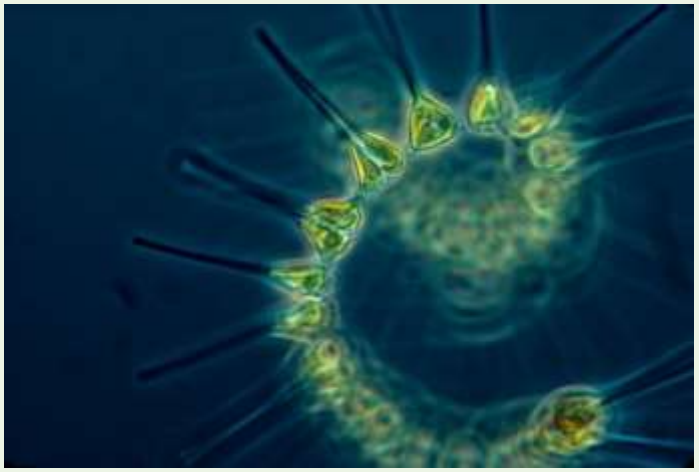
Important impacts and products produced by the ocean:

Produces oxygen and absorbs carbon dioxide

The oxygen we breathe comes from different resources, and it is common to think the majority of the oxygen comes from the forests, but, in fact, most of our breathable air does comes from the world's oceans, specifically from marine photosynthesizers: phytoplankton and seaweed. **"Both use carbon dioxide, water and energy from the sun to make food for themselves, releasing oxygen in the process. In other words, they photosynthesize. And they do it in the ocean."** **(Morsink, 2017).**



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Important impacts and products produced by the ocean:

Produces oxygen and absorbs carbon dioxide

Access the video here: https://www.youtube.com/watch?v=grmMBbHcu_Q&t=75s

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Important impacts and products produced by the ocean:

Therapeutic properties

The color of the ocean and the presence of positive ions have a powerful capacity of reducing stress by producing a calming effect on the human mind. According with Nichols (2015), ***being in, under, on or around the water leaves you calmer***. Hence, **'Blue Mind'** is the term to describe water-associated peace, in contrast to **'Red Mind'** which neuroscientist Catherine Franssen, PhD, describes as "edgy high, characterized by stress, anxiety, fear, and maybe even a little of anger and despair." (Nichols, 2015). In the same perspective, many water sports also develop an important role in people's health and well-being.

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Importance of the Ocean

•Despite the ocean relevance, some of the human activity, climate change and even a lack of awareness of sustainable ocean techniques are threatening its existence and undermining its benefits (Fleming, 2019).

•According to UN Environment Programme, every year, an estimated **8 million tonnes of plastic waste goes to the world's oceans**. In addition, **"climate change is damaging coral reefs and other key ecosystems; overfishing is threatening the stability of fish stocks; nutrient pollution is contributing to the creation of dead zones; and nearly 80 per cent of the world's wastewater is discharged without treatment."**(UN, Environment Programme, 2017).

What you know so far?

1. The main sources of energy are?

2. Mention 3 ways to create awareness concerning the importance of the ocean.

Complete the sentence:

3. The Ocean covers _____of the planet Earth and it is the Earth _____ _____ _____

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Ocean Literacy

Ocean Literacy (module 5)

Sharing public knowledge concerning the ocean is increasing in the last few years and became fundamental to decrease inappropriate actions against the environment and the ocean.

Accordingly, the concept “Ocean Literacy” emerged as “an understanding of the ocean’s influence on you and your influence on the ocean” (UNESCO, 2021).

The concept itself became relevant internationally, and is important in the field of Sustainable Education, especially in the maritime field, by corresponding to the promotion of protection and sustainable management of our precious marine and coastal environments.

Ocean Literacy

Ocean Literacy definition and implementation supports the achievement of the 2030 Sustainable Development Agenda, particularly **Goal 14, Life Below Water.**

Ocean Literacy

Access the video here: https://www.youtube.com/watch?v=8eTFvLe4biY

BLUE ECONOMY?

1. Please, try to define Blue Economy.

2. Please, mention 4 fields related to Blue Economy.

3. Suggest 2 initiatives to turn the Blue Economy more attractive to the young generation.

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Blue Economy

Blue Economy

As previously stated, the sea provides different products and means of living, which leads to an enormous impact on the Economy and that phenomenon is called the “Blue Economy”.

The United Nations representative defined the Blue Economy as:

“an economy that comprises a range of economic sectors and related policies that together determine whether the use of ocean resources is sustainable”

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Blue Economy

The World Wildfire Fund (WWF) in 2015 *(Concept of Blue School, 2019)* confirmed that Blue Economy by definition must contribute to :

- Food security and poverty eradication.
- Protecting the diversity, productivity, resilience and intrinsic value of marine ecosystems.
- Being based on clean technologies, renewable energies, and circular material flows to secure economic and social stability over time, while keeping within the limits of one planet.
- Being publically governed in an inclusive, accountable, transparent, adaptive, innovative, proactive, holistic, cross-sectoral and long-term process.

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Blue Economy

The Blue Economy includes de following fields:

- Marine based such as **capture fisheries** and aquaculture, offshore oil and gas, offshore wind energy, ocean energy, desalination, shipping, maritime transport and coastal tourism
- Marine related such as **seafood processing**, marine biotechnology, shipbuilding and repair, port activities, communication, equipment, maritime insurance and maritime surveillance
- It also includes those parts of the **public sector** with **coastal and ocean responsibilities** such as national defence, coast guard, environmental protection as well as marine education and research

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Sectors of Blue Economy

- To be considered as components of a blue economy, activities must (*Concept of Blue School*, 2019):
  - **Provide social and economic benefits** to present and future generations;
  - **Restore, protect and maintain** diversity, productivity, resilience, essential functions and intrinsic value of marine ecosystems;
  - **Be based on clean technologies**, renewable energies and circular flows of materials which will reduce waste and encourage the recycling of materials.

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Sectors of Blue Economy

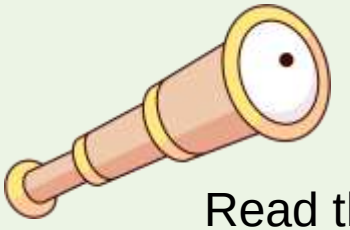
The Blue Economy has two main sectors: **stablished sectors** and the **emerging ones**. Based on the economic reports on EU Blue economy, both sectors have been changing and developing in the past few years based on increasing knowledge and growing technology.

Blue Economy - Stablished Sectors

- According to the Blue Economy Report from 2022, **the stablished sectors** and sub-sectors of Blue Economy are:

Sector	Sub-sector
Marine living resources	Primary production
	Processing of fish products
	Distribution of fish products
Marine non-living resources	Oil and gas
	Other minerals
	Support activities
Marine renewable energy	Offshore wind energy
Port activities	Cargo and warehousing
	Port and water projects
Shipbuilding and repair	Shipbuilding
	Equipment and machinery
Maritime transport	Passenger transport
	Freight transport
	Services for transport
Coastal tourism	Accommodation
	Transport
	Other expenditure

Source: Own elaboration



Read the report here!

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Blue Economy - Emerging Sectors

The emerging sectors has also been changing in the past years, and they correspond to **emerging and innovative sectors that are not mature yet or there's not enough data to the public domain in the topics:**

- Ocen Energy
- Blue biotechnology
- Desalination
- Marine defence, security and surveillance
- Research and Innovation
- Infraestructure

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Blue Economy - Emerging Sectors

It is important to underline that the new fields and job opportunities are mainly focused on avoiding the degradation of the ocean and ensuring a responsible usability of its resources, which is extremely important. According to Juan Vidal, “sustainability is an obligation and a transversal thread in the strategies of all sectors related to the blue economy. Something that is essential to promote inclusive and real growth.”

According to the coordinator of CEIMAR's Atlazul Project**, all blue areas share a common denominator: innovation and the development of new products**. "This is already demanding greater specialization, at the same time that opens up new spaces for growth and employment," he points out.

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Blue Careers

As exposed, within the Blue Economy, it is also included a set of job opportunities also known as **“Blue Careers”,** that are very important for societal economic growth. At the moment, 'The EU Blue Economy Report 2021' report by the European Commission explains that the most established sectors employ 4.5 million people directly and the figure is expected to double by 2030 (“Employment Potential of the Blue Economy in Europe,” 2021).

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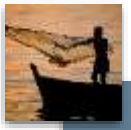
Blue Careers

Some examples of sectors and job opportunities are:

Coastal Tourism

- Beach life guard
- Chef or restaurant staff
- Water sports instructor
- Boat maintenance
- Repair/cleaning services

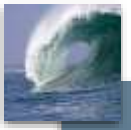


Fisheries

- Fisherman
- Fishing boat captain
- Seafood brokers
- Marine scientist
- Fish biologist
- Fish observer
- Fiheries Officers

Aquaculture

- Fish farm technician
- Farm manager
- Aquaculture engineer
- Hatchery technician
- Fish health technician



Ocean Energy

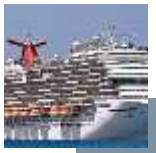
- Construction Workers
- Mechanics
- Mainttenance workers
- Electricians and technicins
- Safety Staff
- Researcher
- Energy information advisor

Blue Careers

Some examples of sectors and job opportunities are:

Marine Biotechnology

- Zoologist
- Wildlife biologist
- Microbiologist
- Marine Farm Worker
- Genetic Counsellors



Ship building maintenance

- Ship Architect
- Designer
- Fabric and Materials Modeller
- Materials Sourcing
- Pumbling Engineer

Maritime Transport

- Boat Mechanic
- Marina management
- Economic analyst
- Yatch captain or Crew
- Sales & Marketing
- Staff service

Blue Careers - Challenges

- It is possible to understand that the Blue economy is growing fast and the need of a well-equipped workforce is starting to be an issue for the maritime field.

- Even though, according with the graphics from the previous slides the offers are numerically high and diversified, **the Blue sector seems not to be not attractive enough for young people, especially people with the required skills and profiles for maritime careers and business.**

"Employment in ocean-based industries is set to more than double between 2010 and 2030, to about 40m. The fastest employment growth is expected in marine aquaculture, fish-processing, offshore wind and port activities." (Ocean Initiative, 2022).

Blue Careers - Challenges

Some countries around the world are already demonstrating struggles in attracting young people to work in artisanal fisheries and to fulfil the existing gaps in the national blue career's opportunities (World Ocean Initiative, 2022).

It is important to motivate the younger generations to consider Blue Careers as a professional option and as a field that it is important not only for the sea but for economic growth of the different societies and to do so, many initiatives, activities and projects can be implemented at educational, social and professional levels.

It's very difficult for fishermen to attract their sons, or the son of anybody else, to step in (World Ocean Initiative, 2022)

Assunção Cristas: Head of the environment practice said at VdA Legal Partners in Lisbon

"Big maritime firms really struggle to attract and retain young talent (World Ocean Initiative, 2022).

Wietse van der Werf, founder and chief executive of the Sea Ranger Service

European Initiatives: Deals, Programmes and Funds

European Iniatives: Deals, Programme and Funds

The sea has become an important worldwide priority and the enforce, determination and investment of Worldwide NGOS, SMEs, Policy-makers and other institutions is relevant for the valorisation of maritime affairs. For that reason, the European Commission has been prioritizing the Blue Economy field and Blue Careers among its investments and initiatives.

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European Initiatives

- After understanding the relevance and social, economic and health impact of the ocean, initiatives, political measures and projects are expected to promote ocean literacy and protect ocean's vulnerability by promoting sustainable practices and values in the different countries.

- Therefore, the EU has put in place comprehensive policies and legislation to protect the marine environment and ensure sustainable development in the blue economy, under the:

European Green Deal

Including the Maritime and the Common Fisheries Policies.

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European Initiatives

- Also, the European Commission had defined a set of relevant strategies that falls under the promotion of qualified educative resources and tools for the maritime field, in different levels of education by developing short learning courses on skills for the green transition, such as micro-credentials. It should be underlined that these efforts are also in line with the new European Skills Agenda which aims to help businesses and individuals adapt to digitalised processes and new technologies through upskilling and reskilling.

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Important European Initiatives: European Green Deal

- **For instance, some agreements implemented can be highlighted:**

- The European Green Deal, approved in 2020, that focuses on European economic growth based on the use of resources and intends to minimize greenhouse gases by 2050. The deal aims to:

1. **Reduce emissions for industry, transports and other sectors**
2. **Creating EU funds to support households in the green transition**
3. **Boosting Circular Economy**
4. **Create a sustainable food production**
5. **Preserve biodiversity**
6. **Finance Green Transition**

The Blue Economy is also under the European Green Deal, due to the relevance of the maritime field, especially because of the impact of climate change and gas emissions on the devastation of the oceans that put in danger all the people living near those areas.

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Important European Initiatives

- **Other relevant agreements can be highlighted:**

- European Commission launched a new approach to a sustainable blue economy in the EU, a communication setting out a detailed agenda for the blue economy, including the goal of ensuring sustainable food production.

- The European strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030, adopted now by the European Commission, aim to contribute to ensuring sustainable food production, through growing sustainable aquaculture in the EU.


EUROPEAN COMMISSION

Brussels, 17.5.2021
COM(2021) 240 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

on a new approach for a sustainable blue economy in the EU
Transforming the EU's Blue Economy for a Sustainable Future


EUROPEAN COMMISSION

Brussels, 12.5.2021
COM(2021) 236 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EMPTY

Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030

{SWD(2021) 102 final}

1. THE NEED FOR A NEW EU STRATEGY FOR AQUACULTURE

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Important European Initiatives: Programme and Funds

- The Sustainable Blue Economy Partnership: an EU Horizon Europe co-funded Partnership. The planned investments over 7 years are expected to reach € 450 Million. It constitutes a network of 60 Partner institutions from 25 countries and the European Commission that enables an unprecedented effort to pool research and innovation investments and align national programmes at pan-European scale, taking into consideration the sea-basin (Mediterranean, Black Sea, Baltic and North Sea) and Atlantic Ocean dimension.

- The partnership will contribute to the goals of the Mission Ocean and Waters, by boosting the transformation towards a climate-neutral, sustainable, productive and competitive blue economy by 2030, while creating and supporting the conditions for a healthy ocean for the people by 2050.

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Important European Initiatives: Programme and Funds

The development of the European Maritime, Fisheries and Aquaculture Fund (EMFAF) programme. EMFAF runs from 2021 to 2027 and supports the EU common fisheries policy (CFP), the EU maritime policy and the EU agenda for international ocean governance. The fund:

- Helps fishers transitioning to sustainable fishing
- Supports coastal communities in diversifying their economies finances projects that create new jobs and improve quality of life along European coasts
- Supports sustainable aquaculture developments
- Supports the implementation of the maritime policy
- The new EMFAF particularly supports small-scale coastal fisheries, young fishers and outermost regions, as well as the promotion of sustainable aquaculture. It also aims to make it easier for applicants to access financing while improving results.

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Important European Initiatives: Programme and Funds

- For example, within the EMFAF programme, it was developed the **Blue careers for a sustainable blue economy Call** (deadline: January, 2023). The Call aimed to contribute to the development of the next generation of blue skills and to provide opportunities for attractive, sustainable maritime careers.

- The objective was to develop the necessary skillsets to support the European Green Deal initiatives promoting a sustainable blue economy, e.g. the Farm to Fork Strategy, the Sustainable Blue Economy Strategy, the EU Offshore Renewable Energy strategy, the Biodiversity Strategy and the Circular Economy Action Plan (CEAP).

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Key Points of the 6th module:

- The Ocean is fundamental to life on earth, by providing energy, food, oxygen and therapeuthical properties.
- Ocean Literacy is built under the 14th sustanable development goals: Life under water
- The Ocean has a positive economic impact in society: Blue Economy & Blue Careers
- Blue Careers leads societal economic growth and include different fields: Coastal Tourism, Fisheries, Aquaculture, Ocean Energy, Marine Biotechnology, Ship Building Maintenance, Maritime Transport.
- Europe is investing in Ocean Literacy throughout the implementation and investment of deals, projects and funds, that promote education, job opportunities and intends to increase the attraction of blue careers among the young generation.

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What you know so far?

1. What are the main purposes of the Green Deal?

2. Mention 3 ways to create awareness concerning the importance of the ocean.

Complete the sentence:

The EU has put in place comprehensive policies and legislation to protect the marine environment and ensure sustainable development in the blue economy, under the: _____ and _____

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Practical Activity

European Projects: Blue Schools

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Blue Schools

•The Network of European Blue Schools is an initiative of EU4Ocean, the European Ocean Coalition that connects diverse organisations, projects and people contributing to ocean literacy and the sustainable management of the ocean. EU4Ocean is the place where new ideas and joint actions come to life to make a bigger change. Supported by the European Commission, this bottom-up inclusive initiative aims at uniting the voices of Europeans to make the ocean a concern of everyone.

•The program challenges schools to *Find the Blue* and explore their connections to the ocean while creating networks all across Europe. The Network of European Blue Schools is an initiative of the European Commission, supported by DG MARE and was developed by the EU4Ocean Coalition partners.

Why become a European Blue School ?

- Schools that take up the *Find the Blue* challenge shall identify an ocean-based topic that is relevant to their students, and collaborate with their pupils to create a school project.
- The aim is to make the ocean a relevant part of the school curriculum through project-based learning. Student ownership, collaborations with other organizations and people involved with the ocean and creating a community with the same passion will be key values of these projects.
- By successfully completing the *Find the Blue* challenge, schools will receive a European Blue School certification.

Why become a European Blue School ?

All certified European Blue Schools become part of the Network of European Blue Schools, where teachers and students:

- become agents of change for ocean sustainability;
- share experiences with teachers and students from other schools;
- connect to the wider ocean literacy community.

How to become a European Blue School ?

Develop a project with interlinked activities:

A project consists of several complementary activities under the umbrella of one central topic. Enable students to gain more in-depth knowledge and skills by working for an extended period of time to explore and investigate an ocean topic, question or problem.

Produce a clear output:

The initiative encourages students to be active learners and develop a product, object, event or service that can be exhibited or used as a tool for communication. Be resourceful and start creating.

Involve all students:

Students play an active role in all phases of the project. The teacher facilitates learning and guides students to become independent workers, allowing them to show what they can do.

Collaborate with a local partner:

Collaborative work is key to success. Invite an expert, marine scientist, NGO, science centre, maritime company and/or government body to help facilitate the creation, implementation and communication of the project. **Go to the EU4Ocean Platform members to find a partner!**

Communicate project results:

Let students improve their communication skills and feel more engaged with their local community by talking about the project in a meaningful and informed way, starting with their own social environment.

Practical Activity: Create your Blue School Proposal

- Let’s put in practice all you learned so far and prepare a fictional submission for Blue Schools Initiative.
- Here you can find the original submission platform, which provides you the necessary information and can inspire you to submit a project in the future.
- In the next slides you have a list of information's you must provide. On the next session you can present your proposal.

Practical Activity: Create your Blue School Proposal

1. Name of the School
2. Country
3. Sea Basin (Atlantic Ocean, Baltic Sea, Black Sea, Mediterranean Sea, North Sea).
4. Name of the project
5. Summary of the project (What are the objectives of the project?; What are they working on?; What is their approach?) (300 words)
6. Start and End date of the project.
7. Is it linked to school curricula? (If yes, define the subjects)
8. Identify possible partners for the project (local companies, municipalities, NGOs, other schools, museums, science centres, universities…)
9. Teachers will be involved?
10. Students will be involved?
11. School Level
12. Specify the category of the project (Health and Clean Ocean; Food from the Ocean, Climate and Ocean, Biodiversity, Maritime Culture, Other…)

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CONSORTIUM

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Green Diving

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Project Green Diving

Ocean Literacy

Ana Rita Rodrigues
Escola do Mar dos Açores

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INDEX OF THE COURSE

- Green Skills
- Ocean Literacy
- Human Impact
- Ocean Benefits/ Importance
- Geology
- Deep sea

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Learning Objectives

- Understading the dynamics of the ocean and their importance to the biosphere
- Increase environmental awareness of ocean health
- Understand ocean cycles and its changes due to human activity

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7 Ocean Literary Principles

1. Earth has one big ocean with many features

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1. Principle

1. **Responsible for the production of:**

50% - 80%

CO2

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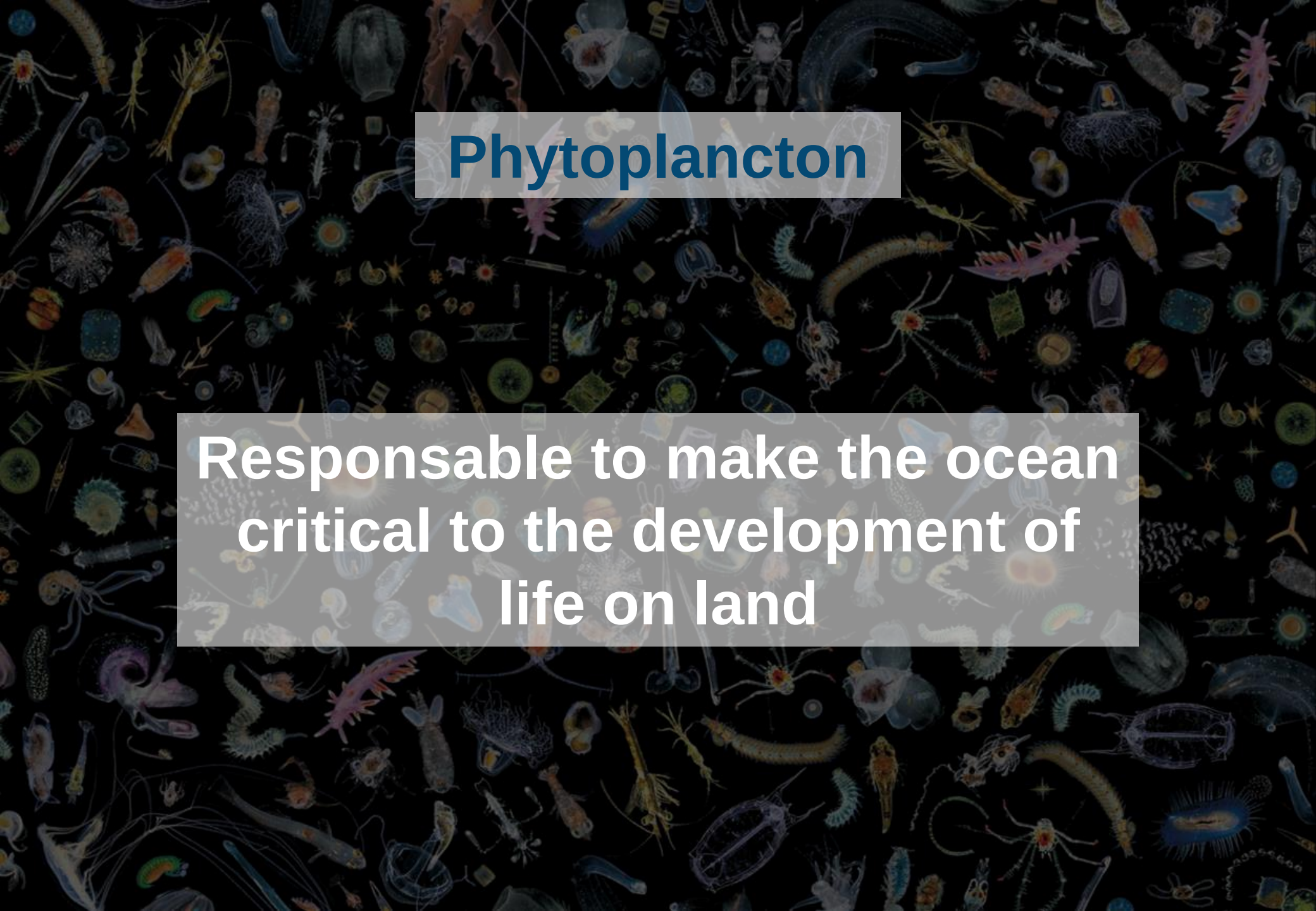
Phytoplancton
Responsable to make the ocean critical to the development of life on land

1.

Ocean Importance

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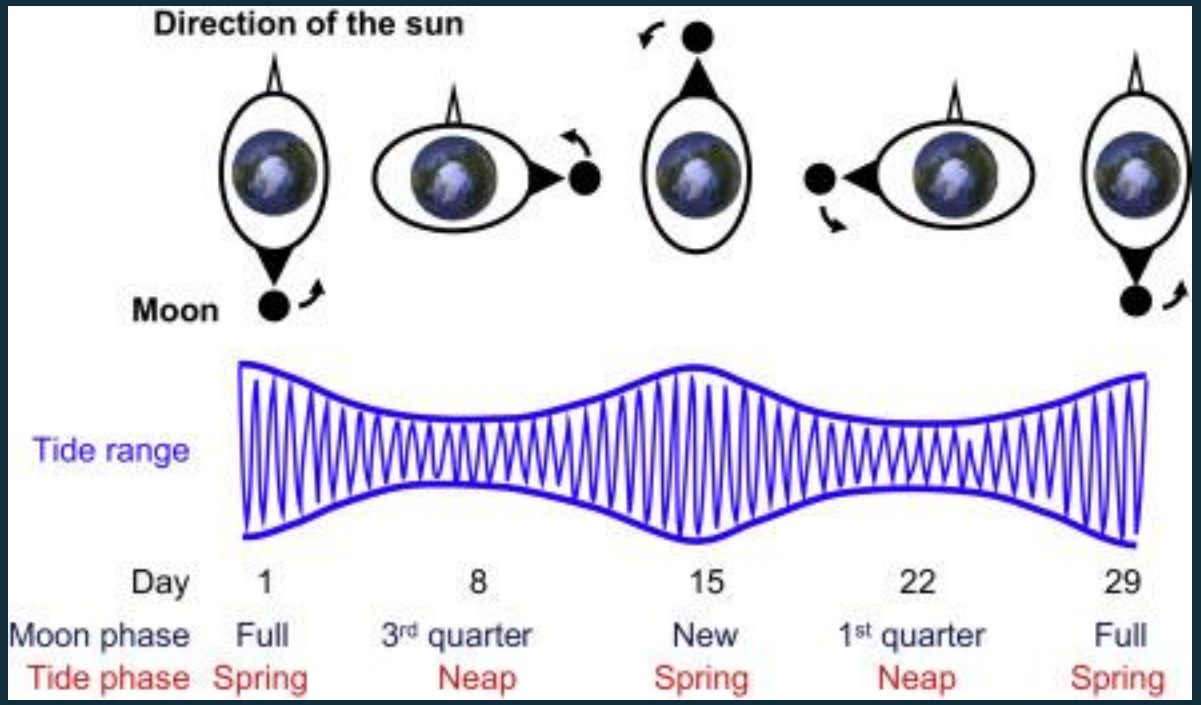
1.

Tide variation influences habitats dynamics



GREEN

1.

97% of the entire planet's water is found in the ocean

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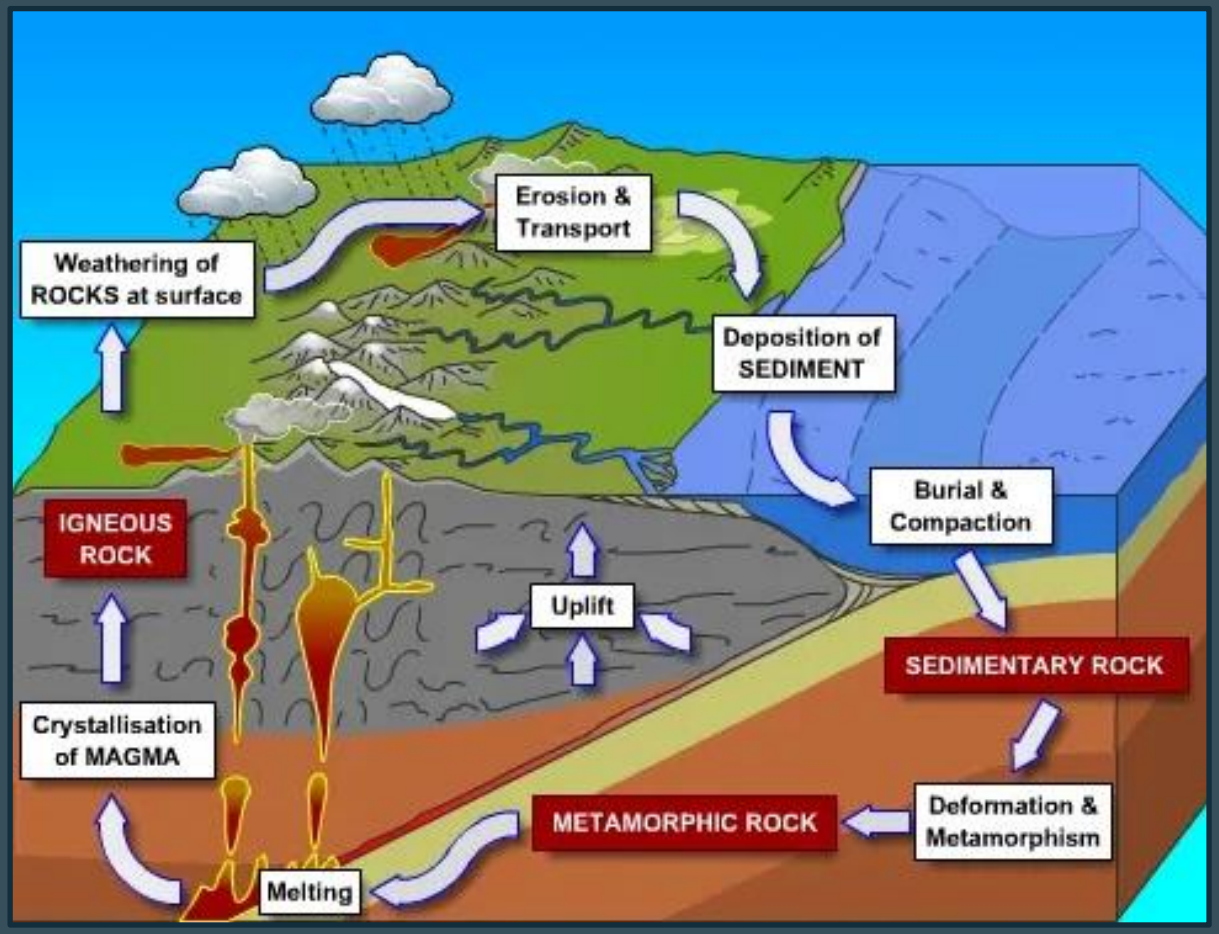
2. The Ocean and life in the Ocean shape the features of the Earth

GREENDIVING

2 Principle

2.

Many Earth materials are originated in the ocean such as sedimentar rocks found on land today



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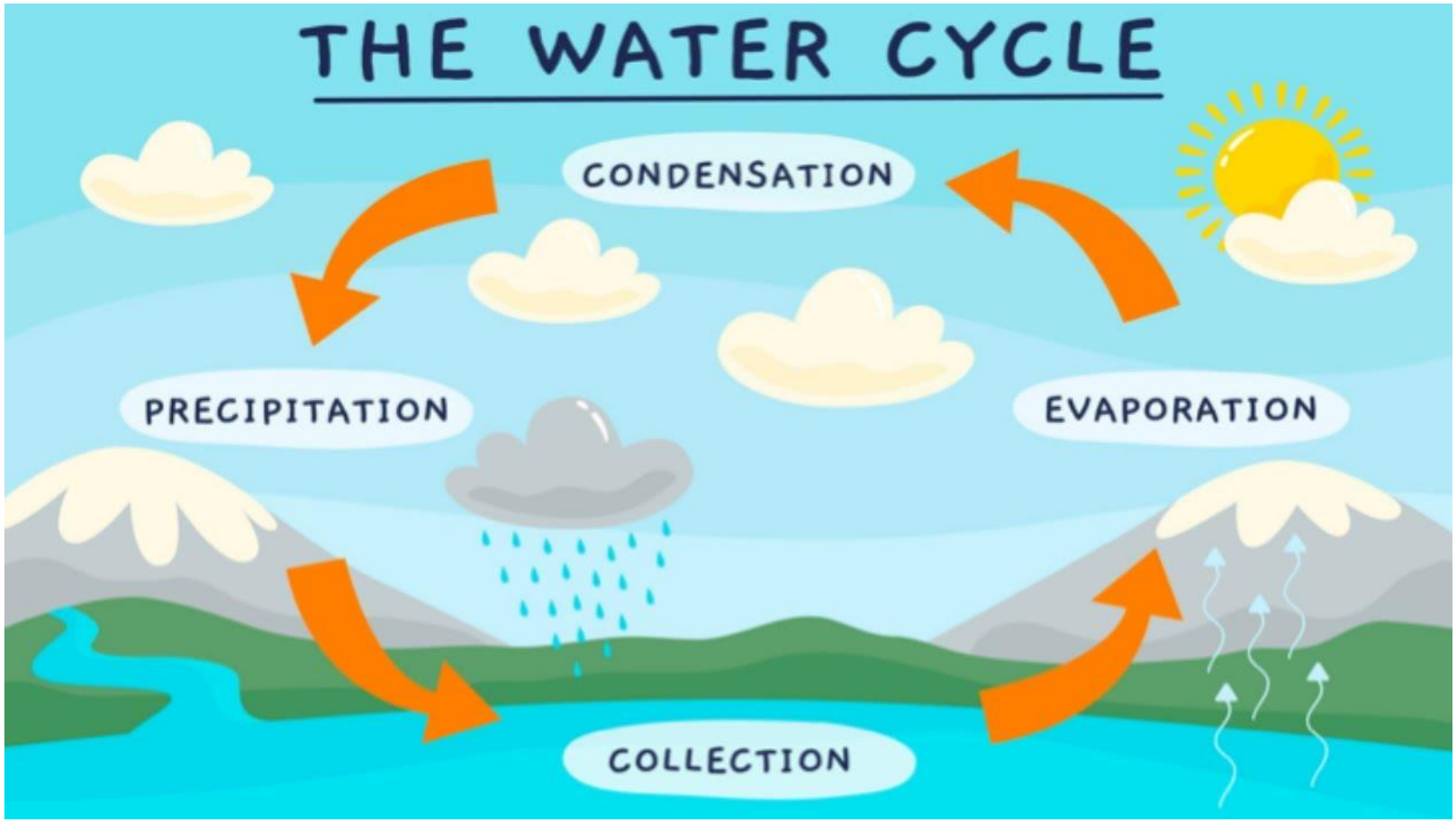
2.



GREENDIVING

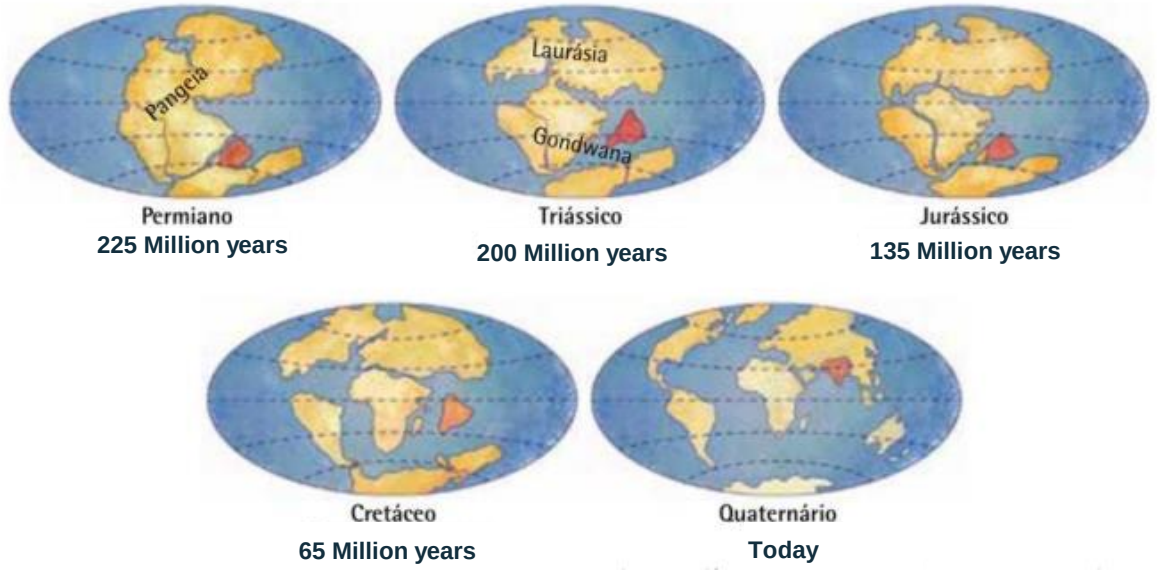
2.

Tectonic Activity

GREEN DIVING

2.

Tectonic evolution of the Planet



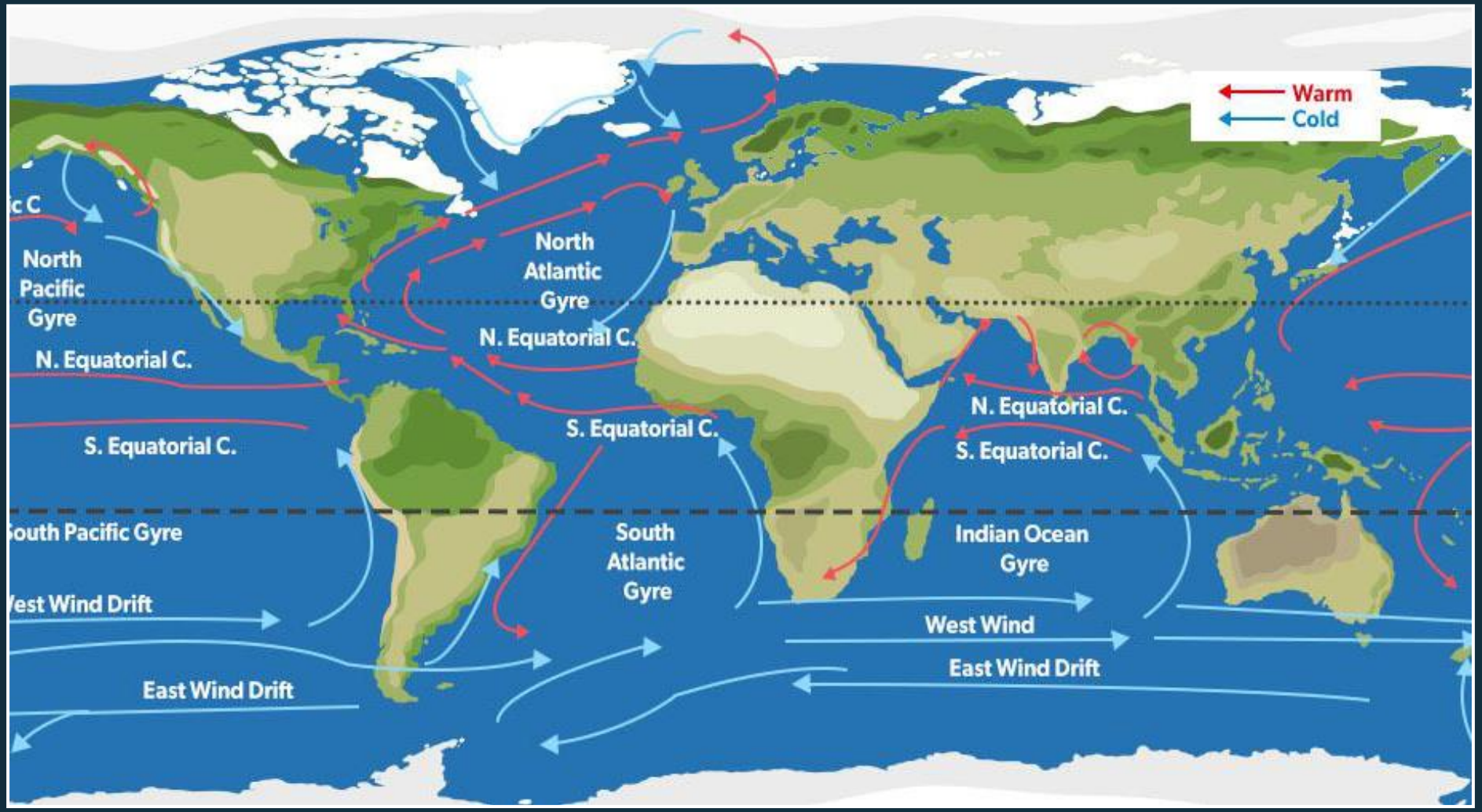
GREENDIVING

3. The Ocean is a major influence on weather and climate

GREENDIVING

3. Principle

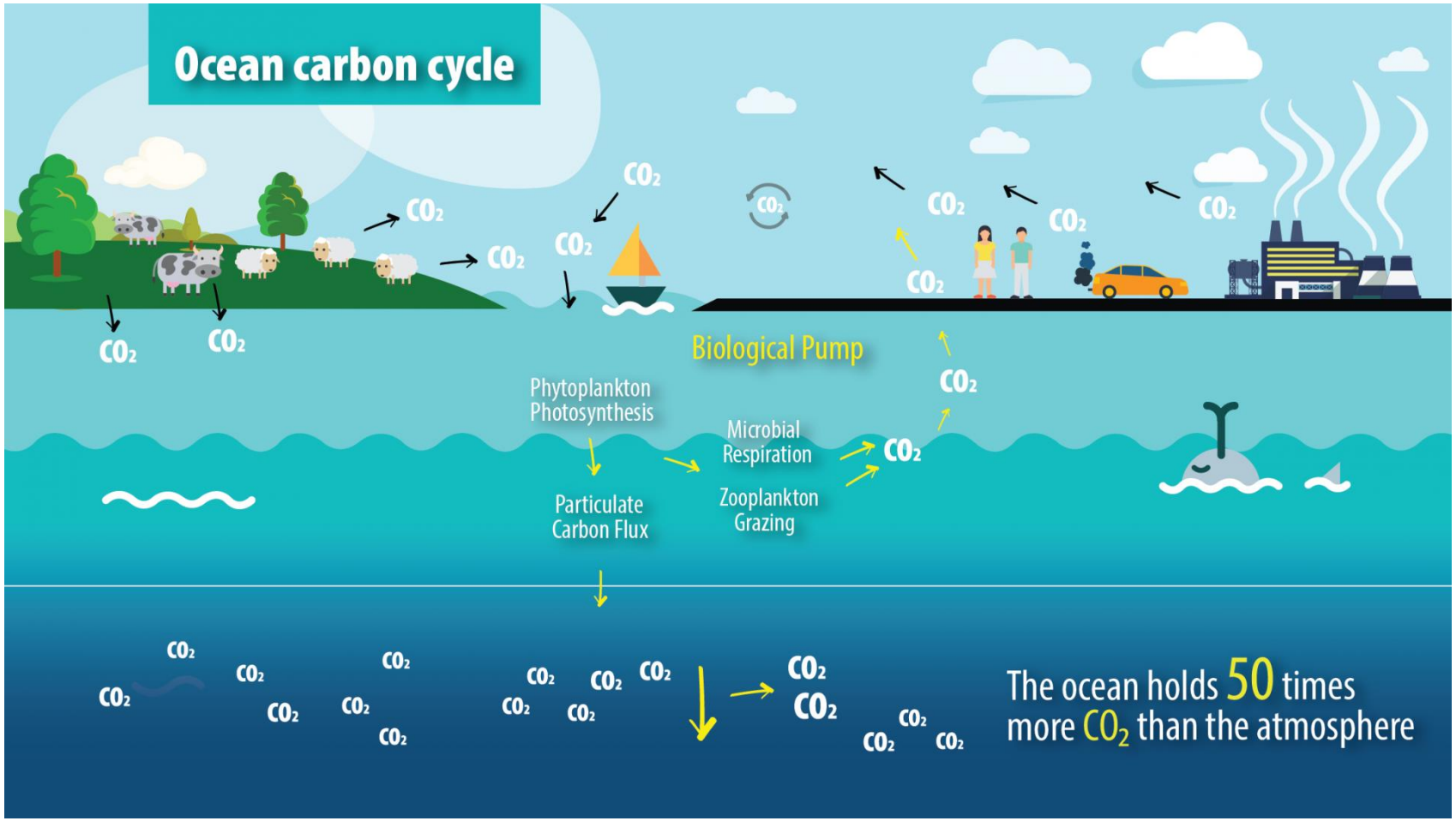
3.



Responsible for climate regulation

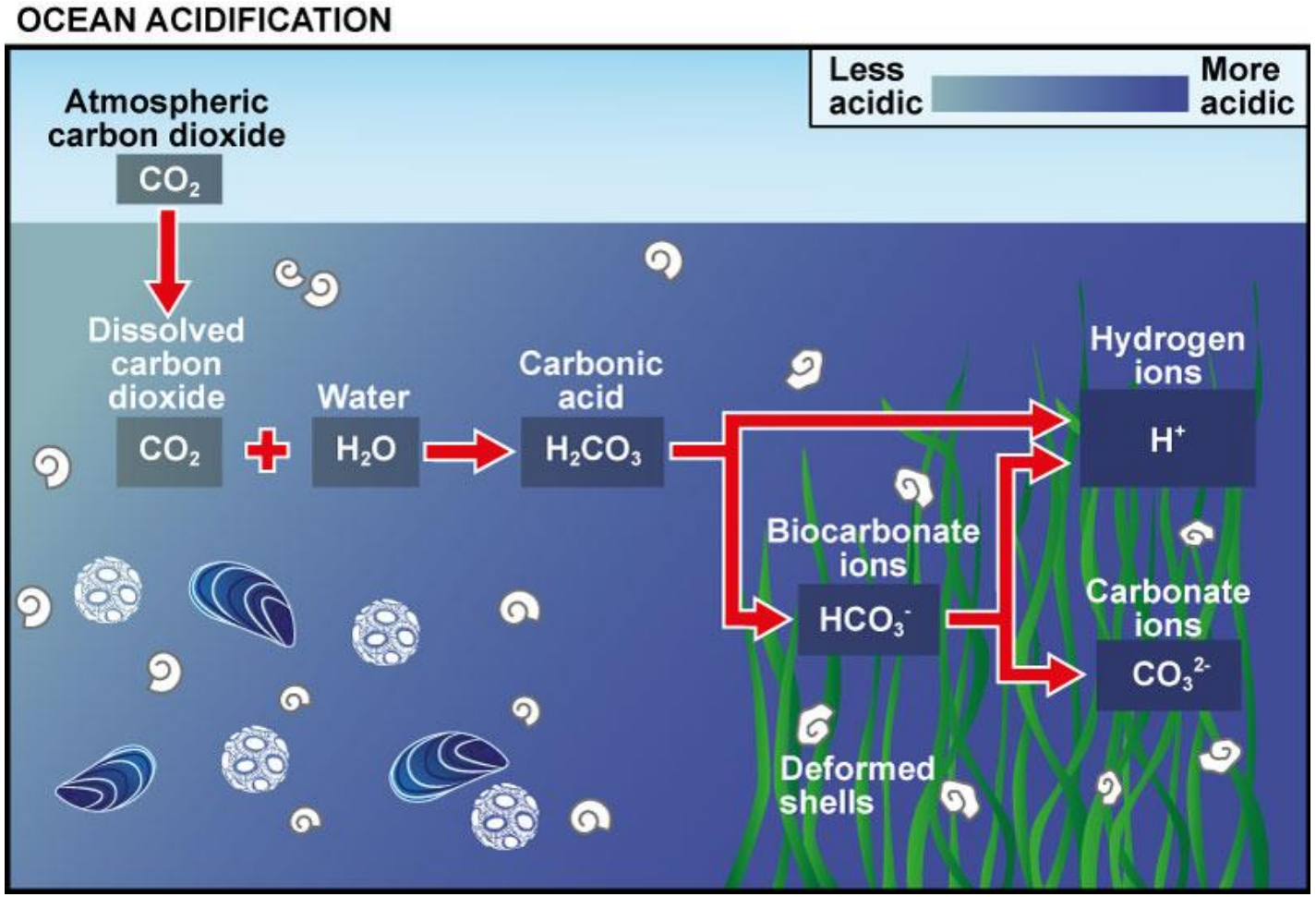
GREEN

3.



GREEN DIVING

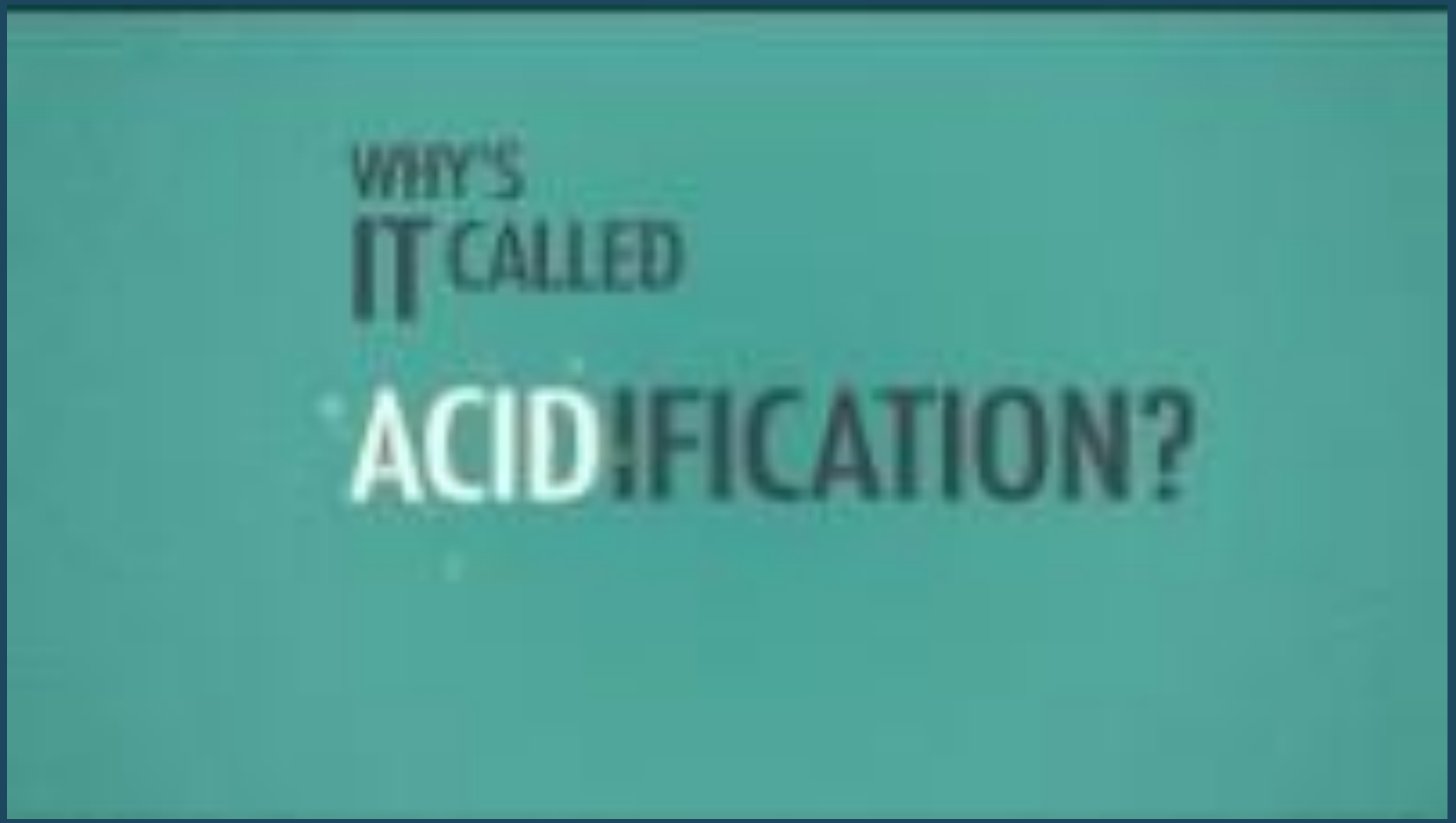
3.



Increased carbon dioxide in the atmosphere increases carbon dioxide retention in the ocean, causing ocean acidification

GREEN DIVING

3.



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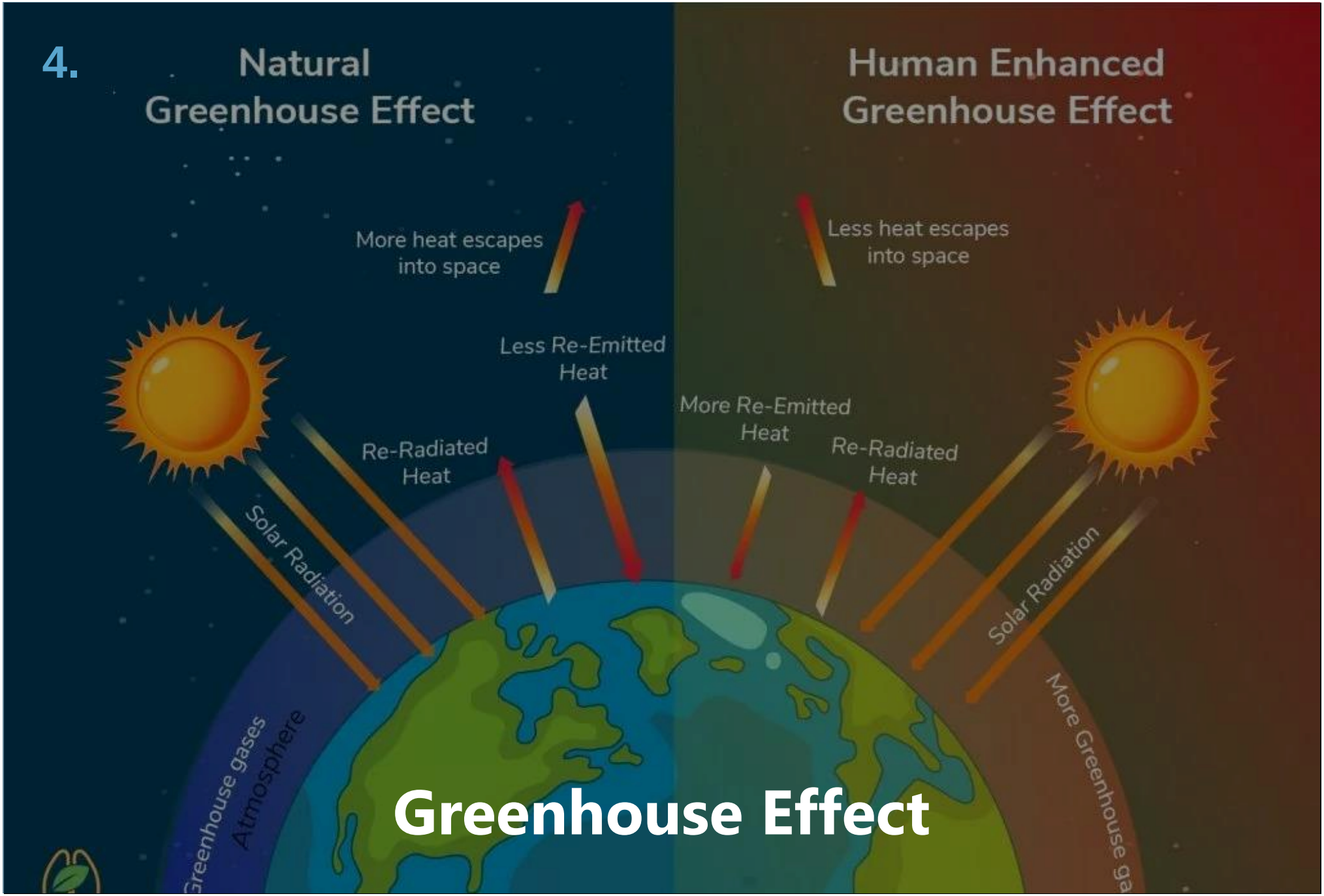
4. The Ocean makes Earth habitable

GREENDIVING

4. Principle

4.



Greenhouse Effect

5. The Ocean supports a great diversity of life and ecosystems

GREENDIVING

5. Principle

5.

Sea turtles travel thousands of kilometers across the oceans and with them….

They carry around 150,000 tiny animals in their carapaces.

(larvae, crustaceans, shrimp, nematodes)

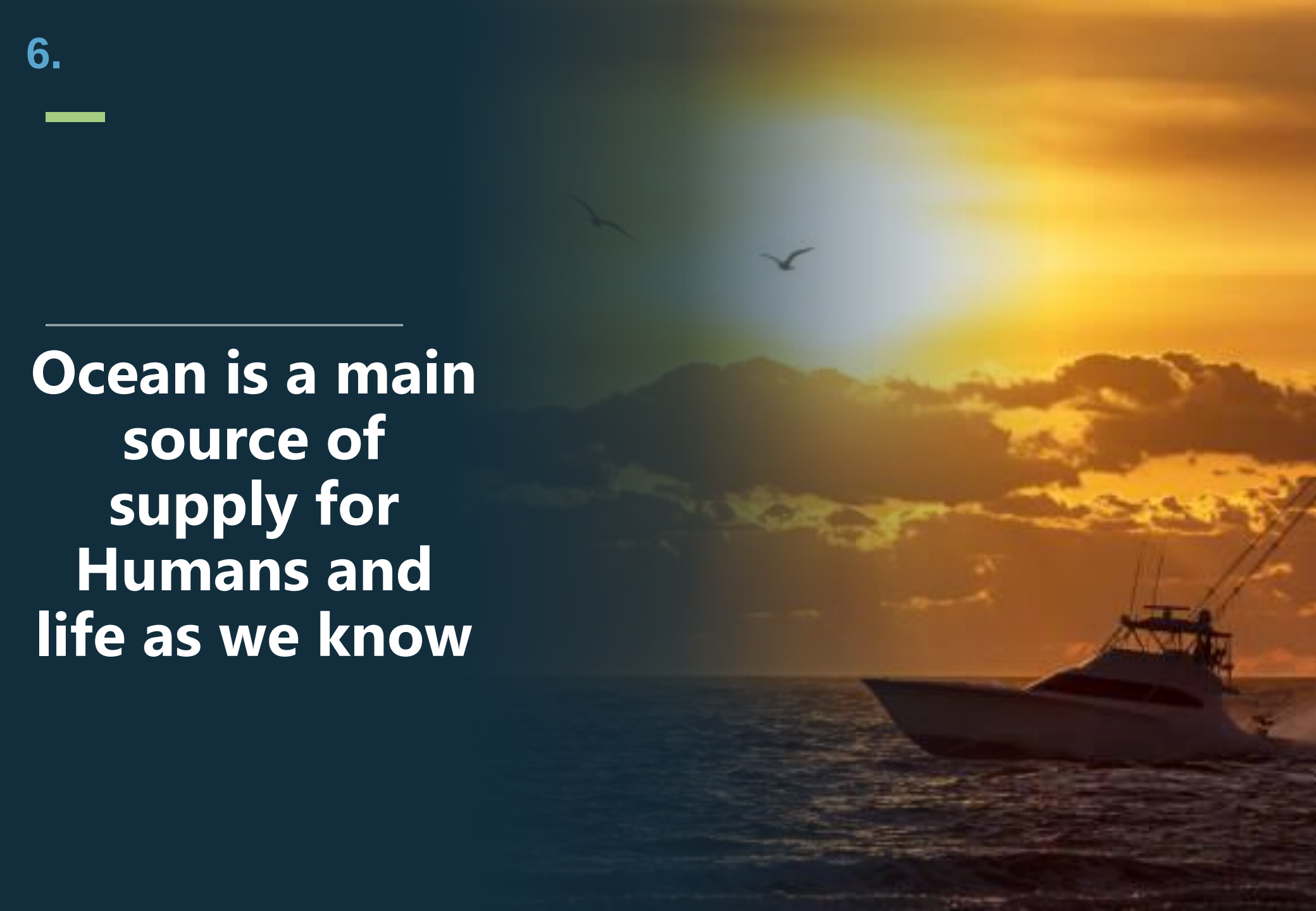
6. The Ocean and humans are inextricably interconnected

GREENDIVING

6. Principle

6.

Ocean is a main source of supply for Humans and life as we know



7. The Ocean is largely unexplored

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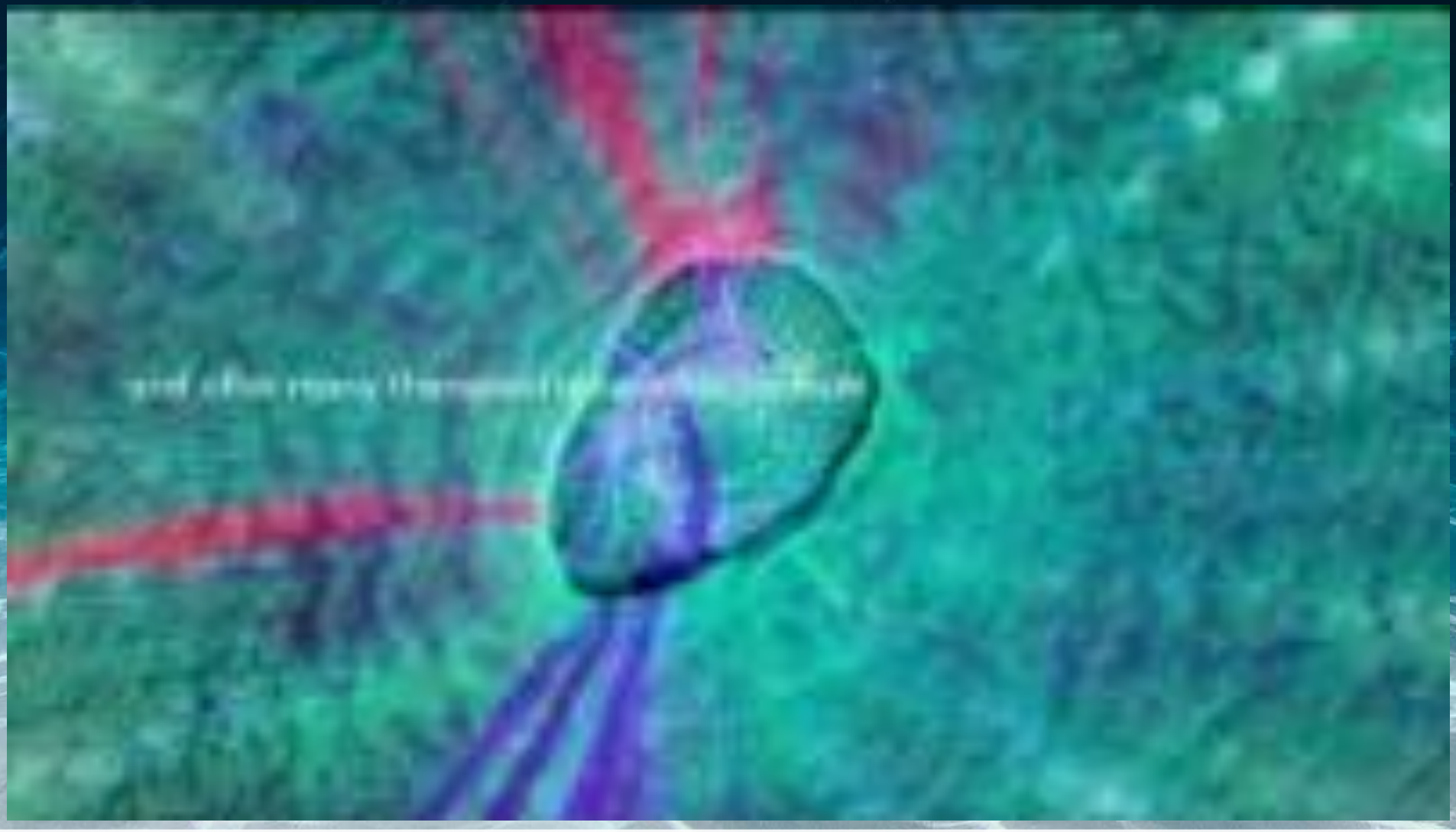
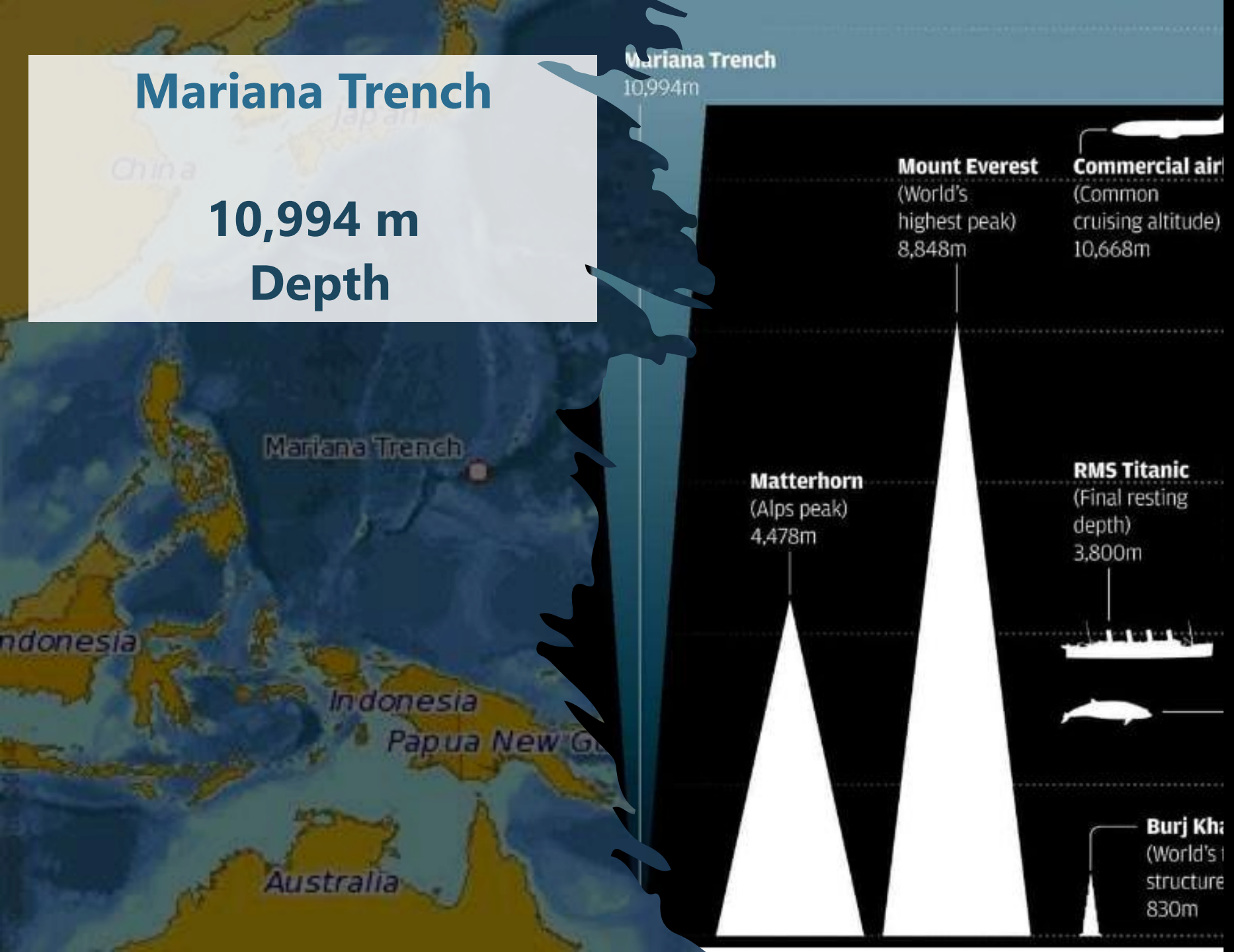
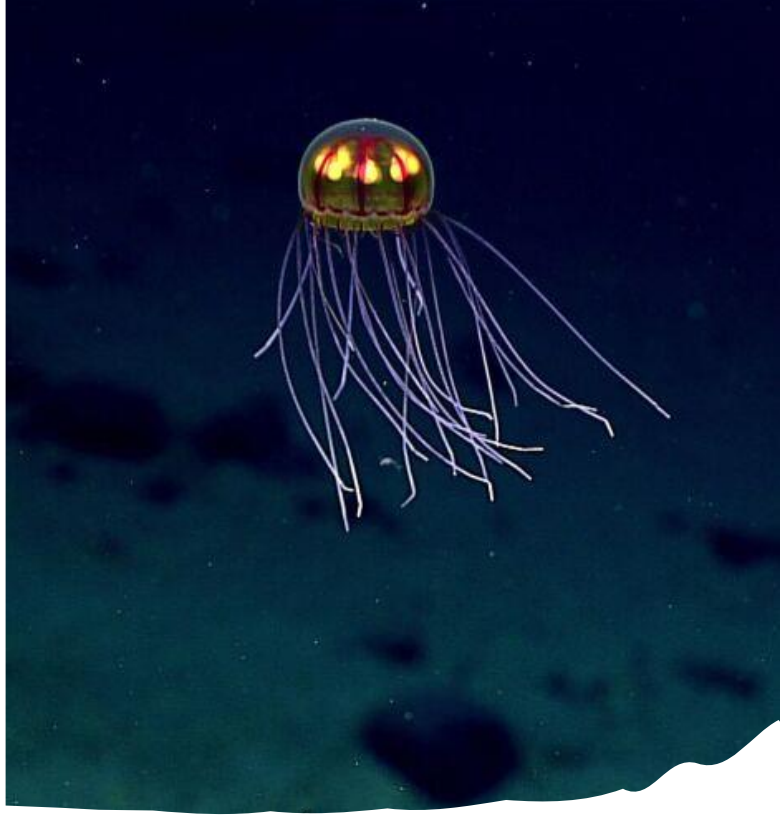


7. Principle

Mariana Trench

10,994 m
Depth





Deep Sea Animals

Group Activity

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UNESCO

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CONSORTIUM

CETMAR
CENTRO TECNOLÓGICO DEL MAR

INOVA+
INNOVATION
FOR GROWTH

BBZ am Nord-Ostsee-Kanal
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