Our (Un)Known Ocean

Challenge #8 –Create a digital representation of the ocean

Learn

- Ocean Literacy Principles
- History of ocean exploration
- Ocean-related professions
- Sustainable Development Goals

Think

- Why (reasons) should we map the ocean?
- How can we create a digital representation?

Act

- Be an agent of change and awareness of the educational community

Theory of changes (table thinking about the challenge and the issue)

Problem	Activities	Resources	Outputs	Outcomes	Impact
Why (reasons) should we map the ocean? How can we create a digital representation?	Learn/Think/Act . Design thinking activities . School trip . Research, writing and speaking activity . Making vídeos . write a newspaper article about one technology to map, explore and protect the ocean	Videos worksheets bibliographical sources work with scientists (ROV LUSO)	. 2 classes involved . Videos - Newspaper articles - Exhibition about ocean technology - building an ROV prototype - Painting a mural about SDG .	Increased knowledge about the ocean and sustainability in my school	Be an agent of change and awareness of the educational community

1

earn

Sea Beyond – What does the ocean mean to me?

Individual Activity / *Making a video*

Introduction

Sea Beyond II - Decade Challenges: Challenge 08

The Sea Beyond project, a PRADA/UNESCO partnership, provides for activities ("Learn, Think, Act") with the aim of developing in students a scientific literacy on the problem of the oceans and, mainly, the motivation to act in towards a more sustainable future. The SDGs (Sustainable Development Goals) proposed by UNESCO, the principles of Ocean Literacy and the tools for exploring the Ocean are worked on.

Throughout the various stages of the project, students get to know the importance of the Ocean to us and our impact on the Ocean.

Task:

Vídeo (2 min) answering questions.

Questions:

- The first three words that come to our mind when we think of the ocean

- A pleasant memory of a special moment by the ocean

- Explain why you consider it important to study the ocean

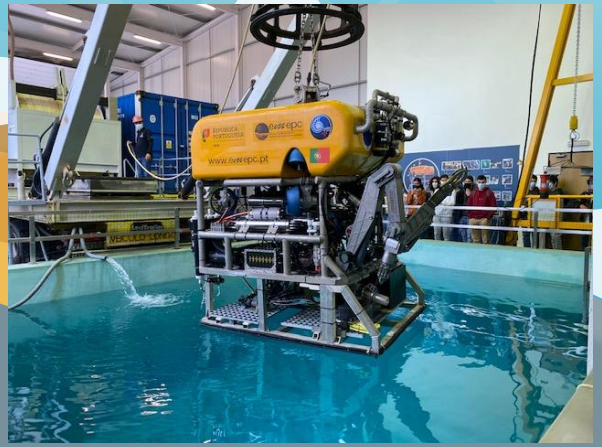
- What does it mean to you to participate in the Sea Beyond project?

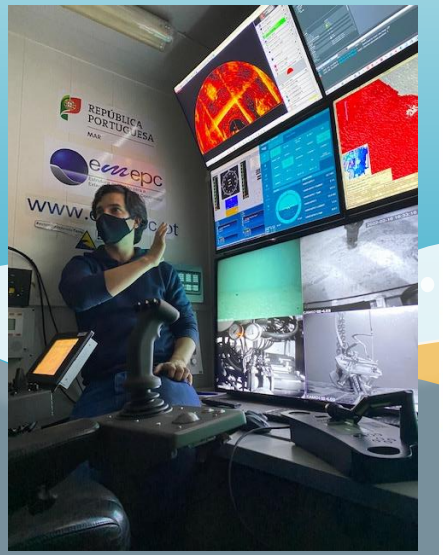
2

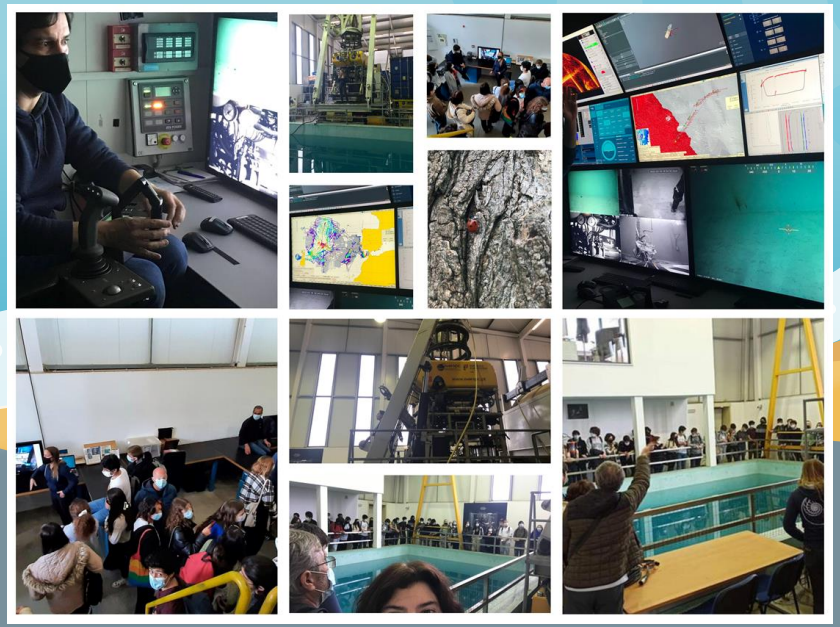
Learn

Can we create a digital representation of the ocean?

School trip to Rov LUSO







3

Think

Sea Beyond - Let's explore the deep sea

Collaborative activity / *Design thinking*

Introduction

Sea Beyond II - Decade Challenges: Challenge 08

"Through multi-stakeholder collaboration, develop a comprehensive digital representation of the ocean, including a dynamic ocean map, which provides free and open access for exploring, discovering and visualizing past, current and future ocean conditions in a manner relevant to diverse stakeholders".

Understanding what goes on beneath the sea is one of the utmost challenges of science. However, exploring the ocean in its depth and complexity is exactly what we need in a world of accelerating climate change and increasing population and economic demands. Mapping the ocean features is crucial if we hope to limit the climate crisis and reduce the risk of critically damaging or exhausting living and non-living marine resources. It's what we need if we want to stop the ocean degradation and the loss of marine biodiversity, as well as we hope to sustainably drive blue economy growth to our advantage.

Ocean exploration is exciting, and it requires collaboration among different disciplines and expertise. The cooperation of scientists, engineers, climatologists, geologists and social scientists is enhancing the understanding of the ocean and its process, achieving a better representation of what lies beneath its surface.

Problems

Why we should map the ocean?

How we are mapping the ocean today?

How can we create a digital representation of the ocean?

Challenge

Let´s explore de deep sea

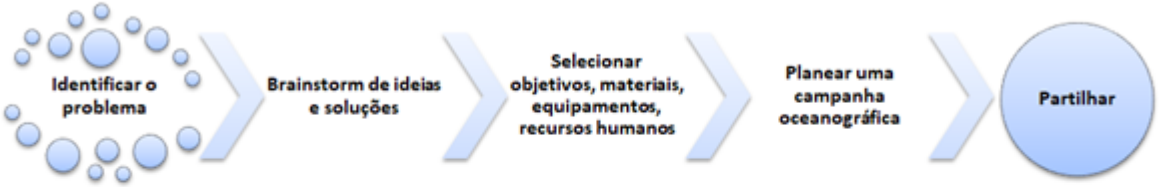


Fig. 1 Etapas do processo de *design* de uma campanha de exploração oceânica.

Experimental Procedure

Material:

- Cards with scientific equipment:
- Cards with marine professions and relative costs
- A seabed map (Atlantic Ocean). You can download JPEG images from this website: https://download.gebco.net/
- Different markers for each type of resource

Method

Divide the class in different groups

1. Preparatory activity (context and background): information on the exploration and uses of marine resources

2. Each group should:

- Choose a living or non-living resource to explore;
- Locate it on the map;
- Choose the right vessel on which to travel and to transport the equipment (if necessary);
- Choose five pieces of scientific equipment that will be of use in the exploration of the chosen resource;
- Establish a multidisciplinary team with eight elements according to the campaign goal;
- Decide the length of the expedition, knowing that there's a limited budget of €300,000.

Presentation

Each group presents the planning of their campaign to the whole class, justifying their choices from different perspectives (e.g. economic, scientific, geographic, environmental)

4

Think

Sea Beyond – Create a digital representation of the ocean

Research, writing and speaking activity

Introduction

Sea Beyond II - Decade Challenges: Challenge 08

WRITING: write a newspaper article about one technology to map, explore and protect the ocean. (deadline: 31st March)
https://docs.google.com/presentation/d/15AO7x58lm0s8DnEQSwCF2lLWxXi4P3IlfS_l82lCFbA/edit#slide=id.gb44da1139d_0_10

SPEAKING: present your findings to the through a **digital representation** of the Ocean (22nd to 29th April)

https://oceanexplorer.noaa.gov/technology/technology.html

News Today

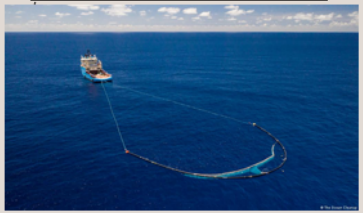
2022-04-06 THIRD EDITION

Boyan Slat an ocean hero

The “OceanCleanup” is an invention made by Boyan Slat to help clean the ocean. Boyan Slat, born on 27th July 1994, explained how he came up with this idea, “I had this idea when I went on a trip to Greece, and I noticed that there were more plastic bags than fish in the ocean. Due to this, I decided that someone should do something about this situation, and two years later, I created “Ocean Cleanup”. Inquired about his foremost goal, he answered, “My goal is till 2025 to reduce half of the plastic in the ocean”.

In the past years, some operations took place, the first of which was “Interceptor 001” in Jakarta, Indonesia. The next one was “Interceptor 002” in Klang, Malaysia, followed by six others. You can consult the link below for further information.

https://theoceancleanup.com/rivers



How does his invention work?

“First, a team prepares a boat and attaches a net to it. Then the circulation begins creating hotspots of plastic with a higher concentration. And with the help of computational modelling, it’s possible to predict where the hotspots are and place the cleanup systems in those areas. Then by maintaining a relative speed, the plastic can be caught in the retention zone of the cleanup system. This part is called the capture. Then comes the sealed off, detached from the system, and emptied on board the vessel. The retention zone is then put back in place, and the cleanup continues. In the end comes recycling. Once the containers are full of plastic on board, they are brought back for recycling”, explained Slat.

SLIDESMANI

OCEAN NEWS

FISHING NETS

Cleaning Our Fun Actions

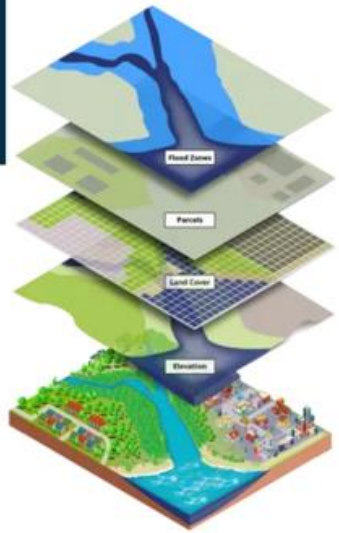
Biodegradable Fishing Nets and Tracking App

29.04.2022 | FRIDAY

THE SUS NEWS

GEOGRAPHIC INFORMATION SYSTEM

THE REVELUTIONARY DATABASE, GIS



The GIS is a database containing geographic data, using software tools for controlling, analyzing and interpreting this data.

Many different technologies are involved in the database, and the importance of GIS is defined by its variety of information.

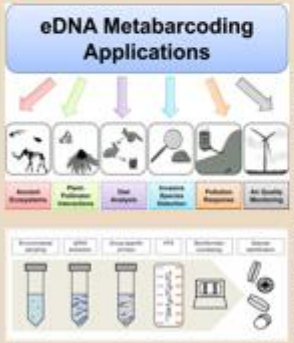
An example of this kind of information is computer data collected by satellites that show land use—the location of farms, towns, and forests. Remote sensing provides another tool that can be integrated into a GIS. Remote sensing includes imagery and other data collected from satellites, balloons, and drones

ANDRÉ GONÇALO Nº1,
FRANCISCO LOURENÇO Nº5
SIMÃO ESTEVES Nº22
TIAGO SOARES Nº25

Bruna Silva, nº1; Mariana Carvalho, nº16; Miguel Silva, nº19; Mónica Portugal, nº20. 10ºB

Today's News

21st EDITION
09 January 2020



The revolutionary technology that changed the way we look to the deep sea

Environmental DNA (eDNA) is essentially DNA collected from the environment. As animals swim through the ocean, they're constantly releasing DNA as they shed skin or scales into the water column.

By collecting samples of sea water scientists can extract eDNA of mucus, feces, or tissue particles. It requires the usage of submersibles - most notably Human Occupied Vehicles (HOVs) and Remotely Operated Vehicles (ROVs).

This revolutionary technology has been used in many studies since 2008. Ficetola et al. discovered that DNA extracted from sea water can be used to detect different species (Biol Lett (2008) 4, 423).

In a recent study from the CNRS France (09 January 2020) scientists used this technology to "assess biodiversity of benthic communities (...) and tracked the recolonization dynamics of benthic invertebrate communities living on the Montsegur edifice within the Lucky Strike (Azores) vent field" and "generated a DNA barcoding inventory that consisted of taxa physically collected from Montsegur and morphologically identified" (Frontiers in Marine Science, (2020) 4, 783).

The eDNA provides a better and efficient way to characterize the deep sea, especially in the hydrothermal vent ecosystems, which are dynamic and irregular habitats that experience severe environmental conditions.

"The water column is the largest environment on earth and is therefore the largest unexplored environment on Earth. eDNA is going to allow us to explore the water column more so than we have ever been able to do before (...). This is going to be a revolutionary technique for getting a baseline understanding of unexplored areas of the deep sea.", says Meredith Everett, Ph. D., Biologist in the NOAA Northwest Fisheries Science Center.

News Today

2022-04-13

VIVIANA AND DÉBORA

FIRST EDITION

ROV RAVES THE WAVES

Today, an unexpected object was found under the ocean when the EMEPC (Mission Structure for the Extension of the Continental Shelf) team of researches were on one of their missions. As you can see, it's a banana peel!

WHAT IS A ROV?

A Remotely Operated Underwater Vehicle (ROV) is a big and powerful robot which has the capacity to reach deeply into the ocean over a long period, mapping and exploring unknown and interesting matter.
Our polluted oceans need a change and ROV will help researches discovir how. Through images, samples, dnasamples together with all of the biological and geological information, researches will find many answers.

THE ROV LUSO

A total of 245 dives, 1155 hours of research and 3248 metres of depth have been accomplished by the 17 oceanographic campaigns.
Not only international, experienced investigators make up each campaign, but also national. They special in geology, geophysics, oceanography, macro and microbiology.
ROV Luso was obtained in 2008, as part of the "PEPC", which is the continental shelf extension project of Portugal.

DISCOVERY

BREAKING NEWS! While diving and using the ROV Luso to collect the information and images, they came face to face with...a banana peel! It was intact.
Scientists have, in fact, commented that something so surprising as this had never occurred after all the numerous unusual, uncommon objects seen in the depths of the ocean, this was the most BIZZARE.

2022-02-30

Yesterday's News

MILLIONTH EDITION

The first humanoid robot made for ocean exploration!

Before speaking about the Main Topic, we will speak about R.O.V.s.

A R.O.V is a Remotely Operated Vehicle and even though they are quite rare, they're still the most reliable way, not only to "make these ocean trips", but they are also used to go to space and other planets (for example Mars), and acquire information about the subject at hand. These is because, just like the name suggests, the equipment does not require a person to be in the robot itself, but it can be operated from afar.

Speaking more specifically about the ocean, the main question would be: "But why not use A.U.V.s (automatic, underwater vehicle)?"

And the simple answer is, that if an abnormal thing happens while the R.O.V is being piloted (like being tangled in fishing lines), the people in charge can try and solve the problem as for the A.U.V., it would be impossible and the robot would probably be lost.

The Daily Sea News

The Seabin

A new and innovative creation, called the Seabin, produced by two Australians, is gathering lots of attention on social media lately, especially around divers, and for a good reason.

860 Seabins around the world! 3.612.8 kg per day! 2.764,988 in total!
There are 2 Seabins in Portugal, one in Cascais and one in Porto. Did you know that?

The history of the seabin

Pete Ceglinski and the Seabin

Pete Ceglinski and Andrew Turton, two ocean lovers, created the Seabin in 2015.
The idea came out of the thought:
"If we can have rubbish bins on land, why not have them in the water?"
After many years of developing and designing the Seabin, in July of 2016, a prototype was finally finalized and installed in Mallorca, Spain.
After the success of the prototype, in November of 2017, the Seabin was ready for pre-sale and in August of 2019, we could count 719 Seabins in 50 countries!

But what is the Seabin exactly?

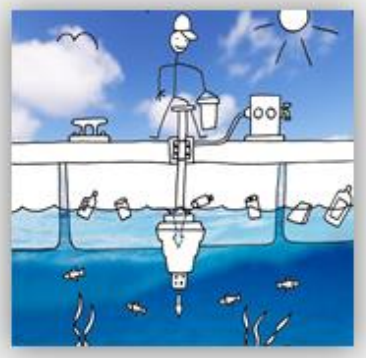
The Seabin, an advanced aquatic "trash skimmer", is a floating trash collector deployed in marinas and harbors to collect debris, macro and microplastics (and microfibers with an extra filter).
The bins have the capacity to collect pollutants of a variety of shapes and sizes, such as cigarettes, plastic bags, bottles, food wrappers, and even hazardous surface chemicals like oil.

SLIDESMANIA.COM

2022-04-18 THIRD EDITION

The Daily Sea News

And how does it work?



The Seabin works like a fish tank filtration device, but instead of focusing on a few gallons of water, the Seabin can clean entire harbors and marinas. It works by being connected to a water pump. Water is sucked in from the surface and passes through a catch bag inside the Seabin, with a submersible water pump capable of 3.8kg. Debris per hour plugged directly into either a 110V or 220V outlet. The water is pumped through the Seabin and out the bottom, leaving litter and debris trapped in the catch bag.
Works 24/7 and is easy to handle. It only requires one person to lift out the bin and empty the catch bag. Another plus, when you take out the trash. it allows you to realize just a fraction of how much pollution really circulates our oceans.

What are the benefits?

The Seabin collects debris that pollutes ecosystems and harms marine life. With this technology, we can reduce plastic and oil pollution and the ocean and provide cleaner and safer water for marine life.!

Their goal

To learn more about their goals, we talked with Pete Ceglinski. "Our goal is to have pollution free oceans for our future generations and live in a world without the need for Seabins" he said.

SLIDESMANIA.COM

2020-01-26 THIRD EDITION

MT Journal

News

MT Journal

1st. EDITION — Lisbon, Portugal

Great Discovery!

Breaking News!

New Life In The Sea

This Tuesday morning a team of scientists piloting a submersible have discovered an unexplored cave deep in the Atlantic Ocean.

Inside, they found what could be only described as one of the most incredible deep sea findings in recent history.

In the cave were new species of plants, like algae and corals, as well as many new species of animals. A new shark subspecies was found, but even animals of unknown species were discovered!

This trip to the bottom of the ocean was only possible because of the recent advances in the technology needed to build this type of manned submersible. The Ocean Protecting Organization (OPO) helped fund this research.

MT Journal

News

MT Journal

1st. EDITION — Lisbon, Portugal

How Has Technology Impacted Ocean Exploration?

The recent technological advances made it possible to build and/or upgrade submersibles like ROVs, AUVs and HOVs. Now they can stay underwater for longer periods of time, carry more people inside them (HOVs) and withstand more pressure from the water.

HOVs

They transport a small team of scientists, letting them see the sea floor with their own eyes.

AUVs

They are programmed robots that explore and collect information about the seafloor without the need of human control.

ROVs

They are tethered to ships, allowing them to be controlled by the people in the vessel. They are used to gather photos and samples of the sea floor.

"A New Age Of Ocean Exploration Has Begun"

A Member Of The Research Team Spoke To MT NEWS

After they came to the surface, we interviewed biologist João Pedro, a 65-year old Portuguese man who earned his PHD in Biology in 1988, and is now working with a handful of aspiring biologists to further explore the Atlantic.

"I am very happy with the way technology has been evolving.
There are more and more new and efficient ways to explore the ocean, and I couldn't be more excited to try them out.
I feel like a new age of ocean exploration has begun", says João Pedro.


SEA BEYOND
SEA BEYOND
SEA BEYOND

5

Act


My Actions Matter
ESTAMOS A PARTICIPAR NA EDIÇÃO 2022 DOS #GLOBALACTIONDAYS!
25 ANOS
Eco-Escolas
25 ANOS
Jovens Repórteres para o Ambiente
We support the
FEE
ECOSYSTEM RESTORATION

AGRUPAMENTO DE ESCOLAS ANSELMO DE ANDRADE
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PENSAR AZUL

CMA CÂMARA MUNICIPAL DE ALMADA

ESCOLA AZUL

19 de maio
Dia Escola Azul

Corrente do oceano

Nas 3 escolas durante todo o dia

Na **Praia da Mata, às 11h30**

Um dia de celebração onde vamos dar as mãos e construir, em conjunto, um cordão humano pelo Oceano capaz de juntar alunos, professores, famílias, entidades parceiras e comunidades locais.

CORRENTE DO OCEANO


Corrente do Oceano
Dia Escola Azul 2022


OCEANO
DE PALAVRAS

ROV4ALL

6

We must see beyond the sea…. The sea is not just a large body of water, it’s what unites the four corners of the world; It allows us to live and it’s the home of billions of living beings.
The sea is very important and it makes our world so much better.
Unfortunately, the human being doesn't know how to value what it has and ends up destroying it's own home…

How are we mapping the ocean today?
How can we create a digital representation of the ocean?
And finally, the most important part: Why we should map the ocean?

Swot analysis

Strenghts

Participants made a connection with the Ocean that invites them to reflect upon the situation of our planet.

Weakness

Participants realized that there is still a lot of research in the future and that much remains to be known about the ocean.

Opportunities

Participants had the opportunity to investigate and learn more about the Ocean and the research being done.

Threaths

Participants realized that there is still a lot of indifference and ignorance about the ocean

Our (Un)Known Ocean

Challenge #8 –Create a digital representation of the ocean

Work by students of 10th grade (A and B classes) of school Anselmo de Andrade with teacher Élia Martins

Almada, Portugal

May, 2022