
BLUE MARINE
FOUNDATION
Journey to a
Healthy Ocean
STUDENT ACTIVITY JOURNAL
FOR AGES 12+

RAINFORESTS OF THE SEA

Media Campaign

#ProtectMaldivesSeagrass

The Maldives is a country in the Indian Ocean that is made up of 1192 islands! Tourists visit the Maldives for its beauty and marine life. The tiny country is home to 5% of the world's coral reefs and thousands of species of fish, including oceanic giants, manta rays and whale sharks.

However, some resorts have begun removing seagrass to make their lagoons more attractive for guests. Seagrass meadows are important for storing carbon and slowing climate change. They are also a habitat for animals like seahorses, and a source of food for fish and turtles. Seagrass meadows also protect the coastline from erosion (wearing away) which helps coastal communities.

In 2019, Blue Marine used social media to convince resorts to keep their seagrass meadows. **The campaign protected 830,000m² of seagrass in just 3 months. This is equivalent to 116 football pitches!**

What is a social platform? Try to think of 3 examples that you have used or heard about.

What is a social media campaign?

A social media campaign uses social platforms to get a specific message across to their audience. Campaigns have a clear goal and are designed with the intention of having people see and interact with them. Usually, campaign posts are made regularly over a period of time.

Create your own blue carbon campaign!

STEP 1: Look at existing campaigns

First, look at these Instagram posts for #ProtectMaldivesSeagrass and #SaveOurSharks. Then, answer the questions. This will help you to create your own campaign!

maldiveswhalesharkresearch Happy World Seagrass Day
.
Seagrass plays an under researched and crucial role in our ocean ecosystems. Seagrass habitats are used as a nursery for small fish, a buffer zone for islands and an important carbon storage entity, storing 15% of the ocean's carbon! They urgently need protection here in Maldives and you can contribute to this by participating in citizen science initiatives created by @maldivesunderwaterinitiative and funded by @bluemarinefoundation
Why not spread the message and post a photo of a Seagrass meadow near you and tag it with #protectmaldivesseagrass .
📷 @maldivesunderwaterinitiative @bluemarinefoundation @andyballphotography .
#seagrassmaldives #worldseagrassday #worldseagrassday2020 #droneshots #whaleshark #shark #volunteer #travelling #travelphotography #protectwhatyoulove #marineconservation #sharkconservation #maldives #dhigurah #reef #moodhu #sea #ocean #travelblogger #islandlife #conservation #volunteer #whalesharks #underwaterphotography @passionpassport @lonelyplanet @ocean_magazine @_ocean.vibes @oceansnation @shark.passion @discoversharks @gopro

Read the caption below the image. What do you think is the main purpose of this post?

_____

_____

_____

_____

maldivesunderwaterinitiative For third day of the #ProtectMaldivesSeagrass challenge we are combining it with our celebrations of #WorldWildlifeDay! We challenge you to explore your seagrass meadows and see what wildlife you can spot. Comment below or share what you spotted with us. .
Tag us, @maldivesresilientreefs and #ProtectMaldivesSeagrass in your post to be sure we see it and don't forget to challenge your friends to do the same! .
A single hectare of seagrass can house as many as 100,000 fish, they're also a vital food source for green turtles and a common feeding site for many species of rays- you never know what you will find!
.
We challenge all our #ProtectMaldivesSeagrass partner resorts to explore the wildlife in their meadows:
@gili.lankanfushi
@anantaraveli
@anantaradhigu
@naladhumaldives
@reethifaruresort
@discoversoneva
@discoversoneva
@kurumba_maldives

How does this post encourage people to take action? Who is being challenged to act?

How are images used to get attention?

How is the text used?

STEP 2: Design your own campaign

Now, DESIGN your own campaign for blue carbon habitats

- What is the **goal** of your campaign?

Goal: _____

- What **element** of blue carbon habitats would you like to bring awareness to?

Element: _____

- What human **behaviour** do you want to change?

Behaviour: _____

- Who is your **audience**? Who do you want to speak to?

Audience: _____

- What **platform** will you use to share your campaign? Why?

Platform: _____

- Is your audience on this platform? How could you find out?

- Can you achieve your goal by using this platform? Think about how content will be shared and how it will reach your target audience.

- What kind of visuals do you want to use? What will grab attention? Sketch or paste some examples below:

- What will you say?
  What **text** is important to get your message across and **why?**

STEP 3: Put it together!

CREATE a rough sketch of one post that you might create for your blue carbon habitats campaign. Include any text that you would post with the graphic. Include text that would **motivate** your audience to act on your message and/or **share** this message.

PROTECTING THE UNDERWATER WORLD

Marine Protected Area (MPA) Survey

MPAs provide safe havens for marine ecosystems to recover from the pressure of human activities. How do we know they work? Scientists monitor the health of protected areas by collecting data using survey techniques called **quadrats** and **transects**. With this data, they can see the change in marine populations over time!

Why do you think it is important to take random samples? Why not place the quadrats where there is the most life?

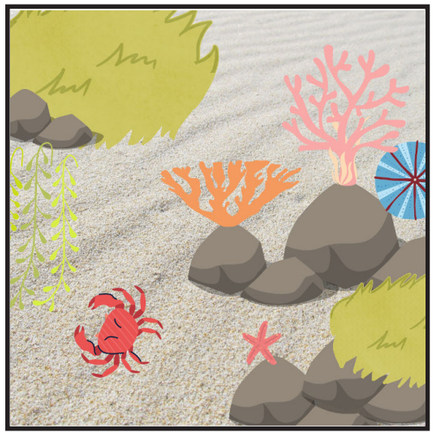
PART 1: Collecting data using a quadrat

Quadrats are used for measuring the types and amount of **benthic** cover (the organisms found on the seabed). They are usually 1x1m squares. Marine scientists often use them in coastal zones or in shallow waters. If the quadrat is placed in deep water, scientists need to use scuba gear to collect the data.

Imagine you are a marine scientist that is collecting data to monitor an MPA. To do this, you have randomly placed two quadrats and will estimate the **percentage (%) cover** of various species within them. This will let you record the types of species that are found on the seabed, as well as how much of the area they occupy. Record your results in the table below.

Quadrat #1

Quadrat #2



Why do you think it is important to take more than one sample?

	Marine Protected Area (MPA)	
	Quadrat #1 (% cover)	Quadrat #2 (%cover)
Coral	%	%
Seaweed, kelp, seagrass	%	%
Rock/sand	%	%
Invertebrates	%	%
TOTAL	100%	100%

Now imagine you previously sampled two quadrats in a nearby area outside the MPA. Compare the data that you just collected with the data outside the MPA, which is shown in the table below. What conclusions can you draw about the effectiveness of the MPA for protecting marine life?

	Unprotected Area	
	Quadrat #1 (% cover)	Quadrat #2 (%cover)
Coral	4%	5%
Algae	20%	40%
Rock/sand	70%	45%
Invertebrates	6%	10%
TOTAL	100%	100%

PART 2: Collecting data using a transect

Transect surveys are often used by marine scientists to measure the abundance of fish in an area. A transect is the scientific word for a line that researchers swim along, counting the number of fish that they see. As they swim, they count the type and number of fish that swim 10m to either side of the line.

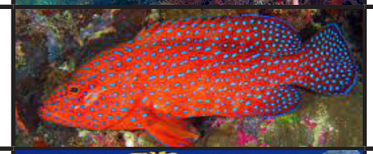
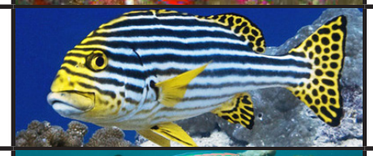
Revisit the RAINFORESTS OF THE SEA web experience. This time, as you navigate through the blue carbon habitats, imagine that you are swimming along a transect line that has been laid. Use the data table and species ID on the next page to identify the types and numbers of species you see along the journey.

Compare your data with your class. Did you record the same numbers? If not, why do you think they were different?

For an additional challenge, research the conservation status of each species. Are they threatened, engaged or another status? Try IUCN and Fishbase. If possible, add the scientific name of each species to the data table. Discuss with your class why they may have this status and when that status was last assessed.

Tip: using a tally can be easier to add up at the end

RAINFOREST OF THE SEA Transect Line Data Sheet

Species name	ID image	Tally	Total	Status and scientific name
Blackspot emperor				
Snapper				
Barracuda				
Coral grouper				
Oriental sweetlips				
Parrotfish				
Peacock grouper				
Blue tang				
Green turtle				
Black tipped reef shark				

THE OCEAN'S WEB OF LIFE

Manage a Fishery

Have you ever been fishing or seen someone fish? What did you/they use to catch the fish? This is called "**gear type**". Many different tools ("gear") can be used to catch fish.

Some fishers use **pole and line** to catch one fish at a time. If you've been fishing, you might have used a rod and reel. Another type of fishing is using **static pots**, also known as creels or traps. These are placed on the seabed for a set number of hours before being hauled back onboard the fishing vessel.

To catch more fish, boats might set **longlines** behind them that have a series of baited hooks hanging off them. Longline fisheries can unintentionally catch and kill animals like seabirds, turtles and sharks. This is called **bycatch**.

Trawling is when boats tow a net through the water behind them, or along the seabed below (**bottom trawling**). **Dredging** also targets the seabed and is where a heavy metal structure, typically with a bar or 'teeth' at the front, is dragged along the seafloor. Trawling is used to catch many different species, but dredging is usually used to catch shellfish, such as scallops.

To target a species of schooling fish in the open ocean, large commercial boats will use **purse seines**. These nets surround and enclose the entire school of fish, like a drawstring on a purse.

In this activity, you'll use different gear types to catch "fish" and observe their effects on the sustainability of your fishery.

What do you think bottom trawling and dredging do to benthic habitats and ecosystems?

In this activity, you will use different gear types to catch "fish". How do they impact the sustainability of your fishery?

MATERIALS:

- Medium-sized bowl (one per group)
- 10 x 4 colours of Froot Loops (or other coloured breakfast rings - you will need at least blue, green and yellow) per group
- 20 Cheerios (or other plain breakfast rings) per group
- Paperclip (one per student)
- Fork (one per student)
- Spoon (one per student)
- Timer

SETUP

1. **Form a group of 2-4 students**. You will be competing to catch fish in the same fishery

2. **Create your fishery**. In a bowl, add :
- 10 Froot Loops x 4 colours (40 tota l) - these will represent your target fish stock
- 20 Cheerios - these will represent other marine animals that you do not want to catch (bycatch)

3. **Get your gear ready**. Each student will need a paperclip, fork and spoon.

PART 1

You will have 5 "seasons" to fish.
During each season, you will be allowed to fish for 15 seconds.

4. Check the gear type to use for each season in Data Log 1. For Season 1, you will use a paperclip.

5. When the 15-second timer begins, catch as many coloured Froot Loops as you can!

6. At the end of each season, record your catch in Data Log 1.

7. Between fishing seasons, your Froot Loops reproduce! Double the **remaining fish stock** (coloured Froot Loops) for the start of the next season.

Season (15 sec of fishing each)	**Gear type**	**Starting stock size** (double last year's **remaining stock size**)	**Your catch** (#)	**Profit** ($10 per fish)	**Remaining stock size**	**Bycatch** (# of plain breakfast rings caught)
1	Paperclip	N/A		$		
2	Fork			$		
3	Fork and spoon			$		
4	Fork and spoon			$		
5	Fork and spoon			$		

Ocean temperatures increase due to climate change! Only blue and green fish survive

Climate change causes back-to-back cyclones which destroy the coastal habitat that your fish stock relies on! Only yellow and green fish survive.

This is called bottleneck effect. **Extension activity:** define what this term means and why it's important to maintain large populations of wildlife in terms of genetic diversity.

Reflect:

- Did your fishery survive all 5 years? Why or why not? Do you think it would survive for 10 years?

  _____

  _____

- What happened to the fish stocks as your gear type became more efficient?

  _____

  _____

- Which gear type was the most profitable?

  _____

  _____

- Which gear type caught the most bycatch? Which gear type caught the least?

  _____

  _____

- What effect did the climate events have on the fish stock?

  _____

  _____

How could these techniques help you manage your fishery to make it more sustainable?

- Choice of gear type:

  _____

  _____

- Add a Marine Protected Area:

  _____

  _____

- Closed seasons (skip a season):

  _____

  _____

- Challenge research question: What is a quota? How might introducing fishing quotas influence your fishery?

  _____

  _____

PART 2

1. Begin with the same setup as Part 1.
2. Using the ideas above, create a management plan with your group to decide how you will make changes to your fishing so that your stock stays stable and healthy. Research the Lyme Bay Fisheries and Conservation Reserve and the responsible fishing infographic from the Maldives for inspiration:

_____

_____

_____

_____

3. Fish for 5 seasons and fill out Data Log 2 as you go.

Reflect:

- Compared to Part 1, how did your management strategy affect the sustainability of your fishery?

_____

_____

- Compared to Part 1, how was your fish stock able to respond to the climate events?

_____

_____

- What do you think creates demand for large-scale (often unsustainable) fishing?

_____

_____

- Can you think of any limitations to your management plan? If you were to repeat this activity, what might you change?

_____

_____

- How could we make sustainable, small-scale fishing more profitable for communities?

_____

_____

Season (15 sec of fishing each)	**Gear type**	**Starting stock size** (double last year's remaining stock size)	**Your catch** (#)	**Profit** ($10 per fish)	**Remaining stock size**	**Bycatch** (# of plain breakfast rings caught)
1	Paperclip	N/A		$		
2	Fork			$		
3	Fork and spoon			$		
Ocean temperatures increase due to climate change! Only blue and green fish survive						
4	Fork and spoon			$		
5	Ford and spoon			$		
Climate change causes back-to-back cyclones which destroy the coastal habitat that your fish stock relies on! Only yellow and green fish survive.						

Extension Activity - Manage Your Marine Environment

You live on an island surrounded by coral reefs, lush mangroves, seagrass meadows and saltmarsh. The beauty of the natural environment has made the island a tourism hotspot, and recreational anglers and divers love the area too.

Many of the local inhabitants rely on fish as their main source of animal protein and income. In recent years, however, dwindling fish stocks mean fishers have taken to using dynamite and cyanide. These unsustainable fishing methods are damaging habitats. Furthermore, large commercial boats are also fishing nearby using longlines and trawling.

Your group of 4-5 represent the interests of local people involved. You will each take on one of the following positions:

- Local fishers
- Conservation scientist
- Large-scale commercial fisher
- Recreational diver
- Tourism operator

First, consider your own interests in the management of the island's marine resources. Then, work together to come up with and agree upon three solutions to help sustainably manage the marine environment. Remember, you all have different interests and priorities!

Tip: Check out the Maldives Responsible Reef Fishing infographic for some ideas on how to manage the marine environment.

Glossary

Key Terms

Acidification - as the ocean absorbs carbon dioxide (CO_2) it causes the pH (acidity level) to drop, so the sea becomes more acidic over time

Blue carbon - the carbon that is captured and locked away by ocean habitats such as mangroves, coastal salt marshes and seagrass meadows

Bottleneck effect - when a population's size is reduced there is less genetic variation and less ability to adapt to environmental pressures

Carbon cycle - the process of carbon travelling between the atmosphere and Earth

Carbon sink - a natural or artificial reservoir that absorbs more carbon from the atmosphere than it releases

Climate change - the long-term shift of the Earth's temperature and weather patterns

Exclusive Economic Zone (EEZ) - the coastal region within 200 nautical miles where a nation has sole rights for exploring, exploiting, conserving and managing natural resources

Gear type - The tools used to catch fish; include pole and line, longline, trawling, bottom trawling, and purse seine

Genetic drift - the shift in the genetic makeup of a population over generations; its effect is strongest in small populations

Greenhouse gas - gases in the Earth's atmosphere that trap heat; they include water vapor, carbon dioxide, methane, oxone, nitrous oxide, and chlorofluorocarbons

Invasive species - species that have inhabited a new environment outside of their natural ranges. They are often better suited to the new environment and face less predation which can lead to overpopulation and have negative impacts on other organisms and the environment

Marine Protected Area (MPA) - a geographic area of the ocean that limits human activities in order to protect marine ecosystems

Overfishing - when fish are caught faster than they can be replaced by reproduction

Phytoplankton - photosynthetic organisms that drift with the current

Quadrat sampling - a method of estimating the abundance of slow moving or non-moving organisms by taking square metre samples (quadrats)

Spillover effect - a benefit of MPAs where protected marine life is able to grow and multiply before 'spilling over' into the surrounding area

Tragedy of the Commons- fisheries provide the classic example of the tragedy of the commons. This occurs when everyone has unrestricted access to a shared resource, which becomes depleted because no-one is managing it, and everyone is taking too much

Transect survey - a method of estimating the abundance of organisms by surveying along a line that is laid through the habitat

Trophic cascade - an ecosystem-wide effect triggered by the addition or removal of a top predator, causing changes in abundance down the food chain

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