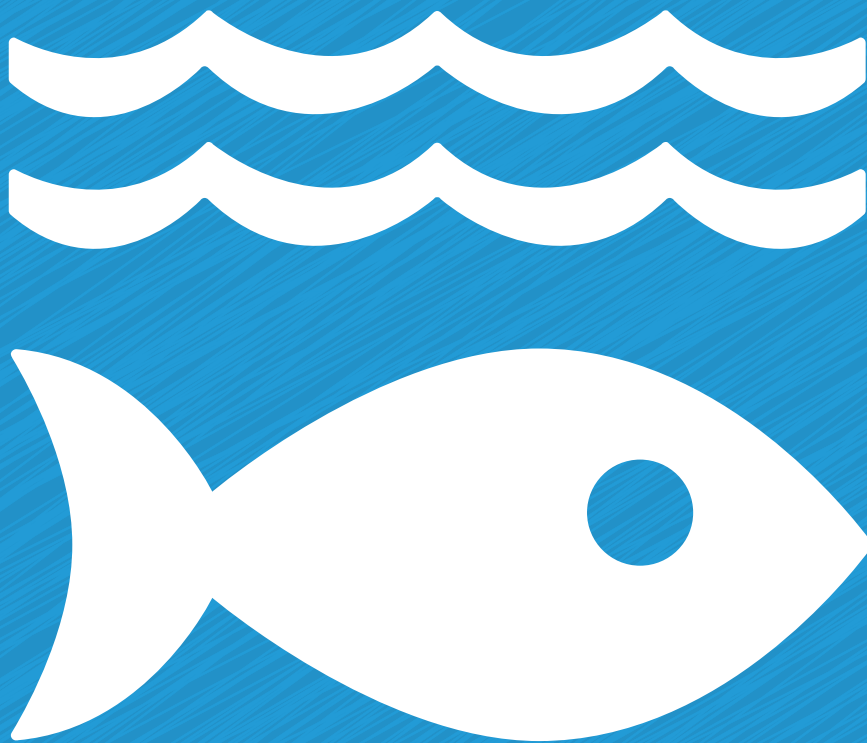


# LIFE BELOW WATER

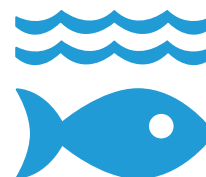
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EDUCATIONAL RESOURCE FOR TEACHERS AND FACILITATORS



The Sustainable Development Goals are 17 unique goals set out by the UN member states to help tackle some of the biggest causes of **POVERTY**, **INJUSTICE** and **DAMAGE** to our planet.

## WHY DOES LIFE BELOW THE WATER MATTER?



The health of our oceans matters more than you might think. Oceans and seas cover more than 70% of the planet. We rely on oceans and seas to provide food, energy, oxygen and water. Not only do sea creatures need healthy waters to live in – our planet needs the oceans and seas to be healthy for its very survival. Human life has managed to do a remarkable amount of damage to life below the water, however we can protect this marine life by eliminating pollution, overfishing and taking responsibility for how our actions effect marine life around the globe. In this resource you will find simple, easy to follow activities to equip your students with the knowledge to take action on SDG 14.

The aim of SDG 14 is to sustainably manage and protect marine and coastal ecosystems from pollution, as well as address the impacts of ocean acidification. Enhancing conservation and the sustainable use of ocean-based resources through international law will also help mitigate some of the challenges facing our oceans.

### *Did you know?*



Over three billion people around the world depend on marine and coastal biodiversity for their livelihood



30% of the world's fish stocks are overexploited to the extent that they are below the level at which they can produce sustainable yields



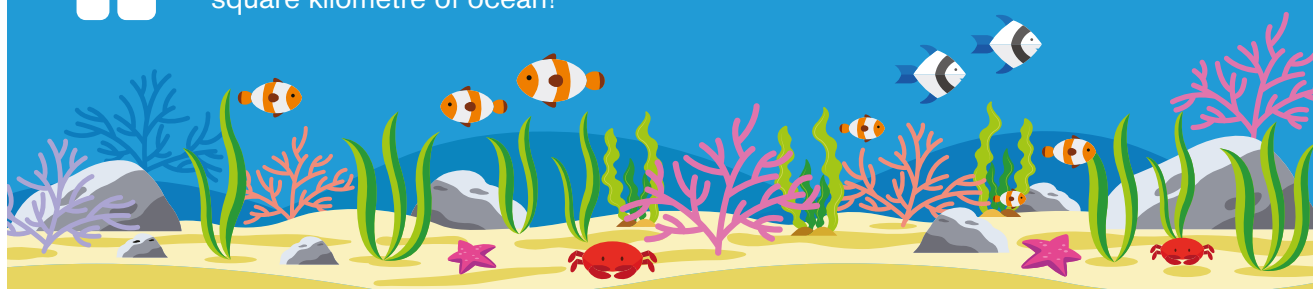
Oceans absorb about 30% of the carbon dioxide produced by human activity



There has been a 26% rise in ocean acidification since the beginning of the industrial revolution



There is an average of 13,000 pieces of plastic and litter to be found on every square kilometre of ocean!



## THE IMPORTANCE OF THE CORAL REEFS

Coral reefs are home to 25% of all marine life on the planet - that's one quarter of all marine life! Coral reefs support a larger variety of life than tropical forests – just like the amazon.

It is estimated that two million species can be found living, on and around the reefs. For many people living in coastal areas, the coral reefs provide a barrier against storms, hurricanes and typhoons. Coral reefs are essential not only to the oceans, but to human health and wellbeing.



Source: SpotFitAholiC

## MAJOR THREATS TO THE CORAL REEF



**Climate change:** Corals will not be able to survive if the water temperature is too high. Already, global warming has led to increased levels of coral bleaching – although coral can survive a bleaching event, they are under more stress and may die.

**Destructive fishing practises:** Cyanide fishing, blast or dynamite fishing, muro-ami (banging the reef with sticks and bottom- trawling). Bottom- trawling is one of the greatest threats to cold-water coral reefs.

**Careless tourism:** Careless boating, diving, snorkelling and fishing happens all over the world. People touch the reefs, stirring up sediments, and also collect the coral. Some resorts are built on top of reefs and some also empty their sewage or other wastes directly into the water which surrounds the coral.

**Pollution:** Urban and industrial waste, sewage and oil pollution are poisoning reefs. Toxins are dumped into the ocean or are carried there by rivers. These pollutants cause an overgrowth of algae – which then smothers the reefs cutting off their sunlight. Think of a flower – if kept in the dark it will not grow and eventually it will die.

The growing extinction threat to fish off the central and western coast of Africa could seriously undermine food security across the region, impacting on progress towards the first two Sustainable Development Goals in addition, of course, to undermining SDG14 on life under water. In a part of the world where poverty reduction remains a challenge, preserving the rich diversity of marine fish species will help safeguard the livelihoods of local communities.

INGER ANDERSEN, Director General of the International Union for the Conservation of Nature.

## TEACHER/ FACILITATOR ACTIVITY 1

### Factory Ship

The FV Margiris is the world's largest 'Factory Ship'. It is 142m long, weighs 9499 tonnes, can process over 250 tonnes of fish a day, and has a cargo capacity of 6,200 tonnes.

**NEED:** Poster of the FV Margiris or scan QR code for access to picture

**INSTRUCTIONS:** Place students in groups of four or five. Show the group the poster pictured to the right or **scan the QR code**

#### DISCUSS:

- Ask each group what point they think the poster is trying to make? Why does the poster read: This isn't fishing?
- The FV Margiris has been banned from Australian waters. Why do you think this decision was made?
- Ask each group to list three consequences of overfishing



1.  
OVERFISHING

2.  
WASTE IN  
THE OCEAN

3.  
DEAD ZONES

4.  
ACIDIFICATION

## 1. OVERFISHING

### Why is overfishing happening?

- Overfishing is when we remove fish too quickly or in too large quantities from both oceans and rivers. When more fish are caught than allows for natural replenishment - this is overfishing. This practice is unsustainable and is an abuse of marine life
- Cod is a very popular fish in Ireland but there are many types of white fish that taste similar to cod – by choosing a white fish that is more sustainable than cod, you will be helping life below water
- The population of the world is constantly on the increase, and as the population grows the need for food multiplies



### What methods can cause overfishing?

1. Blast fishing: Using dynamite to kill schools of fish at one time.
2. Bottom trawling: Using a heavy net to trawl along the ocean floor – scraping the floor of the ocean and damaging habitats.
3. Bycatch: This is when the fishing nets bring up unwanted fish and mammals with the catch – these fish and mammals then die and are discarded overboard.

### What impact does overfishing have?

- The destruction of ecosystems
- The fishing methods listed above are causing mass devastation of whole areas of marine habitats
- The demand for certain fish is leading the species to extinction which will change food chains leading to further damage of the ecosystem



# LIFE BELOW WATER

EDUCATIONAL RESOURCE

## 2. WASTE IN THE OCEAN

- The oceans have become a waste bin, with common household items floating in our oceans. These include: plastic bottles, plastics bags, cigarettes, food wrappers, plastic utensils, straws, beverage cans, paper bags and styrofoam cups
- It is estimated that eight million tonnes of plastic waste ends up in our oceans every year
- Ocean currents cause this waste to gather in massive clusters – these are known as garbage patches. The great Pacific Garbage Patch is estimated to be eight times the size of Ireland!



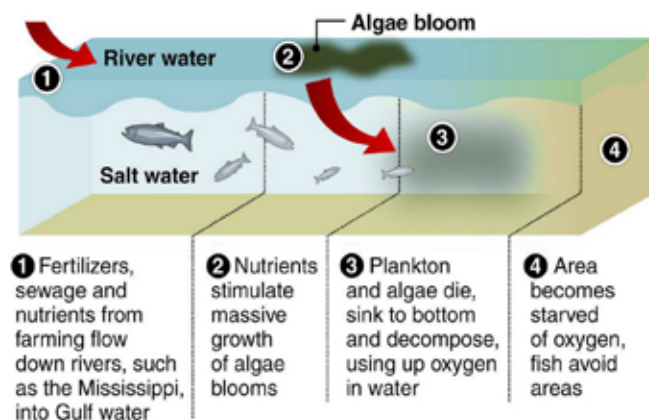
### How does waste end up in the ocean and waters?

- Sometimes waste is intentionally dumped into the ocean and waters. Waste dropped carelessly on land ends up in waters too
- Natural disasters, hurricanes, tsunamis can result in debris being drawn into the oceans and waters

### How does this effect the ocean and waters?

- Sea creatures, fish, birds and mammals can become trapped in plastic bags, netting and packaging causing injury and death
- Marine mammals and birds may end up swallowing waste in the water
- Turtles can mistake plastic bags for jellyfish. If they eat this waste it can lead to illness or starvation

## HOW DEAD ZONES FORM



Source: NOAA (U.S.), Science Museum of Minnesota Graphic: Melina Yingling © 2008 MCT

## 3. DEAD ZONES



- Dead zones are an area of oceans/waters that have very little marine life
- These can occur naturally, but they can occur as a result of human activity
- These areas have low levels of oxygen, making it difficult for plants or animals to survive in these conditions

### How are dead zones caused?

- Dead zones can occur for many reasons, but nutrient pollution has been identified as one of the main human activities that can lead to dead zones
- These excess nutrients in the water can cause over growth of algae which may block sunlight from reaching the water
- When the algae dies it decomposes, which then uses up oxygen in the water
- Without oxygen in the water the animals and plants cannot survive

### What are the effects of dead zones in the oceans and waters?

- Usually you will not find any marine life in a dead zone
- The livelihoods of people can be impacted by these dead zones
- With no marine life to fish the area becomes useless to fishermen

## 4. ACIDIFICATION



- Is when the chemical composition of the water in the ocean changes over time. The PH of our water is decreasing and water is becoming more acidic

### How is acidification caused?

- Acidification in the ocean is caused by the amount of carbon dioxide from the atmosphere. The ocean absorbs about 30% of the carbon Dioxide in the atmosphere; this happens wherever air meets the water
- Human use of technology and the burning of fossil fuels has increased the levels of carbon dioxide in the atmosphere which then increases the amount of carbon dioxide that the ocean absorbs. Once in the ocean the carbon dioxide changes the makeup of the water and the water becomes more acidic

### What is the effect on the ocean?

- The increased acidity of the ocean and seas causes major problems for marine organisms and the ecosystem
- Sea creatures are affected by acidification, it can prevent the building of shells and the formation of corals
- Feeding patterns of some fish might change. The effect of acidification is dramatic for the whole marine eco system

Source: <http://cdn.worldslargestlesson.globalgoals.org/2016/06/23-Protect-Life-Below-Water.pdf>

## TEACHER/ FACILITATOR ACTIVITY 2

### Sustainable Fishing



#### NEED:

- Two or three bags of popped popcorn (amount depends on group size)
- Small cups (1 per student)
- Large plates (1 per group)
- Spoons (1 per group) given to certain groups at a later stage
- Paper straws (1 per student)
- Watch (for timing the activity)
- Fishing Log (below) (1 per student)

#### INSTRUCTIONS:

- Divide your class into smaller groups of 3-4. Explain to the groups that they are going to participate in an over fishing exercise. Give each group one of the following names based on an overfishing area: Coastal East Africa, Arctic, Coral Triangle and Gulf of California
- Distribute the plates, cups, straws and fishing logs
- Place 30 pieces of popcorn on each group's plate (the popcorn represents the fish living in their area)
- All students are to fish at the same time and their hands must remain behind their backs and wait for the signal to start fishing
- Explain to students that they must only use their straws as a suction device to gather the 'fish' or popcorn. Reiterate that they must not use their hands to fish

#### TOP TIP

Use cups and plates from the staff room to reduce waste!

- Explain that once they catch their 'fish' they must try and place them into their individual cups. Do not pick up any fallen popcorn as this represents the bycatch
- The first session is 20 seconds – if students are not depleting their stocks fast enough you can increase the time to 30 seconds, and if they are 'fishing too fast' give less time
- After round one ask each student to count their catch:
  - The total number of fish that made it into the cup
  - The total bycatch for the table (dropped before reaching the cup – bycatch is any fish or creature that is unintentionally wasted)
  - The total fish left in the ocean
  - Students will record numbers in fishing log
- Only fishers who have caught at least 2 fish can continue on for the next fishing season
- Add one or two new fish for every fish left on the plate and explain that the new fish represent fish produced between seasons
- Play a second round – and again ask students to record their catch
- For the third round explain that some fishers have decided to use other methods to increase their catch
- Give a spoon to two groups only and explain that the spoon represents a trawler. This group can now use a spoon instead of a straw
- Continue playing until one group runs out of fish

- What would you do in the real world if all fish in that area were caught? If any group still has fish left at the end of the game – ask the group why they think this was the case? Did they have less people? Did their group not have a spoon?
- Why is sustainability an important goal for a community and why might it be difficult to achieve that goal?
- Ask the students in their groups to brainstorm ways that might have made the fisheries more sustainable (possible ways are, catch limits, marine reserves and bans against trawling)
- How is the demand for certain types of fish causing harm to the oceans?
- Can you think of a news story where a marine animal was harmed by waste in the ocean?
- How do excess nutrients enter the ocean?
- The threats to the ocean are continuously increasing – what impact does technology have on the ocean?

#### Discussion points

### TEMPLATE FISHING LOG

	Fish caught (in your cup)	Bycatch (fish that fell off plate & aren't in cup)	Fish left in the ocean (what is left on your plate)
Round 1			
Round 2			
Round 3			
Round 4			
Round 5			
Round 6			

## Typhoon Haiyan and Concern Worldwide

Fishing is a primary livelihood for many of the world's poorest people. Small scale fishing provides livelihoods to about 90 million fishers and processors, half of whom are women! These small scale fishing communities are facing increasing pressures.



On November 8th 2013, Typhoon Haiyan (locally known as Typhoon Yolanda) crossed the Philippines archipelago from East to West. It hit the coastal areas of Eastern and Western Visayas Islands. In addition to loss of life and extensive material damage on land, marine ecosystems were drastically affected. Most ecosystems have some capacity to respond and recover from natural disasters, however the unprecedented scale of the Typhoon's destruction and the effect of overfishing in Visayan sea before the disaster meant that a more action approach to rehabilitating coastal ecosystems as well as local livelihood was required.

Concern Worldwide began a programme to rehabilitate Mangroves and Coral Reefs. Mangroves are salt-tolerant trees that have adapted to growing in the harsh zones of tropical coasts. They provide shelter, nursing and feeding grounds for hundreds of species of fish, shells and crustaceans. They protect sea grass bed and coral reefs from siltation, and protect the coastline from long term erosion which in turn lessens the impact of tsunamis and storms. Mangroves play an important role in tackling climate change as they are one of the most carbon-rich forests in the tropics and are essential in ensuring the health of ecosystems, fish stocks and reduce the risks faced. The project focused its efforts on fringe patches of mangrove. Concern and their partners aimed to plant one seedling per square meter in a staggered pattern with each plant loosely tied to a bamboo stick (a tutor).



Mangrove seedlings transplanted and staked



Drupella (sea snail) feeding on coral

The typhoon had a dramatic effect on the coral reefs and Concern decided that immediate coral reef rehabilitation should be a priority. Concern worked with experts in the area who trained the Concern teams and partners in coral reef rehabilitation. Following assessment and consultation with the technical experts and local authorities, Concern prioritised four activities to support coral reef rehabilitation: 1) construct concrete artificial reef units to serve as "coral nurseries" and transplant live coral fragments onto them 2) remove debris from the coral reefs and coastal areas and protect them from predator (Drupella) outbreaks 3) support the Local Government Unit (LGUs) to delineate and enforce existing Marine Protected Areas and 4) provide community education on sustainable coastal resource management. The project aimed to transplant 10,000 live coral fragments over three severely affected coral reefs that were located inside the pre-existing Marine Protected Areas (MPA).

Concern's Typhoon Haiyan response programme was a wonderful example of what a short-term response and recovery programme can achieve given the right approach, decision-making and operating conditions. There was a strong focus on both meeting people's immediate needs and building greater resilience to the multiple disasters faced by the people living in the community.

## WHAT CAN I DO TO PROTECT THE OCEAN?



- 1. Reduce energy consumption:** Life below water is directly affected by climate change. You can reduce the effects of climate change on the ocean by consuming less energy.



- 2. Use fewer plastic products:** It is almost impossible to avoid plastic entirely, but are you wasteful with plastic? Do you buy a plastic bottle with your favourite drink every day? Small actions can make a huge difference when it comes to protecting the planet. Avoid using straws or plastic cutlery, buy a reusable bottle for your water or a cloth bag when going shopping. When you cannot avoid plastic ensure you recycle it properly.



- 3. Make sustainable seafood choices:** When deciding what fish to purchase think about the depleting fish populations, the loss of habitat and the unsustainable fishing practises. Help reduce the demand for over fished species by choosing seafood that is sustainable.

### Top tips

- Turn off lights when you leave a room
- Unplug electric items you aren't using
- Walk or cycle to school instead of driving
- Avoid plastic bottles, cutlery
- Use a reusable cloth shopping bag
- Ensure you recycle plastic properly
- When shopping for seafood, with your parents or alone check to see whether they are sustainable caught
- Avoid fish such as blue fin tuna as it is near extinction

**LEAVE COD ALONE!**

## TEACHER/ FACILITATOR ACTIVITY 3

### Typhoon Haiyan and Concern Worldwide



#### NEED:

Ramon's story, question/ discussion sheet, paper for the students to write their answers.

#### Ramon's story:

My name is Ramon and I am 7 years old. I live in Igbon, Concepcion, on Panay Island in the Philippines. My father is a fisherman. Everybody on these islands relies on fishing. When I grow up I want to be a fisherman just like my dad. My dad used to bring me out with him in his boat so that I could help him and learn how to lay the nets to catch the fish. He taught me about the coral in the sea. The coral is alive he tells me, and our sea is full of fish that come to feed in the coral. I love to swim and dive down to the coral. It is full of colours and sea creatures. My dad tells me to be careful not to break the coral as it is very delicate.

We get lots of storms where we live. We stay indoors and wait until the storm is over. Last year a storm came but it was different from all the rest.

This storm was a very bad storm. We were all together in our house and the wind started to get louder. We could see the waves getting really high. Then we heard a giant crash and it was a coconut tree that had fallen down. My dad said that we had to leave and he shouted that we had to go now! My mother grabbed my baby brother up in her arms and my dad took mine and my sister's hand and we all ran out of the house.

The wind blew really strong in my face and took my breath away. My eyes were stinging and it was really hard to run from the house even with my dad pulling us along. He shouted that we should very tight and not let go. My sister was crying and then my dad took her up and carried her and I held onto his shirt very tightly. We all ran away from the sea towards the hill and then up the hill to the top. There were lots of other people from the village running too. We took shelter crouching down in the ground. I didn't let go of my father even after the storm started to ease.

When we went back in the morning to our village I couldn't believe what I saw. Most of our village was gone. It was like a giant had stomped on the ground. A big tree had fallen on our house and it had broken the roof to pieces.

My father went to look for his boat but it had been smashed apart. When he saw his boat all broken, my dad got very sad. My dad's boat is very important. Without it we would have no way to fish and make money for the family.

The worst part after the storm was trying to find water to drink. We had very little food and my tummy hurt. Everybody was helping to clean up and clear away what we could. Even little children like my sister helped carry broken branches away from the beach.

Concern Worldwide came to help and looked at the damage and spoke to us. They talked to my father and he showed them our smashed house and his broken boats. The next day they came again with some supplies that helped people to fix their



houses. A big group from the village helped my father to pull the tree from our house so he could start repairs.

Concern helped in lots of ways. They gave equipment and trained people who could dive to repair the pipes so we could get clean water, they also helped fix the coral. A lot of the coral was broken and damaged in the storm. They planted mangroves. My mum says mangroves are very important, they make more oxygen for our planet to breathe. She is helping in a nursery to plant baby mangroves.

My father went to work in a big shed to repair and build boats. Many men were working there. Concern helped our village to build a temporary school. Our school was badly damaged in the storm and will take a long time to fix up. Now we all go together in one classroom until the new school is ready.

My sister had nightmares for a long time after the storm. If she heard a loud noise she would get scared. I hug my sister when she gets scared. I tell her it is ok because now we are getting everything fixed and we stayed together and we are ok.

#### QUESTIONS:

1. How does Ramon's family make a living to buy food, clothes and other necessities?
2. What does Ramon want to be when he grows up?
3. Are storms common where Ramon lives?
4. Why does Ramon say the coral is important?
5. Was it scary and dangerous when the storm came?
6. What were the impacts that the storm had on the village?
7. What was Ramon most worried about after the storm?
8. In what ways were Concern Worldwide able to help the village after the storm?

#### Discussion points

- More than 3 billion people like Ramon's family depend on marine and coastal biodiversity for their livelihoods. Would it be scary to rely on life below water for your livelihood? Why or why not?
- What SDGs need to be achieved for communities like Ramon's to deal with the threat of natural disasters like the typhoon?
- Find out how Concern supported the communities of Concepcion, Philippines during and after Typhoon Haiyan hit



#### TAKE ACTION! Below are some sample action to take:

- Hold your own workshops in your school teaching other students about SDG 14
- Start a petition to your local government calling for a ban of non-reusable plastics
- Hold an investigation into where waste is being dumped in your local community