Marine Eco-Adventure

Lesson Plan and Resources

Green Jobs for Nature

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Green Jobs for Nature

Outcomes & Materials

Outcomes

This lesson aims to incorporate critical thinking, hands-on problem-solving, and career-oriented discussions about marine green jobs. It combines scientific exploration with advocacy and engineering challenges to engage this age group. The learning objectives are below:

1. Understand the significance of marine green jobs in addressing global challenges like pollution and climate change.

2. Explore real-world problems in marine environments and propose creative, sustainable solutions.

3. Develop collaboration, communication, and critical thinking skills.

Materials

This lesson is designed so you need minimal materials, please see the list below:

- Projector or screen for videos/presentations
- Station-specific materials (printable resources below)
  - Images of healthy and unhealthy reef
  - Recyclable items and a bucket filled with water and plastic items
  - Factsheets (below) and art supplies
- Paper or large whiteboards for group discussions
- ·Worksheets and handouts (see below)
- ·Art supplies: markers, coloured pencils, paper
- ·Research devices (e.g., tablets or access to the internet for some activities)

The lesson consists of four parts and can be completed in one hour.

Green Jobs for Nature

Lets Begin!

Lesson Plan: Marine Eco-Adventure

1.Introduction: Welcome to the Marine Eco-Adventure Lab (5 minutes)

- Hook: Start with a short, impactful video showing marine ecosystems under threat (e.g., coral bleaching, plastic pollution).

- Discussion: Facilitate a quick discussion:
  Why should we care about the oceans?"
  What do you think people are doing to solve these problems?"

- Objective overview: Explain that students will work as a team of marine professionals to solve real-world problems while exploring green careers.

2. Activity Stations: Explore marine green jobs (40 minutes)

<u>Station 1: Marine Biologist – reef monitoring</u>
Objective: Simulate a reef survey to assess ecosystem health.

Materials:

- Photos or mock-ups of reefs (healthy and unhealthy) with data charts (e.g., species counts, water temperature).
- Magnifying lenses, fake coral or 3D coral models (optional).

Activity:

- Analyse reef health based on photos and data.
- Identify stressors (e.g., pollution, overfishing, climate change).

Create a short report proposing solutions like marine protected areas or coral restoration projects.

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Lesson Plan: Marine Eco-Adventure

Station 2: Marine Engineer – ocean clean-up device

Objective: Design and prototype a device to remove plastic waste from the ocean.

Materials:

- Recyclable items (cardboard, straws, mesh, tape, etc.).
- A bin filled with water, plastic debris, and floating toy animals for testing.

Activity:

- Students brainstorm and sketch designs for a plastic-capturing device.
- Build a prototype and test it in the bin, evaluating its effectiveness and safety for marine life.
- Discuss how technology can contribute to sustainable ocean practices.

Station 3: Environmental Policy Advocate – ocean awareness campaign

Objective: Develop a campaign to raise awareness about marine issues.

Materials:

- Fact sheets on marine problems (overfishing, climate change, pollution).
- Art supplies for posters or digital tools for creating social media content.

Activity:

- Choose a marine issue and create a campaign slogan, poster, or social media post.
- Discuss the role of advocacy in shaping public opinion and policy.

Station 4: Aquaculture Specialist – sustainable seafood farming

Objective: Explore sustainable practices in aquaculture.

Materials:

- Diagrams of fish farms vs. wild fisheries.
- Factsheets on aquaculture's benefits and challenges.

Activity:

- Compare traditional fishing methods with aquaculture.
- Plan a sustainable fish farm, considering factors like water quality, species selection, and environmental impact.
- Present their farm plan to the group.

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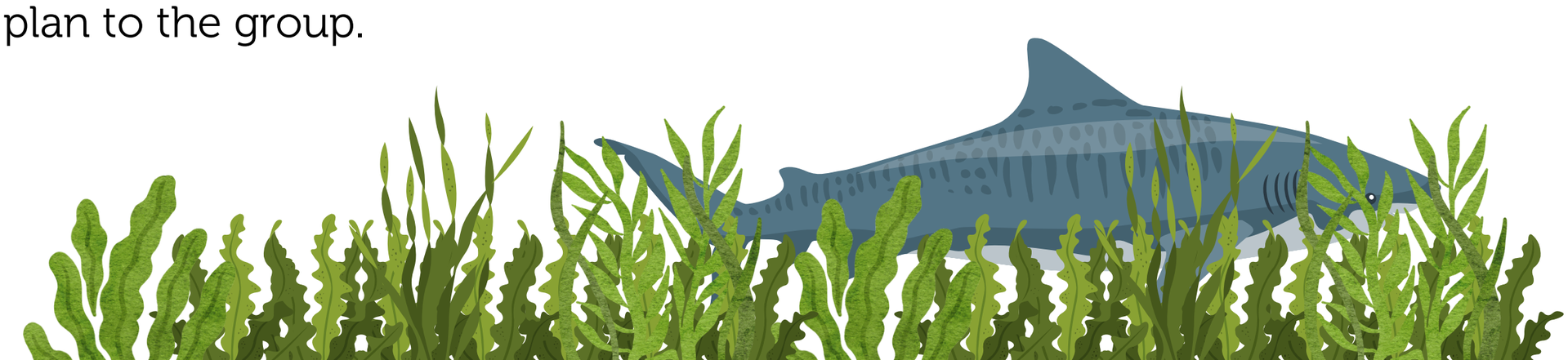

Lesson Plan: Marine Eco-Adventure

Group collaboration project: Saving the Oceans together (10 minutes)

Objective: Combine insights from all stations to propose a "Save the Oceans" plan.

Activity:

- Each team presents their work from the stations.
- Collaboratively, create a “Marine Green Jobs Action Plan” mural, highlighting key solutions and career roles explored.
- Include drawings, slogans, and a list of actionable steps.

Wrap-Up and career discussion (5 minutes)

Reflection questions:

- “Which green job would you consider pursuing, and why?”
- “How can you contribute to protecting the ocean, even if you don’t choose a marine career?

Career pathways:

- Share real-world examples of marine professionals and how students can pursue these careers (e.g., STEM courses, volunteering, internships). STEM Learnings website allows you to post an opportunity for someone in one of these roles to come and talk to students.

Extension Activities

- Virtual field trip: explore a live-streamed marine environment or a virtual tour of a marine research centre.
- Independent research: assign a short research project on a marine green job and its real-world impact.
- Community engagement: plan a local beach cleanup or awareness campaign as a class project.

Assessment

- Observe student engagement and teamwork during station activities.
- Evaluate the quality of their solutions, prototypes, and campaign ideas.
- Use short-answer questions or group discussion to assess understanding.

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Lesson Resources

Station One:

Healthy Coral

Unhealthy Coral

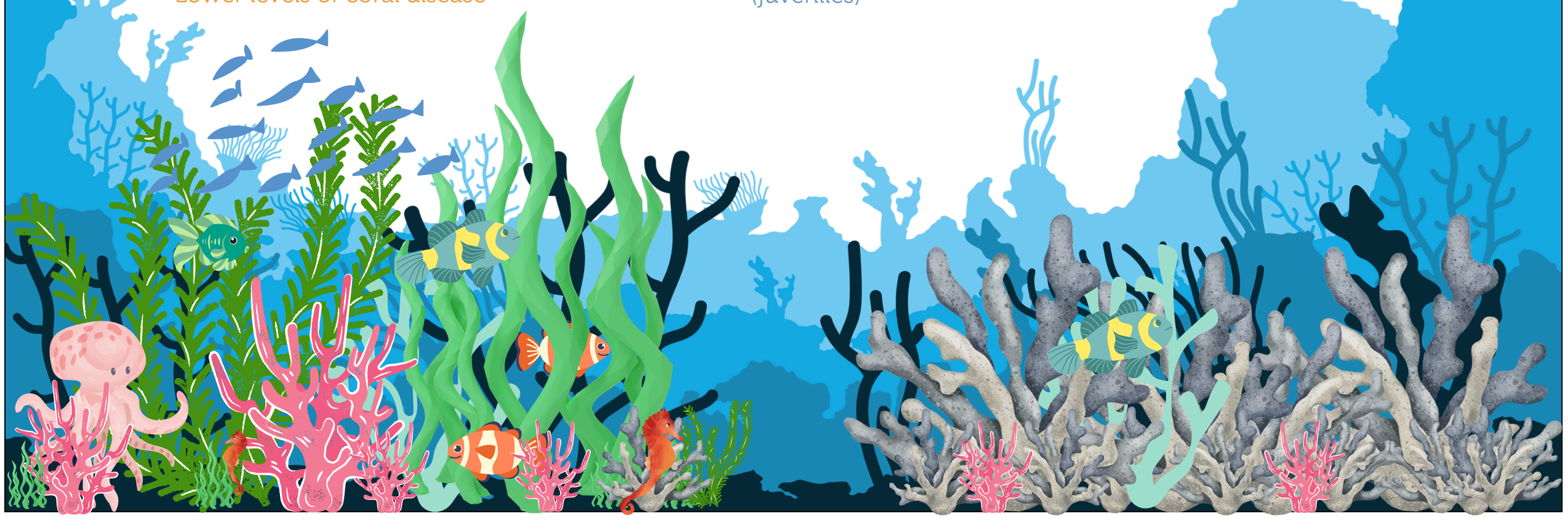
Reef Health Check: Spot the Signs

Signs of healthy reef

- Stronger resistance to coral bleaching
- More plant-eating (herbivorous) fish
- More new baby and young corals (juveniles)
- Lower levels of coral disease

Signs of unhealthy reef

- Weaker resistance to coral bleaching
- Fewer plant-eating (herbivorous) fish
- Fewer new baby and young corals (juveniles)



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Lesson Resources

Station One:

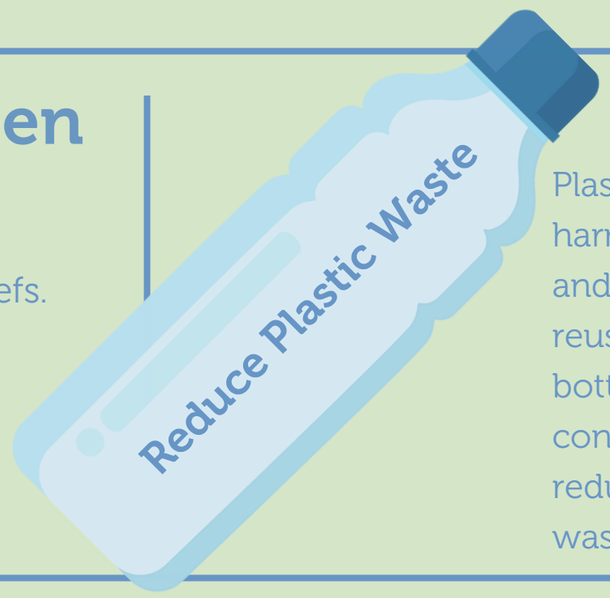
10 Ways YOU Can Help Protect Coral Reefs

Be Reef-Safe When Snorkeling or Diving

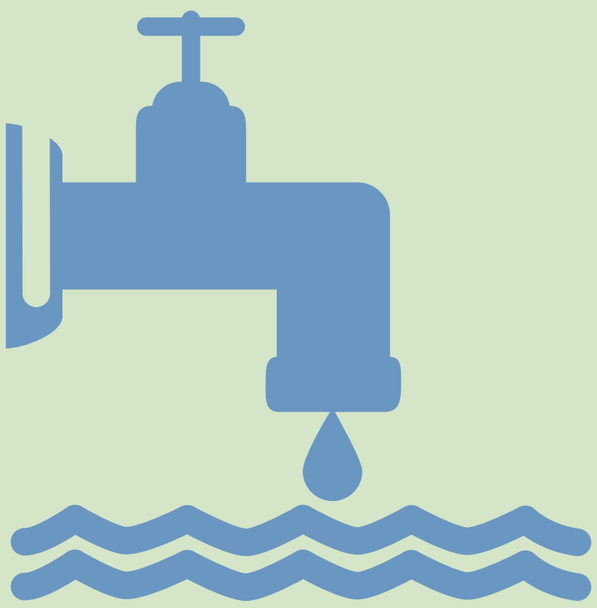
Avoid touching or stepping on corals. They're delicate and can easily be damaged.

Use Reef-Safe Sunscreen

Some sunscreens contain chemicals harmful to coral reefs. Look for "reef-safe" options without oxybenzone or octinoxate.



Plastic pollution harms marine life and reefs. Use reusable bags, bottles, and containers to help reduce ocean waste.



Save Water at Home

Less water use means less runoff and wastewater, which can carry pollutants into the ocean.

Speak Up for the Oceans

Join school projects or groups that protect coral reefs and oceans. Every voice helps make a difference!

Eat Sustainable Seafood

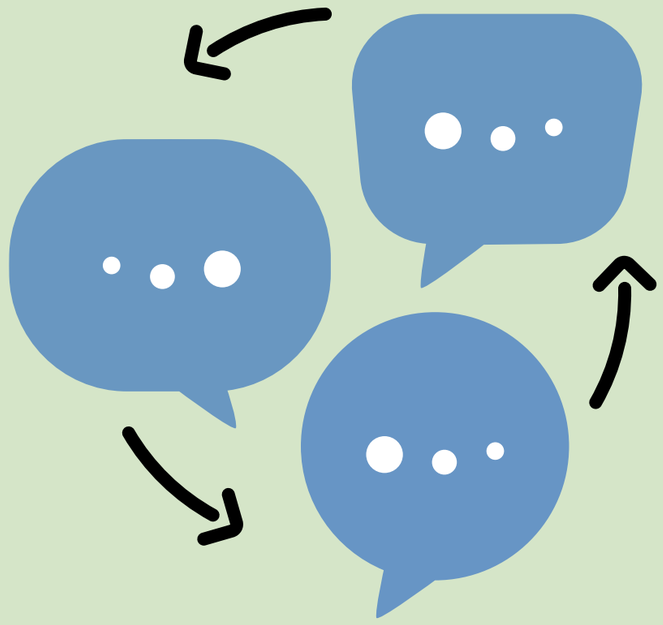
Overfishing and destructive fishing harm reefs. Choose seafood with eco-friendly certifications like MSC.

Don't Buy Coral or Marine Souvenirs

Avoid purchasing coral jewelry, shells, or products made from marine life to protect reef ecosystems.

Join a Beach Clean-Up

Help clean up litter and plastics in local coastal areas to prevent harm to reefs and marine animals.

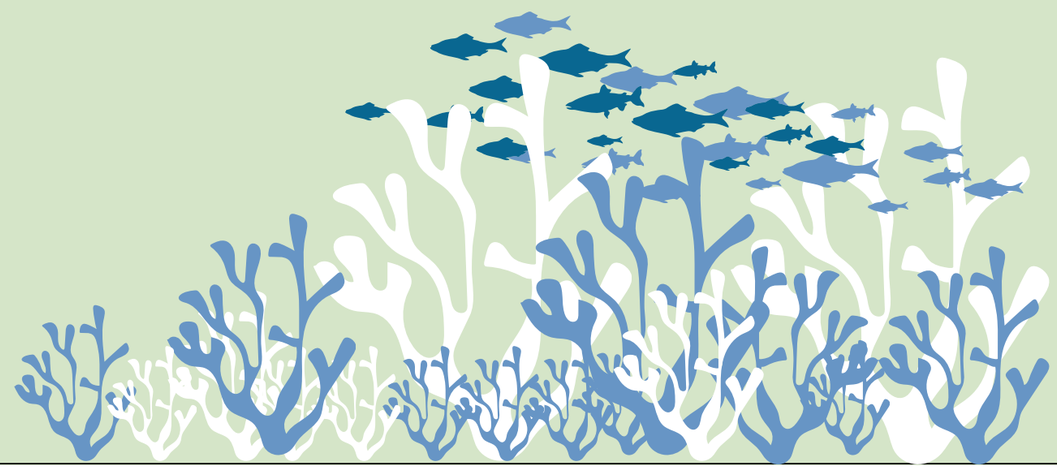


Spread the Word

Teach friends and family about why coral reefs are important and how they can help protect them.

Support Marine Conservation Projects

Volunteer with organizations working to restore and protect coral reefs and coastal habitats.



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Station Two:

How Big Is the Ocean Litter Problem?

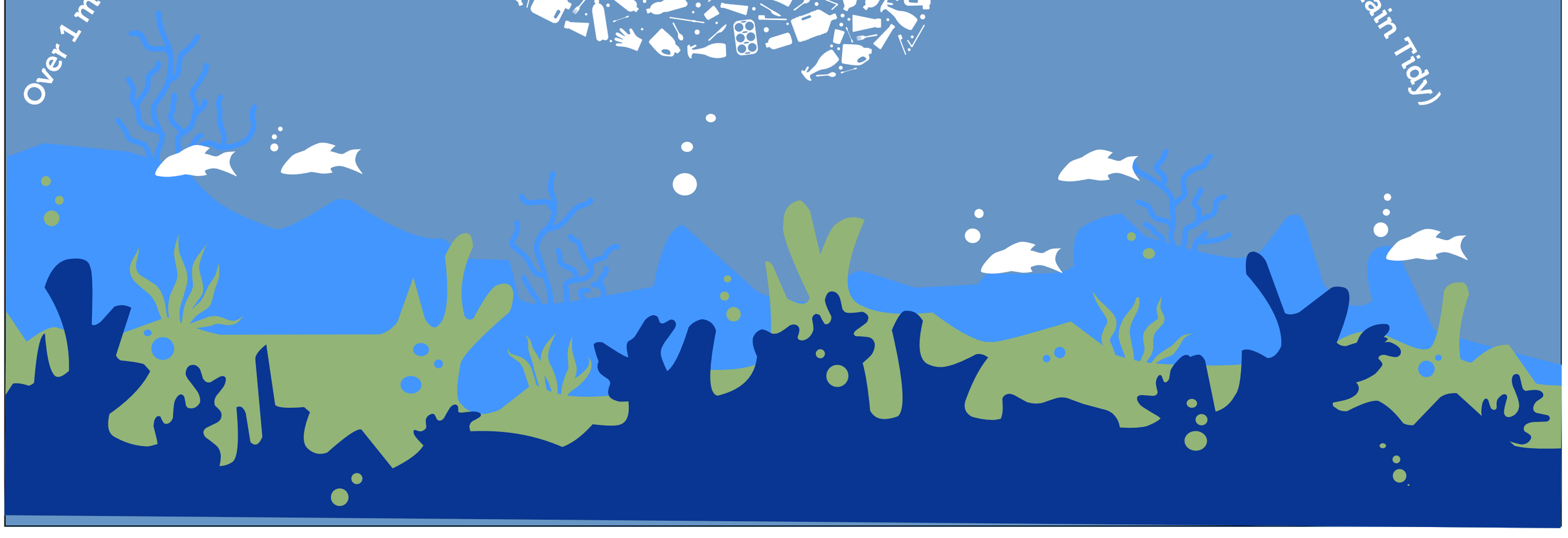
Plastic and litter are choking our oceans – here's what you need to know!

Over 8 million tonnes of plastic enter the ocean each year – that's like dumping a rubbish truck of plastic every minute. (UNEP)

By 2050, there could be more plastic than fish (by weight) in the ocean if nothing changes. (Ellen MacArthur Foundation)

90% of seabirds have plastic in their stomachs. (National Geographic)

Over 1 million marine animals (including fish, turtles, and dolphins) die every year because of ocean litter. (Keep Britain Tidy)



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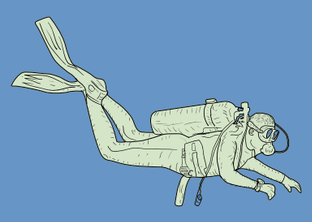
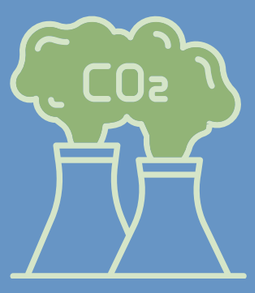
Station Three:

Amazing Marine Environments



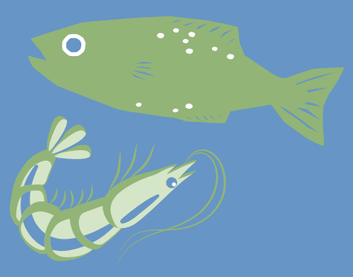
More than half of the oxygen we breathe comes from the ocean.



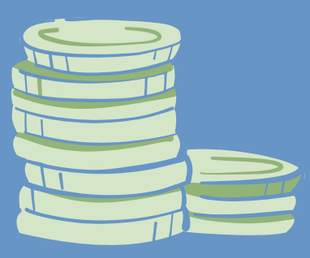
Oceans absorb 25% of human CO_2 emissions, slowing climate change.

Coral reefs, seagrass beds, and salt marshes host thousands of species.

Coral reefs, seagrass, and kelp forests reduce waves and prevent flooding.

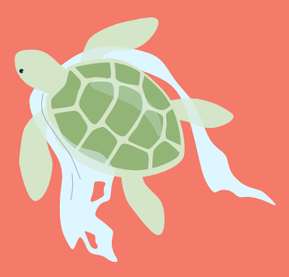


Marine habitats support fish like cod, haddock, and herring, staples in the UK.



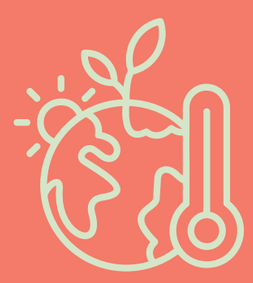
Fishing, shipping, and tourism support millions of jobs, including in the UK.

Threats to Marine Environments

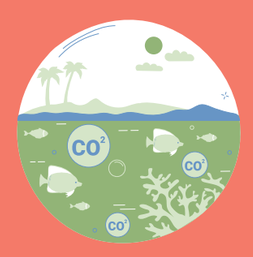


About 8 million tonnes of plastic enter oceans yearly, harming marine wildlife.

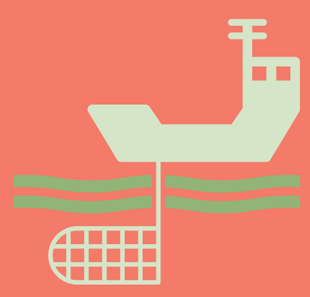
Overfishing depletes fish like cod and haddock in UK waters, disrupting ecosystems.



Rising temperatures bleach corals, disrupt currents, & endanger marine life.



Excess CO_2 acidifies oceans, harming corals and shellfish like mussels.



Trawling and dredging damage seagrass beds and seabeds, harming species

Non-native species, like the Pacific oyster, disrupt local marine ecosystems.

YOUR TASK!

Choose a marine issue and create a campaign slogan, poster, or social media post.

Discuss how speaking up can change public opinion and influence decisions.

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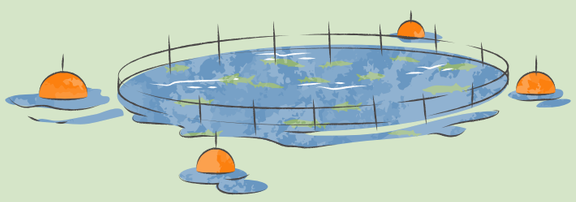
Station Four:

Aquaculture

What is Aquaculture?

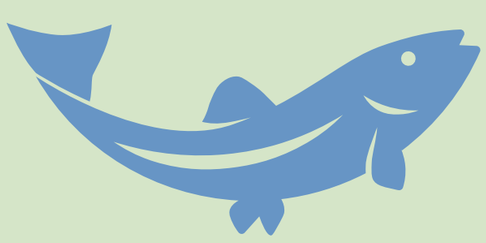


Aquaculture is the farming of fish, shellfish, and aquatic plants. It's done in controlled environments like fish tanks, ponds, or ocean cages.

Benefits of Aquaculture?

Provides a reliable supply of fish, helping meet the growing global demand for seafood.

By farming fish, we can reduce overfishing and allow wild fish populations to recover.



Aquaculture creates jobs in fish farming, processing, and distribution, benefiting coastal and rural communities.

Challenges of Aquaculture?

- Using wild-caught fish to feed farmed fish adds pressure on wild fish populations and affects other animals that rely on them for food.
- Antibiotics and chemicals flowing from fish pens can harm wild fish and the marine ecosystem.
- Fish waste adds harmful nutrients to the ocean, while uneaten food builds up on the ocean floor, affecting local ecosystems.
- Disease, pathogens, and parasites can spread quickly from crowded pens to wild fish.
- Escaped fish compete for resources, spread diseases, and breed with local fish, weakening wild populations.