

# Seagrass

## Introduction

# Seagrass

**Seagrass is the only flowering plant that grows in the marine environment and is one of the most important plants on Earth.**

Seagrass forms underwater meadows which provide food and shelter for a wide range of marine animals, from tiny invertebrates to large fish, crabs, starfish, marine slugs, seahorses, turtles, marine mammals, and birds. Hermit crabs are also common in seagrass meadows, making these habitats lively, diverse ecosystems. Seagrass also benefits people in many ways, but sadly, much of it has been lost due to human activities.

Seagrass plants are similar to land plants—they have roots, stems, and leaves, and they produce flowers and seeds. However, they differ from seaweed or algae, which rely on holdfasts and absorb nutrients through diffusion. Seagrass ranges in size from tiny plants as small as your fingernail to species with leaves that can grow up to 7 meters long. Their leaves come in different shapes, resembling ribbons, ferns, clovers, or even spaghetti. Regardless of their size or shape, seagrass leaves rely on sunlight to perform photosynthesis, a process that converts carbon dioxide and water into oxygen and sugar. This makes seagrass a vital part of the food chain, providing oxygen and energy for many living organisms.

In the UK, two species of seagrass form meadows: eelgrass (*Zostera marina*) and dwarf eelgrass (*Zostera noltii*). These meadows are found in sheltered coastal areas, including along the Welsh coastline, where they play an important role in supporting marine life and contributing to healthy oceans.

Seagrass meadows are fragile ecosystems and are being lost due to pollution, such as sewage, oil spills, and coastal runoff, as well as physical damage caused by dredging, boat propellers and anchors. Overfishing can also upset the balance of these habitats by disrupting the food chain. Moorings can also pose a threat; traditional moorings with heavy chains and anchors can drag along the seabed, uprooting seagrass and leaving scars in the meadows. Monitoring seagrass is critical because it allows scientists, conservationists, and local communities to track the health of these ecosystems over time. By observing changes in seagrass meadows, these groups can identify threats, measure the impact of human activities, and encourage the adoption of seagrass-friendly moorings, such as Advanced Mooring Systems that minimize damage to the seabed. Monitoring also helps us better understand how well seagrass is performing its essential functions, such as absorbing carbon dioxide, protecting coastlines from storms and erosion, and improving water quality by filtering nutrients and bacteria.

Despite their importance, many people are unaware of seagrass and its vital role in marine ecosystems and the global environment. Seagrasses act as ecological engineers, shaping their environment in ways that benefit both marine life and humans. By monitoring and conserving these remarkable ecosystems, we can ensure they continue to thrive and provide benefits to future generations.

### Further research keywords

Photosynthesis, primary producers, food chain, seagrass meadows, chloroplasts, monocotyledon, angiosperms, ecological engineers, ecosystem services.



# Seagrass or Seaweed?

## Equipment required

- Print out or share the photos on sheet (S\_S\_1), one per class/group
- Print out of the 'Seagrass or Seaweed?' worksheet, one per pair
- Pencils or pens
- Internet enabled devices and internet access

## To complete the activity

1. Share the photos on sheet (S\_S\_1) with the class by printing copies or displaying on a digital device. Ask learners to examine the images closely, noting details like texture, shape, colour, and habitat.
2. Provide time for learners to consider and research what they can see. Can they distinguish between seagrass and seaweed? Support learners to understand the difference between plants like seagrass (with roots, stems and leaves) and algae like seaweed (with holdfasts, stipes and blades).
3. Discuss the different parts of each organism and their functions.
4. Split the class into pairs. Provide each pair of learners with the 'Seagrass or Seaweed?' worksheet, and guide them to match each part of seagrass and seaweed to its correct function (A-I). Encourage learners to discuss how these roles contribute to the survival of seaweed and seagrass, and to identify any similarities and differences between them.
5. Support learners to label the parts of seagrass and seaweed on the diagram, ensuring each feature is correctly identified.

## ANSWER KEY

### Seaweed

- Holdfast → F
- Stipe → D
- Blade → A

### Seagrass

- Leaves → B
- Stem → H
- Rhizome → G
- Roots → C
- Flowers → I
- Seeds → E



*Seagrass or Seaweed?*







# Seagrass or Seaweed?

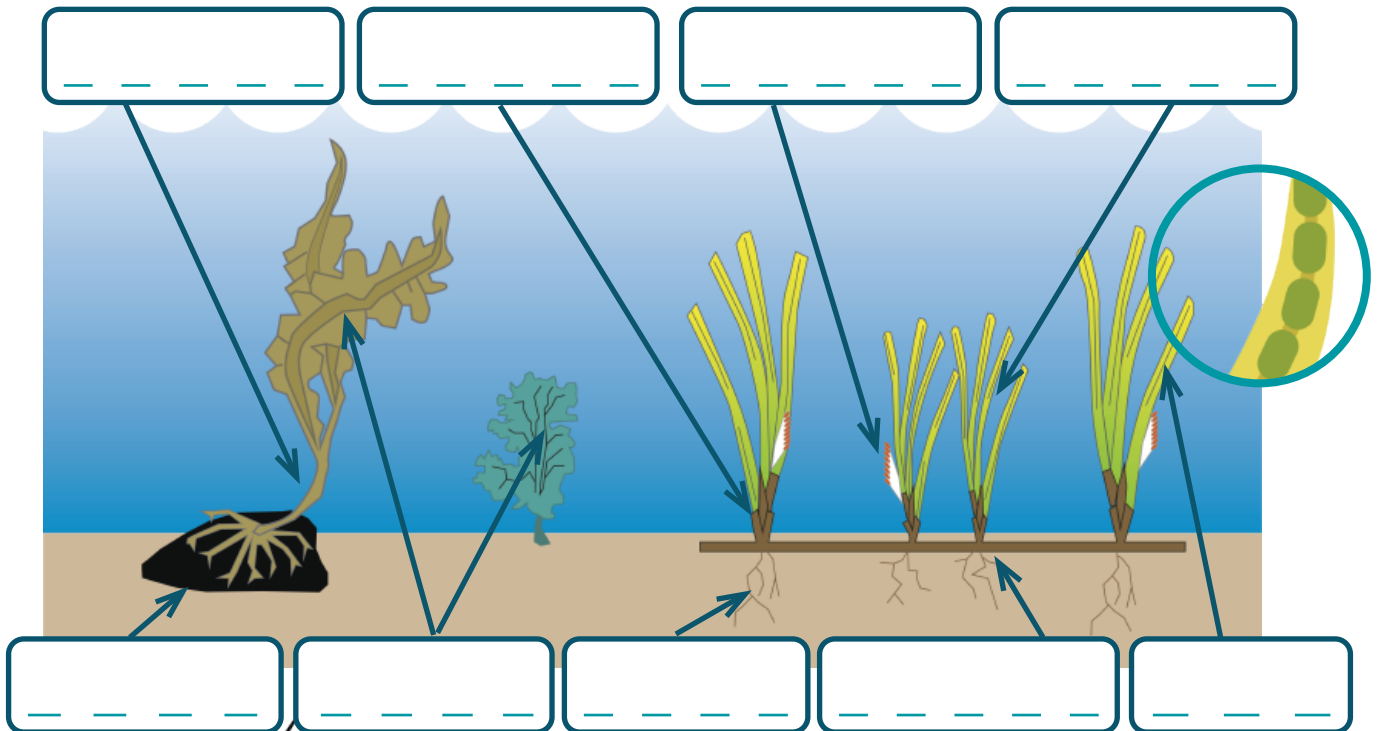
Match each part of the seaweed and seagrass to its correct function by writing the corresponding letter (A-I) next to the name of the part.

## Functions

- A. Absorbs sunlight and produces food for the seaweed through photosynthesis.
- B. Absorbs sunlight to produce food for the seagrass through photosynthesis.
- C. Anchors the seagrass to the seabed and absorbs nutrients and water.
- D. Supports the blades of seaweed, acting like a stem.
- E. Floats through the water to grow new seagrass plants elsewhere.
- F. Attaches the seaweed to rocks or other surfaces.
- G. Spreads out under the sand to store food and nutrients for the seagrass.
- H. Supports the leaves and transports water, nutrients, and energy between roots and leaves in seagrass.
- I. Produces pollen and seeds for seagrass reproduction.

- ☐ Holdfast
- ☐ Leaves
- ☐ Stem
- ☐ Rhizome
- ☐ Roots
- ☐ Flowers
- ☐ Seeds
- ☐ Blade
- ☐ Stipe

Label the diagram below using the correct parts and functions from the list:



Seagrasses are the only flowering plants that have adapted to live in the ocean.



# Seagrass vs Seaweed Sort

## Equipment required

- Print out of the 'Seaweed vs Seagrass Sort' cards, one per group (2 pages)
- Scissors
- 2 Hula hoops or chalk per group
- Internet enabled devices and internet access

## To complete the activity

1. To setup, ask learners to use chalk to draw two large overlapping circles on the school yard, or place two overlapping hula hoops on the ground.
2. Provide each group with the 'Seaweed vs Seagrass' cards. Ask learners to cut the cards, labelling one circle with the "Seaweed" card and the other with the "Seagrass" card. The overlapping section represents characteristics shared by both.
3. Ask each group to share and read their cards aloud. Encourage learners to discuss each characteristic and place the card in the correct part of the Venn diagram: either in the Seaweed circle, the Seagrass circle, or the overlapping Both section.
4. Prompt groups to explain their reasoning:
  - Why do you think this belongs in Seaweed?
  - Can you think of examples from nature that support your decision?
5. Encourage groups to add their own ideas or observations if inspired, writing them on the blank cards.
6. Review the diagrams with the class, discussing any misconceptions and highlighting key similarities between seaweed and seagrass.

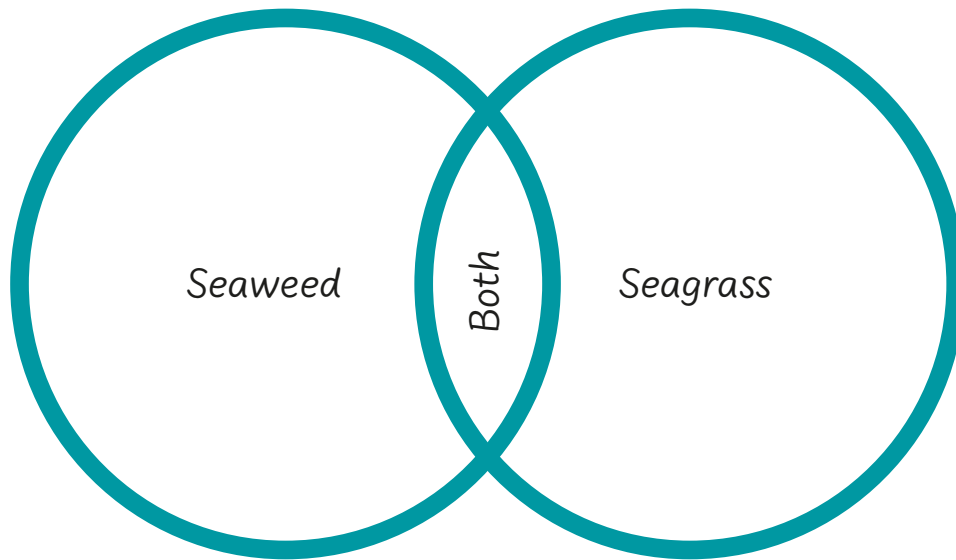
## ANSWER KEY

Statement	Seaweed	Seagrass
Lives mainly on a rocky seabed	✓	
Produces flowers		✓
Is a true plant, like terrestrial (land) plants		✓
Is a good home for sea life	✓	✓
Lives near the shore	✓	✓
Feels rubbery to touch	✓	
Is eaten by humans	✓	
Is an algae	✓	
Attaches to rocks with holdfasts	✓	
Has roots that anchor it into the seabed		✓
Provides oxygen to the water through photosynthesis	✓	✓
Is a food source for marine animals, such as turtles	✓	✓
Can be affected by pollution and climate change	✓	✓

# Seagrass vs Seaweed Sort



Use chalk or hula hoops to create two large overlapping circles



Cut out the cards below and label one circle 'Seaweed' and the other 'Seagrass'. The overlapping section represents 'Both'.

Lives mainly on  
a rocky seabed

Produces  
flowers

Is a true plant,  
like terrestrial  
(land) plants

Is a good home  
for sea life

Lives near  
the shore

Feels rubbery  
to touch



# Seagrass vs Seaweed Sort

Is eaten by  
humans

Is an algae

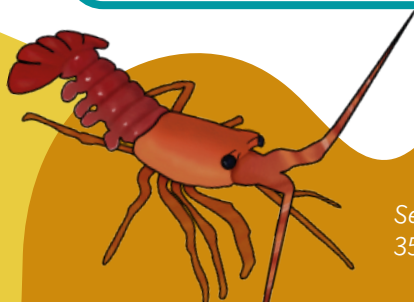
Attaches to  
rocks with  
holdfasts

Has roots that  
anchor it into  
the seabed

Provides oxygen  
to the water  
through  
photosynthesis

Is a food source  
for marine  
animals, such  
as turtles

Can be affected  
by pollution and  
climate change



Seagrasses store carbon up to  
35 times faster than rainforest.

## ADDITIONAL TASK

Use the blank cards to create  
additional statements to add  
to the diagram.





# Seagrass Scars

## Equipment required

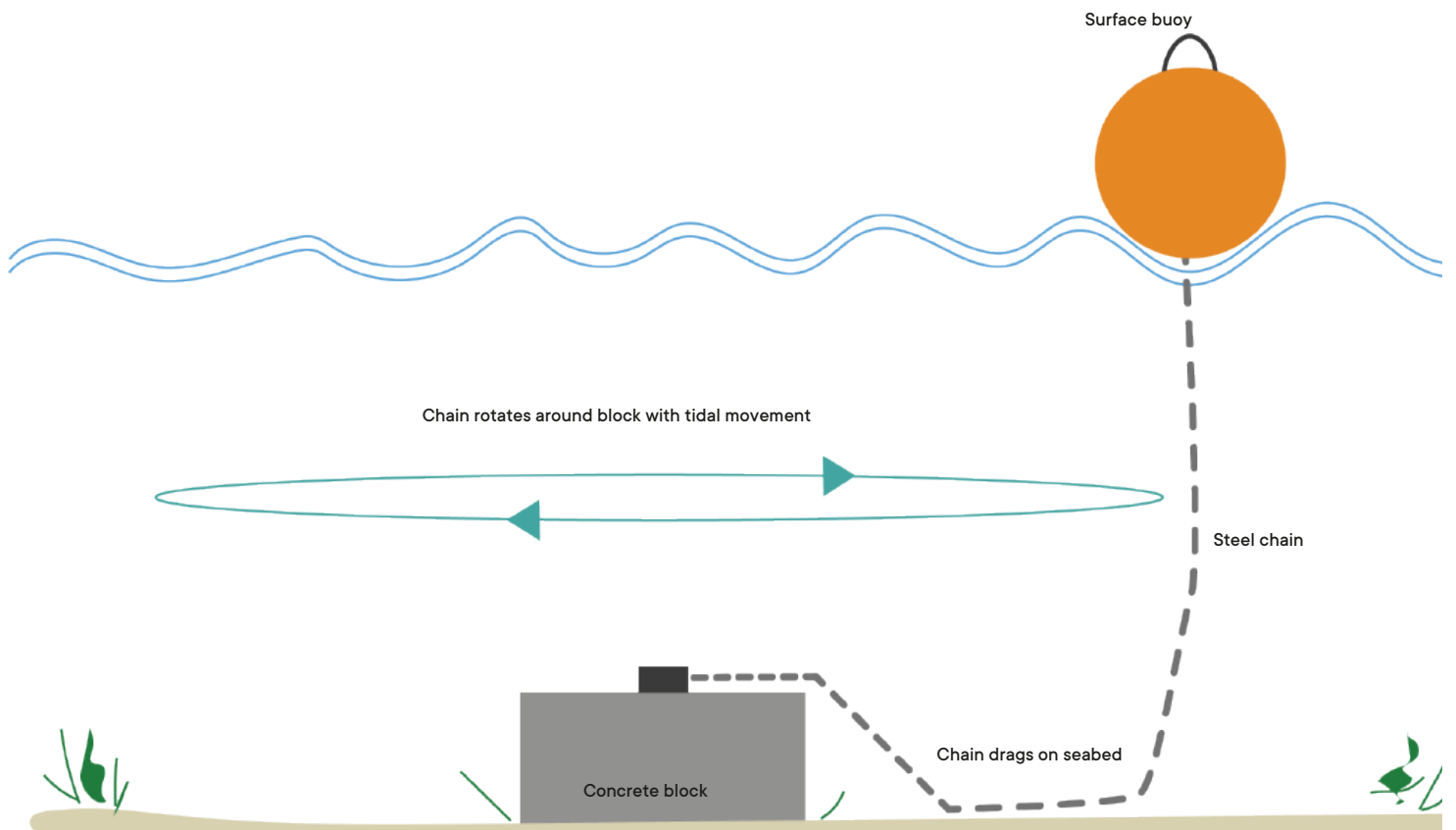
- Print out of the 'Seagrass Scars' worksheet, one per pair
- Print out or share the photos on sheet (S\_S\_2), one per class/group
- Paper
- Art materials
- Internet enabled devices and internet access

## To complete the activity

1. Share the 'Seagrass Ocean Rescue' video with the learners – [www.tiramor.cymru/seagrass](http://www.tiramor.cymru/seagrass) (Resource 1). Discuss with learners the main threats to seagrass ecosystems mentioned in the video and their impact on marine life.
2. Share the 'Seagrass Scars' worksheet (S\_S\_2). Provide an opportunity for learners to discuss what they can see in the image and describe any features they notice. What impact do learners think the moorings might have on seagrass meadows?
3. Challenge learners to find out further causes of seagrass decline, researching and recording any findings on the 'Seagrass Scar' worksheet.
4. Encourage learners to consider the scar caused by each stressor, creating a pattern or symbol to represent the scar.
5. Using the patterns or scars created, provide each pair of learners with art materials such as paints, markers, or paper to design a visual representation of seagrass and the stressors affecting it.
6. Ask learners to share their artwork with the class, explaining the stressors they illustrated and their potential impact on seagrass.

## ANSWER KEY

Stressor	Potential impact on Seagrass
Boat moorings (chains)	Scouring of the seagrass, resulting in the removal of shoots.
Boat keels	Creation of short ditches through the meadow and damage to seagrass shoots.
Boat scouring	Scouring of the seagrass as boats land on seagrass at low tide, resulting in damage or removal of shoots.
Anchors	Dropping anchors in seagrass beds damages shoots, especially as anchors are recovered.
Tractors	Compression of sediments, creation of tracks through meadows, and damage to seagrass shoots.
Dumping of fishery waste	Lobster and brown crab shell waste suffocates seagrass.
Digging seagrass by shellfish gatherers	Loss and disturbance of seagrass.
Coastal development	Loss and disturbance of seagrass through habitat destruction.
Pollution (oil spills and chemicals)	Contamination of water reduces seagrass health and affects associated ecosystems.
Climate change (rising water temperatures)	Increased temperatures stress seagrass, potentially leading to die-offs.
Sea level rise	Alteration of light availability and changes in suitable seagrass habitat due to deeper waters.
Algae overgrowth	Excess nutrients from pollution causing thick algae to block sunlight.
Marine litter	Plastic waste and debris can entangle and suffocate seagrass.





Research and record the causes of seaweed decline:

[illegible]

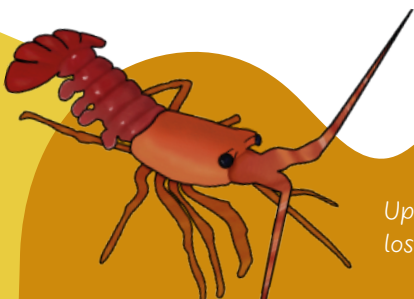
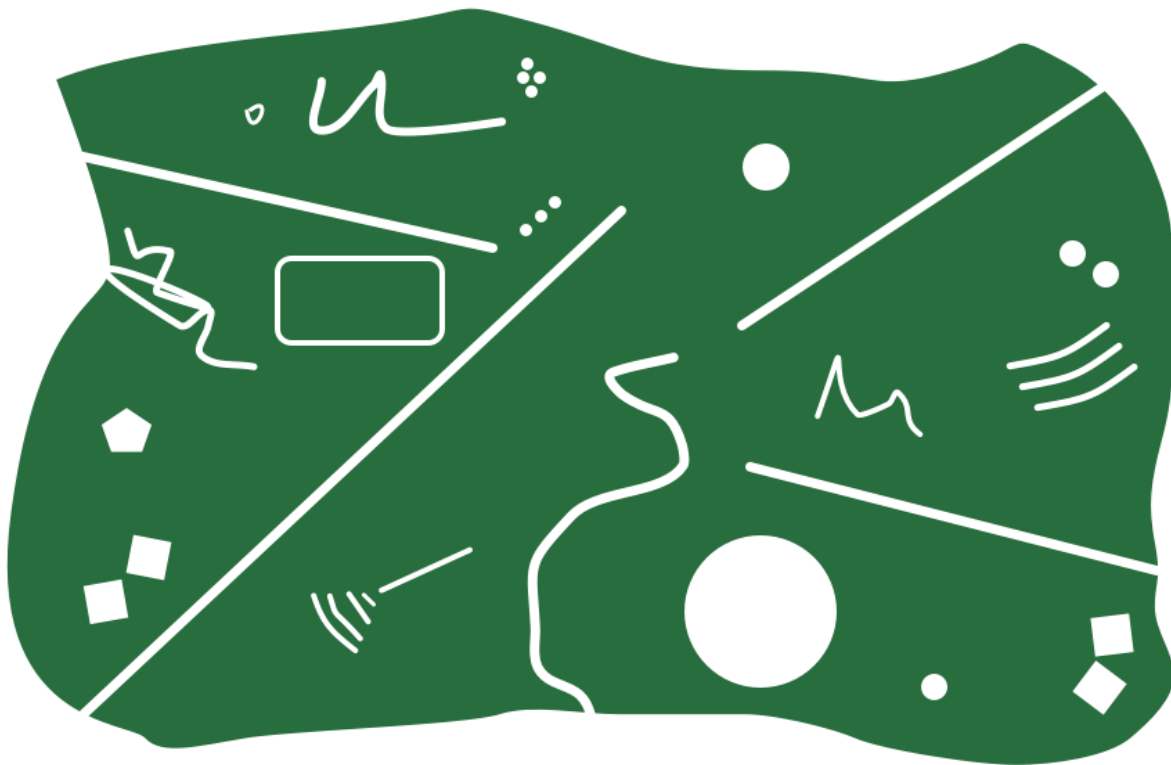
# Seagrass Scars



Create an abstract artwork inspired by the scars and patterns caused by human impacts on seagrass meadows, such as tracks or boat propellers. Use lines, shapes, and colours to visually represent these effects.

**Reflect on your design and explain how it illustrates the challenges seagrass faces due to human impacts.**

Discuss what actions can be taken to protect and restore these vital ecosystems.



Up to 92% of seagrass has been lost in the UK in the last century.



# Seagrass Scar Solutions

## Equipment required

- Print out of the 'Seagrass Scars Solution' worksheet, one per group (3 pages)
- Internet enabled devices and internet access

## To complete the activity

1. Share the 'Project Seagrass' video with the learners – [www.tiramor.cymru/seagrass](http://www.tiramor.cymru/seagrass) (Resource 2).
2. Distribute the 'Seagrass Scars Solution' worksheet – one per group, and provide learners with internet-enabled devices with internet access.
3. Ask learners to imagine they are marine conservation engineers designing solutions to protect seagrass meadows, just like the replanting efforts shown in the video. Explain their goal is to design a creative solution to protect or restore these vital habitats and to prevent scars caused by stressors like boats, vehicles, pollution, or algae overgrowth. Can they help prevent damage to seagrass meadows and ensure they thrive for the marine life that depends on them?
4. Have each group choose a stressor to focus on, such as boat moorings, vehicles in intertidal zones, algae overgrowth from pollution, or sediment disturbance caused by construction or turbulence.
5. Provide an opportunity for learners to research real-life strategies, such as Advanced Mooring Systems, seagrass restoration, education campaigns, or pollution reduction.
6. Ask groups to design a solution for their chosen stressor. They can create a labelled diagram, a 3D model using recycled materials, or a poster/infographic showcasing the stressor, its impact, and their solution.
7. Provide an opportunity for the groups to present their projects to the class, role-playing as conservation scientists. They should explain their chosen stressor, their solution, and the benefits of their idea for seagrass ecosystems.
8. Ask learners to reflect on their work by considering what inspired their solution, how it helps seagrass and marine life, and what else people can do to protect seagrass ecosystems. Learners may wish to complete the checklist provided to evaluate their work. Discuss how learners could improve or what you would do differently next time.





# Seagrass Scar Solutions Challenge Card

**Mission:** You are marine conservation engineers!

Seagrass meadows are being damaged by human activities, leaving scars caused by boats, vehicles, pollution, and algae overgrowth.

Your challenge is to work together to design a creative solution to protect seagrass meadows, prevent these scars, and help them recover.

## 1. Choose your stressor

As a group, pick one stressor to focus on:



### **Boat moorings**

Chains and anchors dragging across the seabed.



### **Vehicles**

Cars or quad bikes driving through intertidal seagrass beds.



### **Algae overgrowth**

Pollution causing thick algae to block sunlight.



### **Sediment disturbance**

Construction or turbulence burying seagrass or blocking light.

## 2. Research solutions

Work together to explore real-life strategies to inspire your solution. Ideas might include:

### **Advanced Mooring Systems**

Special moorings that don't drag on the seabed.

### **Seagrass restoration**

Replanting seagrass in damaged areas.

### **Education campaigns**

Teaching people to protect seagrass.

### **Pollution reduction**

Stopping nutrient runoff to improve water quality.

Divide research tasks between your group members to gather information quickly.

### 3. Design your group solution

Combine your ideas to create one group solution.

Choose how to present it:

#### **Create a diagram**

Show how your solution works and label its parts.

#### **Build a model**

Use recycled materials to create a 3D version of your solution.

#### **Create a poster or infographic**

Explain the stressor, its impact, and your solution visually.

Ensure every team member contributes to the final design!

### 4. Present your solution

Work together to prepare a short group presentation.

Explain:

**1. What stressor you focused on.**

**2. Your group's solution and how it works.**

**3. Why your solution will help protect seagrass meadows.**

Role-play as conservation scientists to make your presentation fun and engaging!

### 5. Reflect

After your presentation, discuss as a group:

**What inspired your solution?**

**How does it help protect seagrass ecosystems?**

**What other ideas could people use to protect seagrass?**

# Seagrass Solution Presentation Self-assessment Checklist

## Content

- ☐ We clearly explained the stressor we focused on.
- ☐ We described our solution and how it works.
- ☐ We explained why our solution will help protect seagrass meadows.

## Visuals

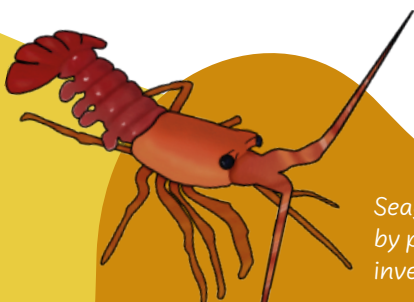
- ☐ We used a diagram, model, or poster to support our explanation.
- ☐ Our visuals were clear and easy for the audience to understand.
- ☐ We labelled important parts of our visuals.

## Delivery

- ☐ Everyone in the group participated in the presentation.
- ☐ We spoke clearly and at a good pace so everyone could hear and follow.
- ☐ We stayed on topic and kept the audience engaged.

## Engagement

- ☐ We answered questions from the audience confidently.
- ☐ We encouraged the audience to think about ways to protect seagrass.



Seagrass meadows support biodiversity by providing habitats for fish, invertebrates and marine mammals.