Native Oysters

Introduction

Native Oysters

Oysters are amazing animals and true superheroes of the sea. Only one oyster is native to the UK, the European oyster (also known as the edible flat oyster). They are molluscs, related to sea snails, and are bivalves, meaning they have two shells connected by a strong muscle.

They have no brain or eyes but do have a nervous system and light receptors. Oysters can live for up to 15 years and generally grow to 10cm long, although some 20cm specimens have been found! They are all born male, then change between male and female throughout their lives. Each adult female can produce 1 million babies each year.

Oysters live at the coast in water up to 80 meters deep, often in muddy areas where they always need a hard surface to settle on, such as bedrock, stones, or shell fragments. If you are lucky, you can see oysters on the low shore (e.g. in rockpools). They can't really move and so are stuck, sometimes literally, to the seabed, filtering seawater that flows over and around them to remove essential food and nutrients needed to grow. They are very efficient filterers, and this is useful for humans and other wildlife, as they can filter water, making it cleaner and clearer. A single native oyster can filter up to 200 litres of water a day. Oysters eat tiny particles, including plankton, which are vital in marine food chains and even play a role in climate regulation. Unfortunately, oysters may also ingest microplastics, highlighting links between pollution and their health.

Oysters start life as tiny larvae floating in the water column. These larvae are washed about before settling onto a hard surface and developing into 'spat,' which are effectively baby oysters. They then grow bigger, forming growth rings like trees, which can help determine their age.

Oysters are very friendly, preferring to live in large groups that form reefs. They make glue that they use to stick themselves to or near to other oysters. Oyster reefs can help to stabilise sandy and muddy seafloors, allowing for more oysters to settle in the area. Oyster reefs create homes, safe hiding places and are food for other animals, all of which helps to increase the number of fish in the sea. Oysters also help to clean the sea, improving water quality by filtering large volumes of water and removing some pollutants. Oysters also provide jobs and food for people.

Oysters need our help. Wild native oyster beds are one of the most endangered marine habitats in Europe. It is believed that oyster populations in the UK have declined by around 95% in the last 200 years, due to overfishing, pollution and habitat loss. The restoration of oyster habitats could help to boost some fish populations and improve catches for both recreational and commercial fishermen over the long-term. Projects around Wales are returning oysters back to the sea to help bring back these amazing animals from near extinction, but they will need help over a long time because oyster reefs take about 20 years to become established. There's so much to learn and lots you can do to help oysters. Oysters are vital to marine ecosystems, and with your help, they can continue to play their superhero role in the sea!

Further research keywords

Ostrea edulis. bivalve, molluscs, brackish water, adductor muscle, shucked, filter-feeding, algae, phytoplankton, gills, cilia, reef-building, substrate, aquaculture.

30 mins

Oyster Battleships

Equipment required (per group)

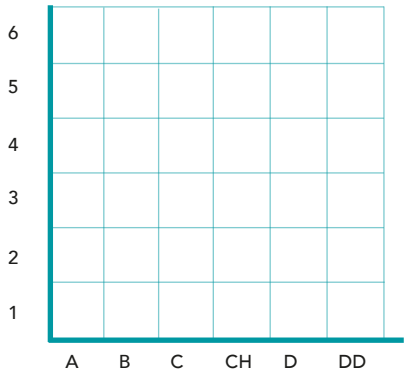
- Chalk

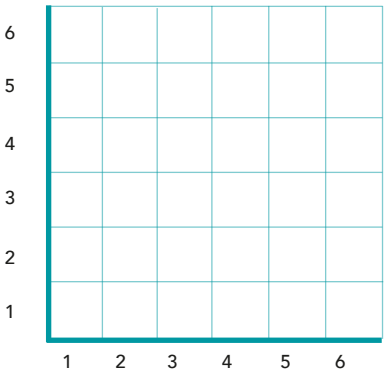
To set up

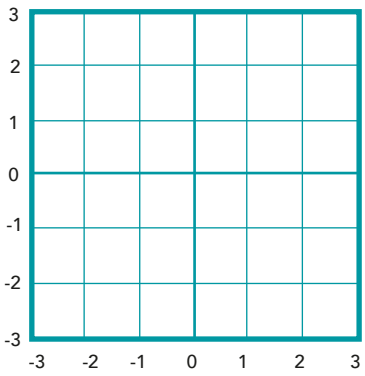
1. Organise learners into groups of 10–12.

2. Support learners to create a large 6x6 grid using chalk on the ground. Each square must be big enough for a learner to sit in comfortably - this represents the ocean floor where oysters live.

3. Encourage learners to label the axes. They could use:
   - Letters for one axis and numbers for the other, like the traditional Battleship game *e.g. A–F ,along one axis, 1–6 along the other.*
   - A simple Cartesian grid using positive coordinates e.g. (3,2).
   - Negative numbers on one axis e.g. (–2 to 2) to explore basic coordinate concepts.



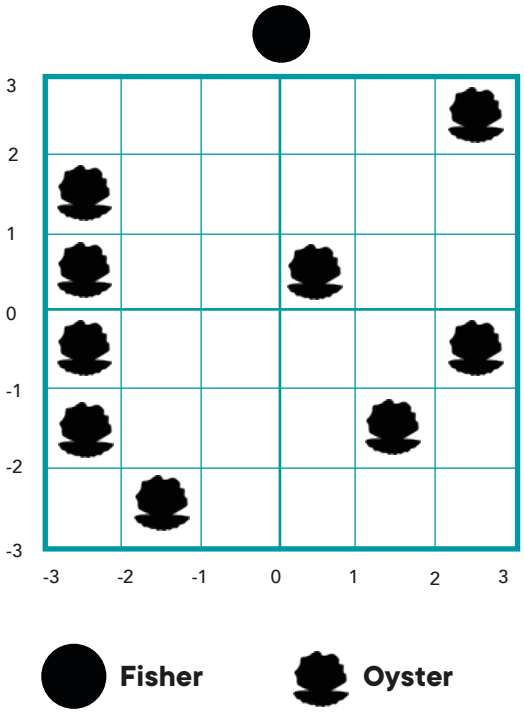




4. Ask each group to choose one learner to be the 'fisher'. The fisher must turn away from the grid or close their eyes while the rest of the group (acting as oysters) silently choose their grid positions.

30 mins

Oyster Battleships



To complete the activity

1. The designated fisher has two attempts per round to catch oysters by calling out coordinates e.g. D4 or (3,2) depending on the grid type. If they pick a square where an oyster is sitting, that oyster is caught and must leave the grid.

2. Repeat the game, increasing the number of fishers to 2–3, making it harder for oysters to survive. Calculate how many oysters were caught after each round.

3. Next, give one fisher a 'better boat', allowing extra turns per round (e.g. four turns instead of two).

4. After a few rounds, swap roles so oysters become fishers and vice versa.

5. Compare how many oysters were left at the end of each round. Link this to overfishing, discussing the impact of having too many fishers or advanced fishing equipment.

6. Consider the following questions:
   - How did the number of fishers in each round affect the oyster population over time?
   - What impact did advanced fishing techniques have on the sustainability of oyster populations during the game?
   - What strategies could be introduced to maintain a balance between fishing and preserving oyster populations?

ADDITIONAL TASK Optional

After each round, ask learners to calculate the percentage of oysters caught using this formula:
Percentage of oysters caught = (Number of oysters caught / Total oysters at the start of the round) x 100

60 mins

Activity Guide

How Oysters Filter Dirty Water

Equipment required (per group)

- Print out of the 'How Oysters Filter Dirty Water' worksheet, one per group
- Empty container (no more than 300ml)
- Oregano (to represent algae)
- Dried onion (to represent debris and other loose material)
- Peppercorn (to represent sediment)
- Teaspoon
- Funnel
- Empty container (over 300ml)
- Coffee filter

To complete the activity

1. Share the time-lapse video 'Oysters Clean the Bay!' with the learners – www.tiramor.cymru/nativeoysters (Resource 1). This demonstrates how oysters can clear cloudy water over 5 hours. This sets the context for understanding their role in ecosystems. Oysters eat the algae (which go into the gut) and expel both real waste faeces and pseudofaeces, which are particles of non-food things (silt, microplastics...). They are very efficient and good at this where other animals suffocate with fouled up gills.

2. Ask learners to discuss the following:
   - Why is clean, clear water important for marine animals?
   - How might dirty water affect the ability of animals to breathe?
   - What impact might dirty water have on sunlight reaching marine plants?
   - How do oysters help clean the water?
   - What do you think happens if there is too much debris or pollution in the water?

3. Provide each group with a 'How Oysters Filter Dirty Water' worksheet and necessary equipment.

4. After completing steps 1–5, encourage learners to observe and discuss how the dirty water looks after mixing the ingredients?

5. Ask each group to predict how oysters might clean the 'dirty' water.

6. Support learners to follow next steps to create their own oyster out of a coffee filter.

7. Support learners to set their coffee filter in the funnel. Before they pour the 'dirty water' through the filter, remind learners not to use a spoon to push liquid through the filter, as this may cause the filter to tear.

8. After filtering, encourage learners to discuss how clean the water is after going through the filter. What was removed easily? Why is it cleaner? Encourage learners to consider whether everything has been removed? What about organisms that are too small to see and those that have been dissolved.

9. Ask each group to consider how the experiment demonstrates how oysters filter water in nature. Reflect on the limitations of the filter and the challenges oysters might face in heavily polluted water.

How Oysters Filter Dirty Water

What you will need

- Empty container (no more than 300ml)
- Oregano (to represent algae)
- Dried onion (to represent debris and other loose material)
- Peppercorn (to represent sediment)
- Teaspoon
- Funnel
- Empty container (over 300ml)
- Coffee filter

1. Add 1 teaspoon of oregano to the container.

   This represents algae, small plants that live in the water.

2. Add 1 teaspoon of dried onion to the container.

   This represents debris, (small fragments of broken-down plants and animal waste).

3. Add 1 teaspoon of peppercorn to the container.

   This represents sediment, which is made up of small pieces of broken-down rocks.

4. Fill the container halfway with tap water.

   This represents the water in a bay or river.

5. Mix everything together with your teaspoon.

   You've now created your 'dirty water'!

6. Set aside the 'dirty water'.

7. Create your own 'oyster' by folding the coffee filter in half; then fold in half again.

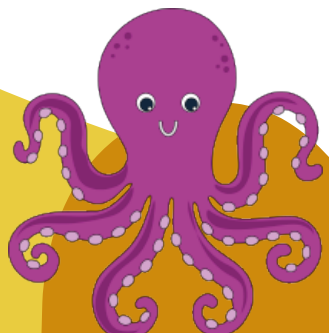
8. Set the coffee filter in a funnel over the remaining empty container.

9. Pour the 'dirty water' mixture slowly through the filter.

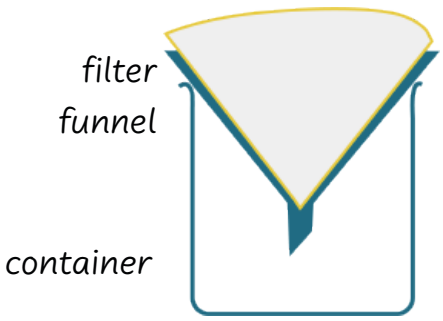
10. Discuss how clean the water is after going through the filter.

DISCUSS

Why is the water cleaner?
How does this relate to how oysters filter water in nature?



Even though oysters are known to create pearls, the European native oyster rarely creates pearls.



60 mins

Human Impact on Oysters

Equipment required (per group)

- Print out of the 'Microfibre Experiment' worksheet, one per group
- Fabric samples (synthetic and natural fibres)
- Scissors
- 5 jars (with lids)
- Magnifying glass or microscope (optional)
- Tap water
- 5 coffee filters
- Funnel and empty container
- Internet enabled devices and internet access

To complete the activity

1. Share the video 'Stop Ocean Threads!' with the learners – www.tiramor.cymru/nativeoysters (Resource 2).

2. Explain that oysters are natural filters that help keep waterways clean by removing particles and debris from the water. Note that human activities can introduce pollutants, including microfibres from clothing, into aquatic ecosystems.

3. Ask learners to consider the following questions:
   - What are microfibres, and where do they come from?
   - How do microfibres enter rivers, bays, and oceans?
   - What impact could microfibres have on oysters and other marine life?
   - How might microfibres affect oysters' ability to filter water?

4. Share the 'Microfibre Experiment' worksheet with each group. Encourage learners to explore how microfibres from synthetic and natural fabrics behave in water and discuss their impact on oysters and water quality.

5. Support learners to record their findings.

6. Discuss findings. What differences did learners notice between synthetic and natural fibres? How might microfibres impact oysters' ability to filter water? What solutions could help reduce microfibre pollution in aquatic environments?

7. Provide an opportunity for learners to research and consider practical solutions to reduce microfibre pollution in their daily lives. This may include using a Guppyfriend washing bag or Cora Ball to capture microfibres during washing; installing a washing machine filter to washing machines to trap fibres; washing clothes less frequently; choosing natural fabrics (which decompose faster that synthetic fibres); using cooler water and gentle washing cycles to minimize shedding and raising awareness about microfibre pollution.

8. Support learners to create a short presentation or poster to present ways to reduce microfibre pollution.

Microfibre Experiment

What you will need

- *Fabric samples (synthetic and natural fibres)*
- *Scissors*
- *5 jars (with lids)*
- *Magnifying glass or microscope (optional)*
- *Tap water*
- *5 coffee filters*
- *Funnel and empty container*

STEP 1
Cut 5 fabric samples (synthetic and natural fibres) into small pieces, 1-2 cm^2.

STEP 2
Place each fabric sample into separate jars, filling each jar three-quarters full of water.

Screw the lid on tightly.

STEP 3
Fill the table below with details about each fabric sample and initial observations before agitation.

STEP 4
Shake each jar for 1-2 minutes to stimulate agitation.

Record any visible changes in the table below.

STEP 5
Pour each jar's content through a coffee filter placed in a funnel into an empty container below.

Record observations about what is captured by the filter in the table below.

FABRIC NAME	NATURAL/ SYNTHETIC	INITIAL OBSERVATION	AFTER AGITATION OBSERVATIONS	FILTRATION OBSERVATIONS

DISCUSS

How might microfibres impact oysters' ability to filter water?

ADDITIONAL TASK Optional

Research and create a presentation or poster proposing practical solutions to reduce microfibre pollution.

Focus on actions individuals and communities can take, including tools, technologies, and lifestyle changes to minimise microfibre release into the environment. Be prepared to share your presentation or poster with the class and discuss your proposed solutions!

Native oysters filter seawater to consume phytoplankton and organic matter – this results in cleaner and clearer water.

30 mins




Oyster Challenges

Equipment required

- Print out of the 'Oyster Challenges' worksheet, one per learner (2 pages)
- Pens or pencils
- Internet enabled devices and internet access

To complete the activity

1. Share the 'A history of the native oyster in Wales' presentation with learners - www.tiramor.cymru/nativeoysters (Resource 3).

2. Share the following link with learners and ask them to identify where native oysters can be found in Wales - www.tiramor.cymru/nativeoysters (Resource 4). Discuss the habitat conditions needed for native oysters to survive. Learners may wish to use The Wild Oyster Project fact sheet to support their research - www.tiramor.cymru/nativeoysters (Resource 5).

3. Provide each learner with the 'Oyster Challenges' worksheet.

4. Encourage learners to solve the challenges and to discuss their strategies and approaches with a partner.

5. Allow time for learners to reflect on the following and to create their own oyster-related question:
   - Which question did they find the most challenging? Why?
   - What new skills did they use or learn in this activity?

ANSWERS:

1. 8 x 12 = 96 oysters
2. 2.5 x 4 = 10 cm
3. 200 x 6 x 7 = 8400 litres
4. 250 x 15 = 3750 grams (or 3.75 kg)
5. 120 / 6 = 20 oysters
6. 2(8 + 5) = 2(13) = 26 metres
7. 14 x 6 = 84 m^2 (square metres)
8. 72 / 8 = 9 oysters
9. 0.40 x 250 = 100 oysters
10. 100 / 20 = 5; 5 x 15 = 75 minutes (1 hour 15 mins)
11. 12 x 4 = 48
12. 25, 36 (squares of numbers)

Oyster Challenges

1. Counting Oysters
A reef has 8 rows of oyster beds, and each row contains 12 oysters. How many oysters are there in total?

Answer: _____

2. Growth Rate
An oyster grows 2.5cm each year. How many centimetres will it grow in 4 years?

Answer: _____

3. Filtration Power
An oyster can filter 200 litres of water per day. How much water can 6 oysters filter in a week?

Answer: _____

4. Weight Calculation
If one oyster weighs 250 grams, what is the total weight of 15 oysters?

Answer: _____

5. Volume Problem
A tank holds 120 litres of water. If each oyster needs 6 litres of water to survive, how many oysters can live in the tank?

Answer: _____

6. Perimeter of Oyster Beds
An oyster bed is 8 meters long and 5 meters wide. What is its perimeter?

Answer: _____

7. Area of an Oyster Bed
An oyster bed is 14 meters long and 6 meters wide. Calculate the area of the oyster bed.

Answer: _____

8. Sharing Oysters
A fisherman collects 72 oysters and shares them equally among 8 friends. How many oysters does each friend receive?

Answer: _____

9. Percentage Problem
40% of an oyster reef has been damaged by pollution. If the reef originally had 250 oysters, how many oysters have been affected?

Answer: _____

Oyster Challenges

10. Time Challenge

It takes 15 minutes to clean 20 oysters. How long will it take to clean 100 oysters?

Answer: _____

11. Money Problem

In 1835, oysters were very popular food, and you could buy 4 for 1 penny. How many oysters would you have been able to buy for a shilling (12 pence)?

Answer: _____

12. Pattern and Sequences Problem

Oysters are planted in rows forming a pattern: 1, 4, 9, 16... What are the next two numbers in the sequence?

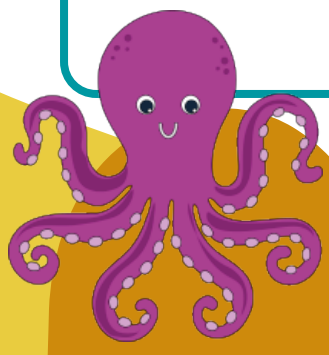
Answer: _____

Which question did you find the most challenging? Why?

What new skills did you use or learn in this activity?

Can you create your own oyster-related question?

Be prepared to share it with the class.



Oysters start their lives as males and change sex multiple times, usually ending as females.