

# BE THE WAVE AR FRIG Y DON

## Sustainable Fishing

Lesson Plan



cadwch keep  
gymru'n wales  
daclus tidy

MARINE  
CONSERVATION  
SOCIETY



UNDEB EWROPEAIDD  
EUROPEAN UNION



Llywodraeth Cymru  
Welsh Government

**Cronfeydd Strwythurol a  
Buddosoddi Ewropeaidd**  
European Structural  
and Investment Funds



Ariennir gan  
**Lywodraeth Cymru**  
Funded by  
**Welsh Government**



<b>Aims</b>
<ul style="list-style-type: none"> <li>Understanding the ecosystem impacts of fishing and how we can manage fishing practices to reduce these impacts. Students will begin to understand what makes seafood sustainable.</li> </ul>
<b>Objectives</b>
<ul style="list-style-type: none"> <li>Describe several ecosystem impacts of unsustainable fishing.</li> <li>Analyse data to determine change over time.</li> <li>Analyse infographics to determine ecosystem impacts of aquaculture.</li> <li>Generate creative solutions to reducing negative impacts of fishing practices.</li> </ul>

<b>Eco-Schools topic</b>	<b>Global Goals</b>
<ul style="list-style-type: none"> <li>Biodiversity</li> <li>Health, Food and Wellbeing</li> </ul>	<ul style="list-style-type: none"> <li>14 Life Below water</li> </ul>

<b>Links to the Curriculum for Wales</b>	
<b>Purpose</b>	
<p>Ambitious, capable learners who are:</p> <ul style="list-style-type: none"> <li>Building up a body of knowledge and have the skills to connect and apply that knowledge in different contexts.</li> </ul> <p>Ethical, informed citizens who:</p> <ul style="list-style-type: none"> <li>Find, evaluate, and use evidence in forming their views</li> <li>Show their commitment to the sustainability of their planet</li> </ul> <p>Enterprising, creative contributors who:</p> <ul style="list-style-type: none"> <li>Express ideas and emotions through different media</li> </ul>	
<b>What Matters Descriptions of Learning</b>	<b>Progression Step: Four</b>
<p>Science and Technology</p> <ul style="list-style-type: none"> <li>Describe how the impact of our actions contribute to the changes in the environment and biodiversity</li> <li>Describe the interdependence of organisms in ecosystems and explain how this affects their chances of survival</li> </ul> <p>Humanities</p> <ul style="list-style-type: none"> <li>Understand the range of factors that affect the interrelationships between humans and physical processes</li> <li>Understand and explain how significant places, spaces, environments and landforms in the natural world are associated with economic, historical, political, religious and non-religious beliefs and practices.</li> <li>An understanding of my own and others environmental, economic, and social responsibilities in creating a sustainable future.</li> </ul>	
<b>LNF</b>	<b>Progression Step: Four</b>
Interpreting data	



- Interpret mathematical information, drawing inferences from graphs, diagrams and data, including discussion on limitations of data.
- Draw conclusions from data and recognise that some conclusions may be misleading or uncertain.

Cynefin

Ecosystems found around the Welsh coast

Activity One	Resources and Equipment
<p><b>Ecosystem Impacts of Unsustainable Fishing</b></p> <p>Use the Sustainable Fishing Presentation to introduce students to the topic.</p> <p>Activity one focuses on ecosystem impacts of unsustainable fishing and is split into four mini activities looking at overfishing, habitat destruction, food web dynamics and bycatch.</p> <p><b>Overfishing</b> - students will analyse a graph showing global trends in fish stocks and record their answers on the ecosystem impacts worksheet.</p> <p><b>Habitat destruction</b> – Watch the video in the Presentation and complete the associated questions on the ecosystem impacts worksheet.</p> <p><b>Food web dynamics</b> – Play the wood web game using the instructions and cards provided. The game explores how overfishing alters food web dynamics. After completing, students should answer the associated questions on the ecosystem impacts worksheet.</p> <p><b>Bycatch</b> - Watch the video in the Presentation and complete the associated questions on the ecosystem impacts worksheet.</p>	<p>Sustainable Fishing Presentation</p> <p>Ecosystem impacts of fishing worksheet</p> <p>Food web game</p>

Activity Two	Resources and Equipment
<p><b>Managing fishing in a sustainable way</b></p> <p>Split the class into small groups. Give each group one of the ecosystem impacts covered in activity one (overfishing, habitat destruction, food web dynamics and bycatch). Each group should mind map how we could improve fishing practices and the fishing industry to decrease their allocated ecosystem impact and make fishing more sustainable.</p>	



<p>To help the students generate their ideas you could write some key words on the board for example, fishing gear, boats, species, habitats, protection, law.</p> <p>After five minutes, ask students to share their ideas and create a mind map on the board for each ecosystem impact with everyone’s ideas. Many ideas will have crossover between the different ecosystem impacts. Stress to students that in order for fishing to be sustainable it will need to consider ways to reduce all the ecosystem impacts. Notes are provided in the teacher’s background information to aid you with this activity.</p>	<p>Teachers Background Information</p>
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Activity Three	Resources and Equipment
<p><b>Aquaculture</b> Introduce aquaculture as a fishing practice using the Sustainable Fishing Presentation.</p> <p>Students should analyse the infographics and draw out key points to create a table of positives and negatives of aquaculture using the aquaculture worksheet. Students should think about ecosystem impacts, food supply, climate impact and overall sustainability and should not be restricted to the information on the infographics alone, but also add their own knowledge and thoughts to their table.</p> <p>To introduce positive solutions for sustainable aquaculture, show students the video in the Presentation. After watching use the questions in the notes section of the Presentation to discuss 3D farming.</p>	<p>Sustainable Fishing Presentation</p> <p>Infographics</p> <p>Aquaculture worksheet</p>



## #BeTheWave

Apply the knowledge gathered in the lesson into action as ethical and informed citizens. It is an important aspect to ensure students know they have the power to enact and make changes within their own lives and within their school. It is also a positive step which helps balance some of the negative impacts explored within the lesson.

Decide on an action or actions to take forward either as individuals or as a class. Below are some suggestions, or the class could generate their own.

School:

- Use the Marine Conservation Society’s Good Fish Guide when buying fish for school meals to ensure you are providing sustainable fish in your school’s canteen.  
<https://www.mcsuk.org/goodfishguide/search>
- Promote your agreement to buy sustainable fish on your website and through your social media channels to help raise awareness of the issue and inspire other schools to do the same.
- Incorporate learning about sustainable seafood into your food technology curriculum.

Alternative Activities	Resources and Equipment
<p><b>Activity One - Maximum Sustainable Yield</b> In this game students will take on the role of fish, sharks and fishers. Students will have to make choices about how many fish can viably be taken from the ocean without affecting the overall fish population, but still maintain demand for food. Worksheets are provided for students to take notes and make calculations to understand the processes that inform sustainable fishing. <a href="http://www.msc.org/docs/default-source/default-document-library/education-page/msc-go-fish.pdf?sfvrsn=cd19fbdf_22">www.msc.org/docs/default-source/default-document-library/education-page/msc-go-fish.pdf?sfvrsn=cd19fbdf_22</a></p> <p><b>Activity Two - Trawling and Ocean Biodiversity</b> This recent report entitled ‘Marine unProtected areas’ highlights how bottom trawling is damaging ocean biodiversity. Students could draw out key findings of the report to write a summary blog post / newspaper article. <a href="http://www.mcsuk.org/media/marine-unprotected-areas-summary-report.pdf">www.mcsuk.org/media/marine-unprotected-areas-summary-report.pdf</a></p> <p><b>Activity Three - Summary Videos</b></p>	



This video sums up the ecosystem impacts of fishing and what sustainable means. (Stop at 2.11 as last section is America focused). It could be shown before activity 3 to sum up what has been learnt and to introduce aquaculture.

[www.youtube.com/watch?v=6ps0truARKs](http://www.youtube.com/watch?v=6ps0truARKs)

This video brings together everything learnt in this lesson from overfishing, habitats destruction and management challenges. You could watch this at the end of your lesson and ask students to write a paragraph to summarise all they have learnt.

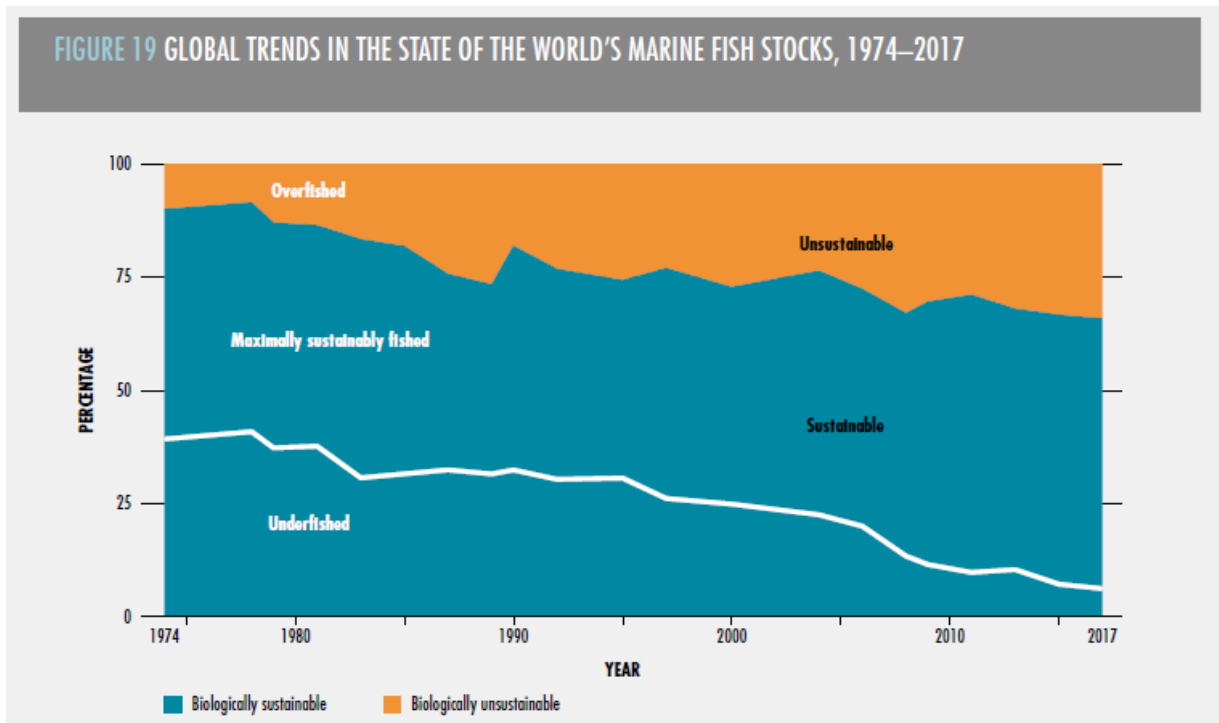
[www.youtube.com/watch?v=WNdR808jMSA&t=52s](http://www.youtube.com/watch?v=WNdR808jMSA&t=52s)



## Ecosystem Impacts of Unsustainable Fishing

### OVERFISHING

FIGURE 19 GLOBAL TRENDS IN THE STATE OF THE WORLD'S MARINE FISH STOCKS, 1974-2017



What was the percentage of unsustainable fishing in 1974?

What was the percentage of unsustainable fishing in 2017?

Describe how the global trend of fish stocks has changed between 1974- 2017?



### **HABITAT DESTRUCTION**

How big can super bottom trawlers be?

How does bottom trawling affect the marine life and plants living on the seabed?

Does this video represent all fishing types? Can you think of an alternative fishing method that would be more sustainable and cause less damage to the habitat?

### **BYCATCH**

What is a target species?

What is bycatch?

Why is bycatch bad for wildlife and unsustainable?





### **FOOD WEB DYNAMICS**

What species were affected by the loss of mussels from the food chain?

How does overfishing change food web dynamics?

Discuss changes to the direct food chain and the wider food web. Consider changes to predator and prey dynamics.



## Aquaculture

Analyse the infographics and complete the table below to show the positives and negatives of aquaculture.

Consider the ecosystem impacts, food supply, climate impact and overall sustainability.

Once you have finished analysing the infographics, add your own knowledge and thoughts on aquaculture to the table.

Positives of aquaculture	Negatives of aquaculture



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gymru'n wales  
daclus tidy

33-35 Heol yr Eglwys Gadeiriol, Caerdydd, CF11 9HB | 33-35 Cathedral Rd, Cardiff, CF11 9HB  
029 2025 6767 keepwalestidy.cymru info@keepwalestidy.cymru

Cadwch Gymru'n Daclus yn gwmni wedi ei gyfyngu trwy warant. Rhif Cwmni: 4011164 Rhif Elusen: 1082058 Rhif TAW: 850 3958 13  
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