



MARINE FOOD WEBS AND OVERFISHING

Teacher resources - Lesson plan



LESSON: MARINE FOOD WEBS AND OVERFISHING



This lesson is suitable for learners aged 10+ in Science – studying food chains and webs, ecosystems and habitats and humans and the environment – and Geography – studying sustainability, energy and resources, or conservation.

In this 30-45 minute lesson, learners can complete a variety of activities in groups or individually to examine examples of how marine food webs work, and can understand the impact that people can have on marine food webs when we choose to eat certain species of fish.

Learning objectives

- Learners make links between our own food choices and the ocean ecosystem
- Learners examine the impact of human interaction with the ocean, including rising fishing levels and declining fish stocks
- Learners understand that organisms in the marine ecosystem are linked through food webs that start with a plant, and that these can be drawn to represent the feeding relationships between them

You will need

- Access to the [Shorthand story - https://dad-fishes-for-the-future.msc.org/](https://dad-fishes-for-the-future.msc.org/) – *How my dad fishes for the future*
- [Go Fish - https://www.msc.org/docs/default-source/default-document-library/education-page/msc-go-fish.pdf?sfvrsn=cd19fbdf_22_game](https://www.msc.org/docs/default-source/default-document-library/education-page/msc-go-fish.pdf?sfvrsn=cd19fbdf_22_game) – printed and prepared for groups of 4-6 learners to work together (it's a good idea to read this beforehand)

- The [Marine food webs and overfishing PowerPoint](#). It's optional, for reference
- Access to the [film - https://www.msc.org/docs/default-source/default-document-library/education-page/3-overfishing.mp4?sfvrsn=51806387_4](https://www.msc.org/docs/default-source/default-document-library/education-page/3-overfishing.mp4?sfvrsn=51806387_4) – *My dad the fisherman* - or film clip – Overfishing

Key questions

- What consequences can our food choices have for the oceans? Why is this?
- What's the relationship between fishing and the marine environment?
- Why are global fish stocks declining?
- What's the impact of overfishing?
- What can be done in response to overfishing?

Key terms

- Species
- Farmed / wild caught fish
- Fish production / stocks
- Food web
- Energy transfer
- Producer / predator / consumer
- Various species of sea creature living in the North Atlantic

Starter (5-10 mins)

- Start by writing the names of some popular seafood on the board and asking learners which one they see most often in their kitchen at home, e.g. cod, salmon, tuna, haddock and prawns.
Which is the most popular in this class?
Does anyone often eat other types of seafood?
Are these species farmed, wild caught or both?
These are the “big five” in the UK - the five species of sea creatures that people like to eat the most there. These five species





together account for around two thirds of all seafood eaten in the UK. (It's different elsewhere, for instance in the USA, the most popular is shrimp (prawns), and in South Africa it's sardines.

Can learners think of the reasons why this might be?

Can they think of any consequences of our choices for our oceans, for fishermen and for us?

Main activity (20-25 mins)

Activity One

Learners work through the second section of the Shorthand, called “*Why are fish stocks declining?*”. Depending on how you set it up, this might be individually, in pairs or as a class. They complete exercise 2, writing their answer as a paragraph, sharing as a class or preparing something on a large piece of paper as a group.

Exercise two: More and less - Answers

Between 1950 and 2016, what happened to global fish production?

- It increased from 19 million tonnes to 92 million tonnes, an increase of 384%. And what has happened to the proportion of global stocks that are overfished, fully fished and underfished? Why do you think this might be?
- The proportion that are overfished increased from 10% to 33%.
- The proportion that are fully fished has increased from 51% to 60%.
- The proportion that are underfished has reduced from 39% to 7%.
Why might this have happened?
- Global demand for fish has increased, due to a growing global population as well as a growing middle class with more disposable income to buy fish. More boats are therefore on the water to meet this demand.

- Fishing methods have become more advanced, meaning that a single fishing boat can catch many more fish now than it could in 1950. This is due to boats having bigger nets (some big enough to swallow a 747 jumbo jet!), bigger engines (allowing them to travel greater distances), and technologies such as sonar which help them to locate larger schools of fish underwater and catch more of them.
- Traditional fisheries management has also prioritised short term economic gains over the long-term sustainability of fish stocks. This is in part because our oceans have long been considered ‘inexhaustible’ supplies of food.

Round up the activity by reinforcing what learners have found out – that there are several reasons why fish stocks have declined but the most significant is the volume of fish that we catch.

What does that mean for our most popular fish species?

What impact could there be on other creatures in the ocean?

Activity Two

Next tell learners that they're going to examine how different species of fish are connected together in a food web where some species eat other species to get their energy, in a process called energy transfer. Start by asking them what they know about food webs, or remind them that food webs start with a producer (usually a plant); consumers eat plants; predators eat consumers. You could show them one or more of the slides from the [Marine food webs and overfishing PowerPoint](#) and ask them to identify producers, consumers and predators in the simple food webs.

Then you have two options. You could play the [String Game](#) as a group. Alternatively, you could cut out the animal names from copies of the printed String Game sheet, and get groups to





work together to arrange some of the species into simple North Atlantic marine food chains or a more complex web. Whichever activity you choose, you could end it by asking learners

What would happen to other species if all the cod were fished?

What would happen to other species if all the herring disappeared?

Plenary (5-10 mins)



Show learners the film clip Overfishing, or play part of the film - https://www.msc.org/docs/default-source/default-document-library/education-page/3-overfishing.mp4?sfvrsn=51806387_4, starting it at 6:26-8:23, to reinforce the learning objectives, and ask learners to explain the links between our some of our favourite fish and the impact we have on the marine environment.

Choosing a sustainable source of our favourite fish, and trying some new species, are two things we could do to help global fish stocks recover. *What else do learners think would improve the situation?*

Extension or homework idea

Now that learners have examined the problem of overfishing, and some of its causes and consequences, they could work together or individually to create a [consequences kelp](#) to illustrate their ideas.

