

What Lives Around the Turbines Food Chains and Food webs – Teacher Notes

AIM:

To introduce simple food chains and food webs using species found around an offshore windfarm development to illustrate key concepts such as energy flows, trophic levels and predator- prey interactions.

LEARNING OBJECTIVES

- Who eats what/whom?
- What is a food chain?
- How is a food web created?
- What are producers, consumers, herbivores, carnivores and omnivores?
- How are all things interconnected?

LEARNING OUTCOMES

After the lesson the class should be able to:

- Identify and use key vocabulary associated with food chains.
- Know the difference between producers, primary consumers (herbivores) and secondary consumers (predators).
- Understand that energy is transferred up the food chain, always beginning with energy from the sun.
- Understand that each organism may eat and be eaten by many others, so food webs become very complex.
- Explain how organisms are linked together in a food web.
- Begin to understand interdependence, and that changing one factor will produce knock-on effects.

CURRICULAR LINKS

- Science
 - Sc 1 Scientific enquiry
 - Sc 2 Life processes and living things
 - Unit 2B Plants and animals in their local environment
 - Unit 4B Habitats
 - Unit 6A Interdependence and adaptation

Suggestions for additional cross curricular work

- DT
 - Create a food chain mobile
 - Create a food chain game with producer & consumer cards
- Literacy
 - Write an imaginary food diary for a consumer that eats a varied diet.
 - Read beach/sea stories/poetry and compile a class word bank.
 - Create individual/class poems about marine food chains.
 - Use books, websites and other resources to gather information.
- Art
 - Draw the organisms involved in a food chain and then create a large class food web made out of all the different chains.

RESOURCES FOR THIS LESSON

- Background information pages
- Lesson plan
- Powerpoint presentation (available late 2008)
- Food chain species printable cards
- Printable worksheets/activity sheet

Lesson Plan

This lesson is designed to compliment the lesson on habitats and adaptation, also based around species found on and around offshore windfarms. It can however also be used on its own. A PowerPoint presentation is provided and can be adapted to suit your teaching style and the time available.

Begin the lesson by introducing the concept of feeding relationships within a habitat. *What does every living thing need to grow?* Write the terms producer and consumer on the board and ask if the children know what they mean. *Can you give examples of a producer and consumer?* Repeat this with the terms herbivore, carnivore and omnivore. *Can you think of examples of animals in each of these groups?* Now introduce the term food chain and point out that all food chains will begin with the sun which gives energy to plants. *Why do plants need sunlight? What else do they need to grow?*

As a class, think of some simple food chains and write these on the board. Next, discuss how most animals eat a very varied diet and so there are many different predator-prey interactions. Ask the children for ideas to construct a very simple food web.

Use the introductory PowerPoint presentation to enhance children's understanding of food chains and to introduce the idea of simple food webs. This will also introduce them to marine food chains and webs. Explain that these plants and animals can all be found in the sea on and around offshore windfarms.

In groups, use the printable species cards to construct simple food chains and food webs using the species found around the wind farm.

When the children have a good understanding of this sort of marine food web, give each child a species card and play the food web game.

Food Web Game 1

Each child has a species card with facts about what this species eats and is eaten by. The children must find something that they can eat before they are eaten! Whilst searching for prey, children should be encouraged to hold their species card out, so that the other children can clearly see what they are. When prey and predator meet, they must link arms/hold hands and not let go, but can still find more food! This should result in a tangle of children!

Now, with the children untangled, ask the children to retain their species card and move on to Food Web Game 2.

Food Web Game 2

One child has the Sun card and stands in the middle of the room with a supply of rope, wool or string. The other children also have one species card each and are spread out around the room. To begin, the 'sun' holds on to the end of the string and passes the ball on to any energy producer (Sea weed, phytoplankton). The wool is then passed onto anything which eats those producers (herbivores) and then onto anything which eats these herbivores (carnivores/secondary consumers). Eventually, all of the children should become connected in a complex food web. Once they are connected begin asking certain species to tug their string and ask anyone who feels the tug to raise their hand.

- Explain that this shows how anything which affects one species in the ocean can have a knock-on effect on many other species.
- Explain how energy travels from the sun through the food web.
- Explain also that although this food web seems complicated, it is in fact extremely simple when compared to food webs in real life, which may contain hundreds of different species.
- Talk about why it is important for many of the creatures in the food web to have several different prey species and what happens when this is not the case (When one type of prey is lost, a predator will switch to a different prey type. If no alternative exists, the predators may be lost).
- Explain how many marine species are opportunistic and will scavenge whatever food they find.
- Discuss with class the ways in which all things are interconnected and interdependent.
- How are humans connected?

For further development of the lesson, ask the children to draw their own food chains based on the Life Around the Turbines online resources and species cards provided. Other activities are also provided within these resources.

Background Information

Introduction

Wind turbines attract a wide variety of marine life and the sea around them is home to many other creatures, many of which are connected by complex food webs. The organisms include examples of producers and primary and secondary consumers. The online resources available on this website make a useful tool to introduce the concept of food webs. The lesson plan and teachers notes provide suggestions for how to introduce these concepts in a fun, hands-on way. The following background information is designed to give you some information about the issues discussed during these lessons.

Food chains and food webs

Plants and animals in a habitat or ecosystem are linked together by their feeding relationships. The sequence of steps within this feeding relationship is called a food chain. Every living thing needs energy to grow, and animals get this energy from their food. A food chain is made up of producers and consumers. Producers get their energy from the sun. On and around offshore windfarms, the primary producers are primarily seaweed and microscopic plants called phytoplankton. Essentially, all life depends on the sun's energy. Plants are called producers because they produce their own food using sunlight, water and nutrients in a process called photosynthesis. Animals are called consumers because they consume (eat) food provided by plants or other animals. Primary consumers eat plants and are called herbivores. Secondary consumers eat other animals and are called carnivores. Animals which eat plants *and* other animals are called omnivores. A predator is an animal which hunts and eats other animals for food (its prey).

Energy from food is transferred up the food chain from producers to consumers. The arrows in a food chain represent the direction of this energy flow. If each plant was only eaten by one herbivore, and that herbivore was eaten by one carnivore, then food chains would be very simple. However most habitats contain many different plants and animals which are interconnected, and so the chains become more complicated and are called food webs. Most animals eat a varied diet, because if they relied on just one food source then they would be vulnerable to hunger or starvation if that source became scarce. An exception is the sea slug *Onchidoris bilamellata*, which only eats acorn barnacles.

Some examples of simple marine food chains:

Phytoplankton – zooplankton – common mussel – common starfish

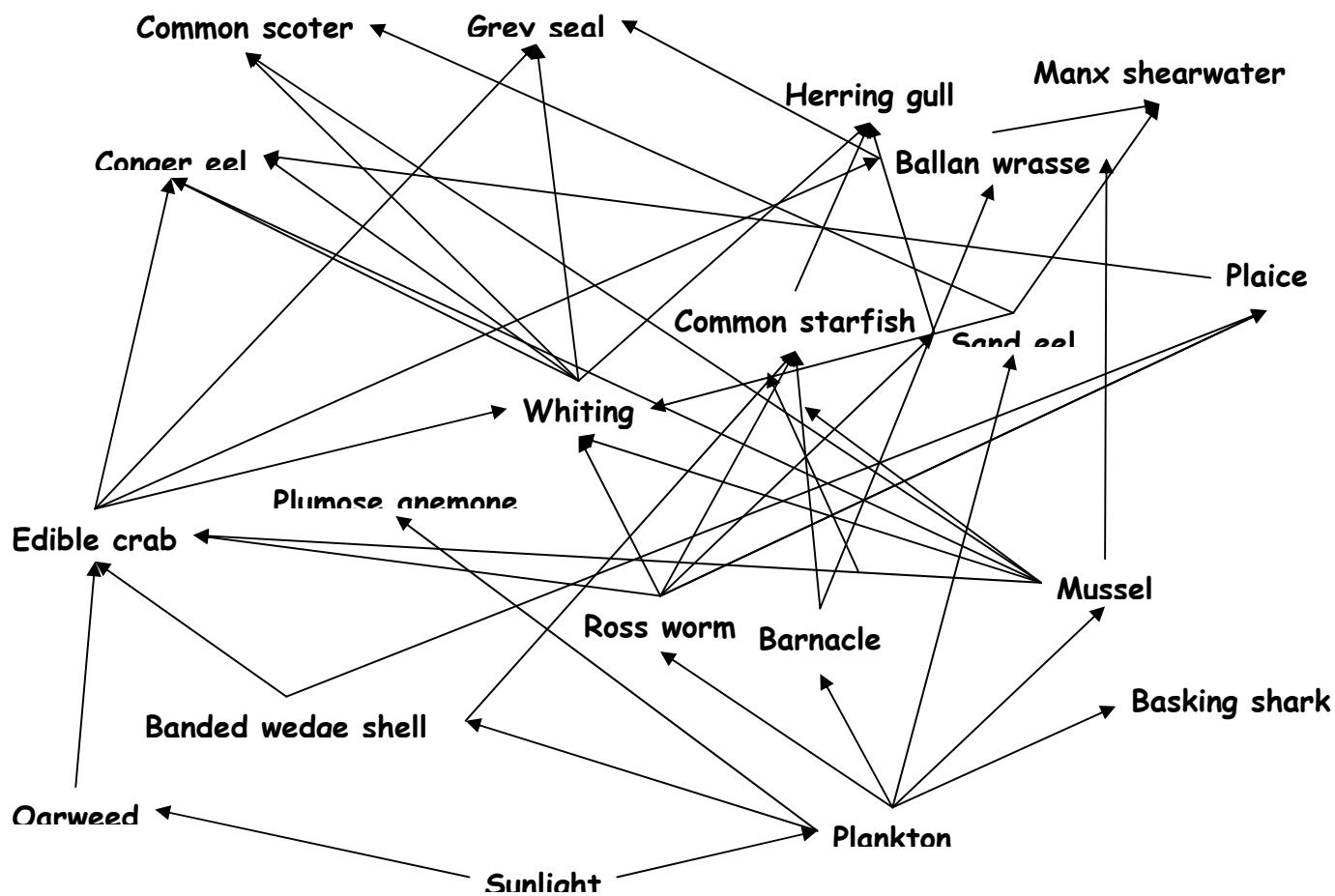
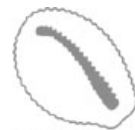
Phytoplankton – zooplankton – sand eel – common guillemot

Seaweed – harbour crab – whiting

Phytoplankton – zooplankton – basking shark

Phytoplankton – zooplankton – barnacle – ballan wrasse – grey seal

Where these species interact to form food webs, the interactions can be extremely complex!



ADDITIONAL USEFUL RESOURCES

SAHFOS education pages: http://www.sahfos.ac.uk/edu_foodchain.htm

Marine Stewardship Council 'fish and kids' activities and teaching resources: <http://www.fishandkids.org/>

BBC science and nature: http://www.bbc.co.uk/nature/blueplanet/infobursts/food_chains_bg.shtml

A variety of resources from the National Marine Aquarium: <http://www.national-aquarium.co.uk/otherOptions.aspx?m=schools>

Marine Conservation Society 'cool schools' pages: <http://www.mcsuk.org/coolseas/schools>

Educational games about life in the oceans: <http://www.bbc.co.uk/nature/blueplanet/games.shtml>