Key Stage 3/4 Lesson 3 – Food Webs in Action

Practical activity – Microplastics in the food web

Introduction

Approximately 20,000 tonnes of litter and waste are dumped into the North Sea every year. Only 15% of that is washed ashore, the rest remains out at sea. Plastic takes hundreds of years to break down. Microplastics are tiny pieces of plastic that come from a variety of sources; they may be produced by larger plastic items breaking down into smaller pieces. Some microplastics are used as exfoliants in beauty products, such as toothpaste, while others may be tiny threads from washing plastic clothing.

Plastics and microplastics can be mistaken by marine organisms for food and eaten. As plastic takes so long to break down, it remains within the animal and is passed up the food web. In this activity, you will work as a group to model how plastic builds up in the food web.

Bioaccumulation = when toxins, such as microplastics, build up in a food chain. The animals at the top of the food chain are affected most severely.

Apparatus

- A bag containing a counter per student
- Labels (enough for one per student)
- Pen

Method

1) You will be given the role of an organism that is a member of a food web. Write the name of the organism you are on a label and stick it on yourself.
2) Collect a bag containing a counter. One counter represents one piece of plastic and the bag represents your stomach.
3) If you are zooplankton, an oyster, a crab, or a sea snail, you are prey animals.

4) If you are small fish, you are a secondary consumer; you can only eat zooplankton, oysters, crabs and sea snails.
5) If you are a large fish, you can only eat small fish.
6) If you are a human, you can only eat large fish.
7) The prey animals walk around the classroom first. The small fish then enter the ecosystem and start to walk around the classroom, followed by the large fish and the human. If you meet your prey, you 'eat' the animal by touching them on the back. Take their counter(s) and put them in your bag. The eaten prey returns to their seat.
8) The game is over when there is no food left for the organisms still in play.

Questions

- Who had the most plastic in their stomach at the end of the game?
- How does plastic enter and make its way up the food chain? Work with a partner to discuss how plastics enter the food web and accumulate.
- What effect does plastic in an animals' stomach have on them? Can animals with a large amount of plastic in their stomachs survive and have healthy offspring?
- What happens if no healthy offspring are born?