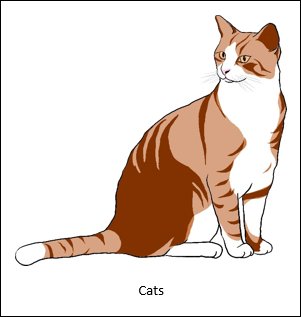
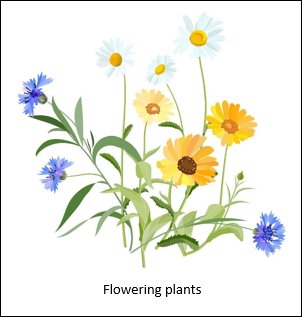
**Build a food chain**



**To talk about in your group**

1. How would you arrange the organism cards and the arrow cards to make a food chain?
2. Can you explain why you arranged them in that order?
3. Which organisms would you label as producers and which as consumers?
4. Which organisms would you label as prey and which as predators?
5. Can you explain why you labelled them that way?

*Biology> Big idea BOE: Organisms and their environments > Topic BOE1: Interdependence of organisms > Key concept BOE1.1: Food chains and food webs*

|  |
| --- |
| **Response activity** |
| **Build a food chain** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Feeding relationships within a community of organisms can be modelled using food chain and food web diagrams. |
| Observable learning outcomes: | Explain the order of organisms in a given food chain, using ideas about producers, consumers, predators and prey.  Explain that the arrows in a food chain diagram represent transfers of biomass from producer to consumer, or from prey to predator. |
| Activity type: | Modelling, discussion |
| Key words: | food chain, producer, consumer, predator, prey |

This activity can help to increase engagement and develop students’ understanding of food chains and food webs through model-making and small group discussion. It can be used in response to the following diagnostic questions:

* Diagnostic question: Food chain (1)
* Diagnostic question: Food chain (2)
* Diagnostic question: Bottom of the food chain
* Diagnostic question: Links in the chain
* Diagnostic question: What do the arrows mean?

|  |  |
| --- | --- |
| **P** | **PRIOR UNDERSTANDING**  This activity explores ideas that are usually taught at age 5-11, to aid transition from earlier stages of learning. |

**What does the research say?**

In a multinational study of students aged 16-18 (Barman, Griffiths and Okebukola, 1995), the majority of students described a food chain as showing ‘what eats what’ (i.e. feeding relationships); however, only approximately 10% of students used the terms ‘producer’ and ‘consumer’ when asked to explain what is shown by a food chain.

Leach et al. (1992) found that just under half of students aged 5-16 could select pictures of organisms to construct a food chain containing a producer and primary and secondary consumers. Many of the students used teleological reasoning to explain feeding relationships, i.e. that producers of prey existed in order to feed consumers or predators.

In another study of 506 children aged 9-10 years old, it was found that many of the children used their perceptions of an organism’s relative size and ferocity when making conclusions about predator-prey relationships, and when deciding which animals were likely to be herbivores and which were likely to be carnivores (Gallegos, Jerezano and Flores, 1994). It was found that some children did not consider a plant to be a producer, but placed it correctly at the beginning of a food chain because it was the smallest, could not defend itself, and could not eat an animal.

Confusion about the direction and meaning of the arrows in a food chain is a commonly reported misunderstanding (Gallegos et al., 1994; Gotwals and Songer, 2010), and suggests that students interpret the arrow to mean “eats” (Allen, 2014). Most of the students in the study by Barman et al. (1995) placed the arrows the wrong way around (e.g. from predator to prey) when asked to assemble a food chain using pre-printed cards, yet when presented with a correct depiction of a food web they did not question the direction of the arrows even though in most cases they contradicted the students’ own constructions.

It has been suggested that children find it easier to correctly identify predator and prey arrangements within food chains when the species are familiar, and particularly when the names are accompanied by pictures (Schollum, 1983).

A number of authors have suggested using model-making (e.g. Grumbine, 2012) to increase engagement and help develop students’ understanding of food chains and food webs.

**Ways to use this activity**

Students should complete this activity in pairs or small groups. The focus of the activity should be on group discussion to decide where the organisms should be placed and labelled, and how they should be linked with arrows, to build a food chain. It is through the discussions that students can check their understanding and develop their explanations. Listening in to the conversations of each group will often give you insights into how your students are thinking.

The quality of the discussions can be improved with a careful selection of groups; or by allocating specific roles to students in the each group. For example, you may choose to select a student with strong prior knowledge as a scribe, and forbid them from contributing any of their own answers. They may question the others and only write down what they have been told. This strategy encourages contributions from more members of each group.

After their discussions, each group should be prepared to report the key points of their discussion to another group, or to the class.

*Differentiation*

The groups could be provided with organism and arrow cards, printed and cut out from the last page of this document. The organisms could be substituted with one that will be more familiar to your students. For a more challenging activity, students could be asked to collate or draw their own organisms to construct a food chain or food web.

**Equipment**

For each pair/group:

* arrow cards, printed and cut out from the last page of this document
* label cards, printed and cut out from the last page of this document
* organisms cards, printed and cut out from the last page of this document (unless students are making their own)

**Expected answers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | → |  | → |  | → |  |
| Flowering plants |  | Bees |  | Insect-eating birds |  | Cats |
|  |  |  |  |  |  |  |
| Producers |  | Primary consumers |  | Secondary consumers |  | Tertiary consumers |
|  |  |  |  |  |  |  |
|  |  | Prey |  | Prey |  | Top predators |
|  |  |  |  |  |  |  |
|  |  |  |  | Predators |  |  |

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**Print and cut out cards for card-sort activity**

*Organism cards*

✁

|  |  |
| --- | --- |
|  |  |
| Flowering plants | Bees |
|  |  |
| Insect-eating birds | Cats |

*Arrow cards*

✁

|  |  |
| --- | --- |
|  |  |
|  |  |

*Label cards*

✁

|  |  |
| --- | --- |
| prey | prey |
| prey | prey |
| predators | predators |
| predators | predators |
| top predators | top predators |
| top predators | top predators |
| producers | producers |
| producers | producers |
| primary consumers | primary consumers |
| primary consumers | primary consumers |
| secondary consumers | secondary consumers |
| secondary consumers | secondary consumers |
| tertiary consumers | tertiary consumers |
| tertiary consumers | tertiary consumers |