**Ecosystem connections role play**

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|  |  |  |  |
| flowering plants  and crops | bees | blackbirds | owls |

|  |  |  |
| --- | --- | --- |
|  |  |  |
| pigs | humans | decomposers |

The pictures show some different organisms.

You are going to role play as the organisms and map out how they depend on each other.

**To do**

1. Take an organism label and attached it to yourself.
2. If you’re a **consumer**, it’s time to feed! Pick up a string and give the other end of the string to the organism you eat.
3. If you’re a **pollinator**, pick up some strings and give the other ends to the organisms that depend on your ability to pollinate flowering plants and crops.
4. If you’re a **decomposer**, pick up some strings and give the other end to the organisms that depend on your ability to break down dead organisms and make essential elements available for reuse.
5. Your teacher will now describe a change to one of the populations in the food web. What effects will this change have on you, and the rest of the community?

*Biology> Big idea BOE: Organisms and their environments > Topic BOE1: Interdependence of organisms > Key concept BOE1.2: Interdependence within ecosystems*

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| **Response activity** |
| **Ecosystem connections role play** |

**Overview**

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| Learning focus: | An ecosystem is made up of interdependent populations of organisms interacting with each other and the environment in which they live. |
| Observable learning outcome: | Use a food web diagram to predict and explain effects that a change in the size of a population could have on other populations in the same community. |
| Activity type: | Role play |
| Key words: | ecosystem, interdependence, community |

This activity can help to increase student engagement and help develop their understanding of the interdependence of organisms beyond direct predator-prey relationships. It can be used in response to the following diagnostic question:

* Diagnostic question: The bees are disappearing

**What does the research say?**

It is important for students to appreciate that the interdependence (or “connectedness”) of organisms within an ecosystem arises from more than just feeding relationships (Driver et al., 1994; Allen, 2014).

All of the organisms in a food chain can depend upon animals that pollinate plants and disperse their seeds, and human food security is critically dependent upon animals that perform these services for food crops (Díaz et al., 2006). Pollinator populations are in decline, at least in part due to human activities that result in habitat loss, bioaccumulation of substances such as insecticides, and climate change (Potts et al., 2010), and learning about the important roles of pollinators in school can help to increase students’ engagement with biodiversity loss and conservation (Schönfelder and Bogner, 2017).

In addition, all living organisms depend upon decomposers that can break down dead organic matter and make essential elements available for reuse. Research has found that school children generally do not appreciate the important roles of microorganisms in decomposition and the recycling of carbon, nitrogen and other elements, with many associating microorganisms only with disease and associating decay only with rotting food (Brinkman and Boschhuizen, 1989; Leach et al., 1992).

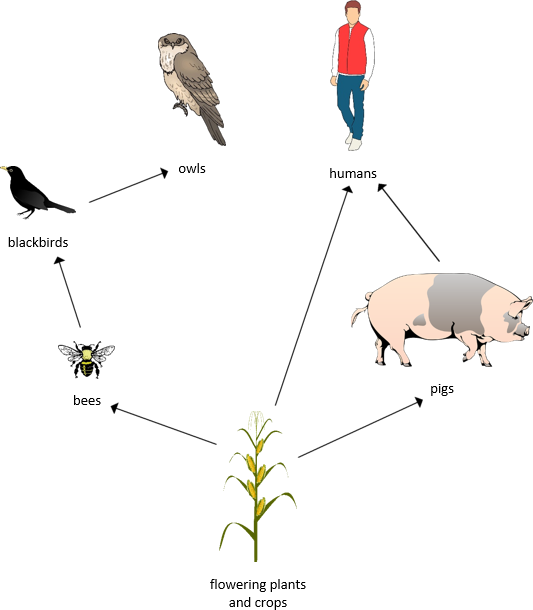
A number of authors have suggested using interactive activities to increase engagement and help develop students’ understanding of the interdependence, including role play (e.g. Ford and Smith, 1994).

**Ways to use this activity**

In this whole-class activity, students role play as the populations of organisms in a community. The model of interdependence they create is used to investigate who a change in the size of one population affects other populations throughout the community.

**This role play activity is an extension of ‘*Food web role play*’, which is provided as part of key concept BOE1.1 *Food chains and food webs*. It starts in a very similar manner, and is extended by adding additional connections between organisms to represent dependence upon pollinators and decomposer (ideally using different coloured strings).**

The organisms depicted on the student worksheet can be used for this exercise, or can be swapped for other organisms that may be more familiar to the students – ideally from a local ecosystem. If the organisms from the student worksheet are used, the suggested food web is:



Procedure

1. Give organism labels to students so that there is at least one student representing each population in the community.
2. Give each student representing a **consumer** one or more strings (depending on how many different organisms they eat), and tell them to give them the other end of the string(s) to the organism(s) they eat.
3. Give a string to each student representing an organism that depends upon the ability of pollinators to pollinate flowering plants and crops (this is likely to be all of the organisms in the community). Then give the other ends of these strings to the **pollinator** population(s) (e.g. bees).

*Ideally, these strings should be a different colour to the strings used to join consumers to the organisms they eat.*

1. Give a string to each student representing an organism that depends upon the ability of decomposers to breakdown dead organic matter and make essential elements available for reuse (this is likely to be all of the organisms in the community). Then give the other ends of these strings to the **decomposer** population.

*Again, ideally these strings should be a different colour. Students will notice that the organisms in the community are now highly connected and interdependent!*

1. You could now describe a change to one of the populations in the community. For example: a population has been wiped out by a disease, or over-hunting, or destruction of their habitat; or a population has increased in size due to a warm spring. If a population decreases in size, some or all of the students representing that population should sit down and drop their ends of the string; the student holding the other end of a dropped string should also drop it and sit down.
2. Ask students to role play how the effects of a change in the size of one population spread through the community to change the sizes of other populations.

**Equipment**

For the class:

* organism labels (e.g. sticky notes, lanyards, clip-on name cards, badges, etc.)
* lengths of string, ideally in three different colours

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