**Food chain Jenga!**



Jenga can be used as a model of a food chain.

The different blocks represent the organisms in the food chain.

* The blocks at the bottom are the producers.
* The blocks on top of the producers are layers of consumers.

**To talk about in your group**

1. What happens to the Jenga tower when the number of ‘producer’ blocks decreases?
2. What would happen in a real food chain if the number of producers decreased? And can you explain why this would happen?
3. What happens to the Jenga tower when the number of ‘consumer’ blocks increases?
4. What would happen in a real food chain if the number of consumers increased? And can you explain why this would happen?

*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** |
| **Food chain Jenga!** |

**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: | Recall that the community of organisms in an ecosystem depends on producers to make food. |
| Activity type: | Modelling, discussion |
| Key words: | producer, consumer, food chain, interdependence |

This activity can help develop students’ understanding by addressing the sticking-points revealed by the following diagnostic questions:

* Diagnostic question: Phytoplankton
* Diagnostic question: Producers and consumers

**What does the research say?**

There is some evidence that even when students are aware of feeding relationships between organisms, they fail to appreciate that these are an example of the interdependence (or “connectedness”) of organisms (Driver et al., 1994).

In a study of students aged from 13 up to undergraduate level, most biology students knew that animals could not exist without plants, but only one quarter of these students could explain that this is because animals cannot make their own food and some thought that carnivores could exist seemingly indefinitely without plants by feeding on their prey (Eisen and Stavy, 1988).

A number of authors have suggested using games (e.g. Biffi et al., 2016; Hartweg et al., 2017) to increase engagement and help develop students’ understanding of interdependence within food chains.

**Ways to use this activity**

In this activity, a Jenga tower (or similar) is used as a model of a food chain. The different bricks represent the organisms in the food chain; the bricks at the bottom are the producers, and the bricks on top of the producers are layers of consumers.

One Jenga tower could be set up for demonstration to the class, so that everybody can watch together, or students could work in small groups with a tower each.

Ideally, use a Jenga set that has coloured block. Green bricks can be used to represent producers at the bottom of the food chain, and then different coloured bricks placed on top to build up trophic levels of primary, secondary and tertiary consumers. Optionally, or alternatively, the blocks could be labelled with the names “producer”, “primary consumer”, “secondary consumer” and “tertiary consumer” or “top predator”, or with the names of organisms with which the students will be familiar.

Usefully, a second Jenga set or spare blocks should also be available, so that the numbers of organisms in various trophic levels can be increased by adding blocks.

With the tower set up, tell the students that there has been a change in the ecosystem that causes the number of producers to decrease – e.g. a new disease. Begin to remove ‘producer’ blocks from the tower. It should become unstable, as the number of producers becomes too few to support the number of consumers. Eventually the tower/food chain will collapse.

Reset the tower, and this time tell the students that there has been a change in the ecosystem that causes the number of consumers in one of the upper trophic levels to increase. Add ‘consumer’ blocks to the tower. Then begin to remove ‘producer’ blocks from the tower, as the increase in consumers will mean more producers are being eaten (or that they are being eaten more quickly than they can be replaced by reproduction). Again, the tower should become unstable, as the number of producers becomes too few to support the number of consumers. Eventually the tower/food chain will collapse.

**Equipment**

For demonstration to the class:

* a Jenga set (or similar) ideally with coloured blocks
* spare blocks or a second Jenga set (or similar) to match the first (optional)
* labels for the blocks (e.g. “producer”, “primary consumer”, “secondary consumer”, and “tertiary consumer” or “top predator”) (optional)

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Developed by Alistair Moore (UYSEG), from an idea described by Biffi et al. (2016), Hartweg et al. (2017) and others.

Images: pixabay.com/thekurupi (4027764)

**References**

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