**What makes up an ecosystem?**



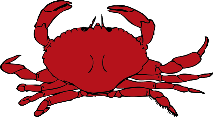
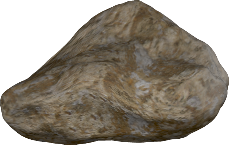














Look at the picture and the cards you’ve been given.

The cards show the things from the picture.

**To talk about in your group**

1. Which cards would you put under the heading “Things that make up the ecosystem”?
2. Which cards would you put under the headings “Biotic” and “Abiotic”?
3. Which cards would you put under the heading “Community”?
4. Which cards would you put under the heading “Population”?
5. How did you decide which cards to put under each heading?

*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** |
| **What makes up an ecosystem?** |

**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 an ecosystem is made up of a community of organisms interacting with the environment in which they live. |
| Activity type: | Discussion |
| Key words: | population, community, ecosystem |

This activity can help develop students’ understanding of the meaning of the term ecosystem through small group discussion. It can be used in response to the following diagnostic question:

* Diagnostic question: Ecosystem words

**What does the research say?**

Many researchers have recognised the difficulties that school children have in reaching this kind of understanding, which seems to be due to misunderstandings of key ideas including how the biotic and abiotic components of ecosystems are organised, that they interact, that they are interdependent/connected, that ecosystems exist in a state of balance, and that this balance can be perturbed by changes over time (e.g. Grotzer and Bell Basca, 2003; Sander, Jelemenska and Kattmann, 2006).

Research into how children’s thinking about the relationships between themselves, other organisms and ecosystems develops from age 5 to age 16 found that up to age 11 children are more likely to think about individual organisms than populations (Leach et al., 1992). Students at age 11 are likely to be more familiar with the everyday, rather than the ecological, use of terms such as ‘population’, ‘community’ and ‘environment’ (Driver et al., 1994). In one study, a quarter of children in a sample of secondary school students thought that a ‘community’ could only be formed by people living together, and another quarter could not distinguish between ‘population’ and ‘community’ (Adeniyi, 1985).

Researchers have used ‘word association tests’ to probe students’ understanding of ecological concepts, in which students must associate short definitions with key words (Yücel and Özkan, 2015).

**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 which cards to choose in response to the questions on the worksheet or presentation.

Note: in the Word and PowerPoint versions of this activity, all of the organisms and some of the other elements of the picture can be selected separately from the landscape background; this means that they can be moved, deleted or replaced as desired.

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.

**Equipment**

For each pair/group:

* cards, printed and cut out from the last page of this document

**Expected answers**

1. Things that make up the ecosystem: all cards should be included, as all are biotic and abiotic components of the ecosystem.
2. Biotic: all the living organisms (octopus, clownfish, starfishes, seaweed, grass, crab).

Abiotic: all the non-living components (water, sand, shells, rock, bubbles of gas, litter).

1. Community: all the living organisms (octopus, clownfish, starfishes, seaweed, grass, crab).
2. Population: a group of organisms of the same type (e.g. clownfish, or starfishes).

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**References**

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

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| --- | --- | --- |
|  |  |  |
| Octopus | Clownfish | Starfishes |
|  |  |  |
| Seaweed | Shells | Crab |
|  |  |  |
| Litter | Rock | Water |
|  |  |  |
| Grass | Bubbles of gas | Sand |
| **Things that make up the ecosystem** | **Biotic** | **Abiotic** |
| **Community** | **Population** |  |