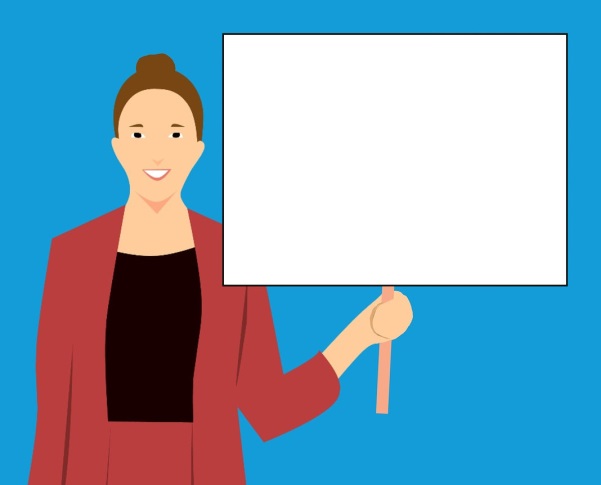
**Starter for ten**



**10**

Write down the first ten words that come to mind when you think of **ecosystems.**

|  |  |
| --- | --- |
|  | **Word** |
| **1** |  |
| **2** |  |
| **3** |  |
| **4** |  |
| **5** |  |
| **6** |  |
| **7** |  |
| **8** |  |
| **9** |  |
| **10** |  |

*Biology > Big idea BOE: Organisms and their environments > Topic BOE2: Organisms in their environments > Key concept BOE2.1: Ecosystem components and dynamics*

|  |
| --- |
| **Diagnostic question** |
| **Starter for ten** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | The environmental conditions in different ecosystems, and in different parts of an ecosystem, affect and are affected by the organisms that live there. |
| Observable learning outcome: | Identify abiotic and biotic components of an ecosystem. |
| Question type: | Word association |
| Key words: | ecosystem |

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

**What does the research say?**

Research suggests that students lack awareness and understanding of the interactions between the living (biotic) and non-living (abiotic) components of ecosystems. Work conducted by Adeniyi (1985) found some students aged 13-15 years old believed there was no interaction between living and non-living things in an ecosystem. Brehm et al. (1986) found that even some college students perceived that ecosystems consisted only of living things, and Prokop’s (2007) work with students aged 11-12 found that whilst students perceived living things as major components in ecosystems, they considered the abiotic components to be less essential than living things.

Word association tests have been used by researchers to identify misunderstandings about basic ecological concepts. Yucel and Ozkan (2015) using this technique found that students aged 12-14 when presented with the word ‘environment’ failed to mention non-living things other than air. Analysis showed that some of the words used by students, including ‘ecosystem’ and ‘biodiversity’, were being used because they were familiar from everyday life but without understanding of their scientific meanings. Zak and Munson (2008) used concept maps to determine elementary preservice teachers’ understanding of ecology; they discovered that concepts such as abiotic and biotic were frequently not used, suggesting that unfamiliarity and failure to use these terms is not unique to young students.

**Ways to use this question**

Students should complete the question individually. This could be a pencil and paper exercise, or you could use the presentation with an electronic voting system or mini white boards.

*Differentiation*

You may choose to read the question to the class, so that everyone can focus on the science. In some situations it may be more appropriate for a teaching assistant to read for one or two students.

**Expected answers**

There are no expected answers for this activity. The answers given by the students are likely to be different and in a different order. It is this information that will prove useful in determining the extent to the individual understanding of the term ecosystem.

It will be useful to analyse each individual students’ responses, but also the class as a whole. Make a list of the words used by most of the class, which words appear at the top of the list and any words that have been used incorrectly, as these will reveal misunderstandings.

Word association tests reveal relationships between concepts. Shavelson (1974) suggests that there are 4 features that may prove useful when evaluating such tests.

1. The number of responses
2. The kind of responses
3. The order of the responses
4. If used with other key concepts consideration to any overlapping response.

It will be useful to analyse each individual students’ responses, but also the class as a whole. The number of responses generated by the student can be an indication as to how well the concept is understood. Make a list of the words used by most of the class, which words appear at the top of the list and any words that have been used incorrectly, as these will reveal misunderstandings.

It will interesting to see if your students use the words biotic and abiotic as the research suggests that these are words that students of all ages fail to associate with the term ecosystem, yet could be argued that they are the most important terms in understanding the environment of the ecosystem and interactions within it.

**How to respond - what next?**

There is likely to be a range of answers, you may choose to respond through structured class discussion. Ask one student to explain why they gave the particular words; ask another student to explain why those words should be used when discussing ecosystems. This sort of discussion gives students the opportunity to explore their thinking and for you to really understand their learning needs. Responses often work best when the activities involve paired or small group discussions, which encourage social construction of new ideas (meaning making) through dialogue.

If students have misunderstandings about biotic and abiotic components of ecosystems the following BEST ‘response activity’ could be used in follow-up to this diagnostic question:

* Response activity: Biotic or abiotic?

**Acknowledgments**

Developed by Elizabeth Lupton (UYSEG), from an idea by Yucel and Ozkan (2015).

Images: pixabay.com/mohamed\_hassan (3231387)

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