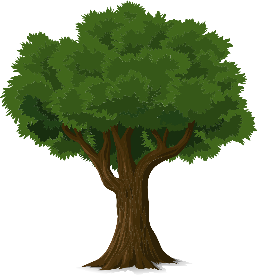
**Animal or plant?**



1. What type of organism does each word describe?

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **A** | | | **B** | | | **C** | | | **D** | | |
|  | It is an **animal** | | | It is a  **plant** | | | It is  **something else** | | | I can’t decide | | |
| cow |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| flower |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| grass |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| human |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| invertebrate |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| jellyfish |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| mammal |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| seed |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| tree |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| vegetable |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| vertebrate |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| weed |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| whale |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| worm |  |  |  |  |  |  |  |  |  |  |  |  |

1. What feature or features do all the **animals** have in common?
2. What feature or features do all the **plants** have in common?

*Biology> Big idea BVE: Variation, adaptation and evolution > Topic BVE2: Classification > Key concept BVE2.1: Identifying and classifying organisms*

|  |
| --- |
| **Diagnostic question** |
| **Animal or plant?** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Organisms can be identified and classified into hierarchical groups based on their characteristics at the macroscopic and cellular levels. |
| Observable learning outcome: | Recognise that organisms can be classified into groups according to similarities and differences at the cellular level. |
| Question type: | Simple multiple choice, classifying/sorting |
| Key words: | classification |

**What does the research say?**

‘Animal’ and ‘plant’ are familiar concepts from everyday life, yet research suggests many school-age students struggle to define and apply the terms according to the accepted scientific definitions (Driver et al., 1994).

For example, studies have found that when students were asked to give examples of animals they most often restricted their suggestions to creatures that live on land, usually with four legs, and often mammals with fur (Bell, 1981; Trowbridge and Mintzes, 1985; Patrick and Tunnicliffe, 2011). These very restrictive criteria would exclude many familiar organisms from the animal kingdom, including vertebrates such as birds and fish, and invertebrates such as worms, arachnids and insects.

Notably, many students also did not recognise humans as animals, perhaps because in everyday language people are often regarded separately from wild and domesticated animals. Some cultural and religious worldviews also regard non-human animals as being less than human, uncivilised and bestial – and therefore implicitly separate (Allen, 2014).

Classic studies by Bell (1981) and Leach et al. (1992) found that school-age students also place restrictive criteria on their definitions of ‘plant’, including only organisms that have leaves, have roots, are green, and grow in the ground (or pots). Evidence suggested that some of the students regarded ‘plants’, ‘trees’, ‘flowers’, ‘weeds’, ‘vegetables’ and ‘seeds’ to be mutually exclusive categories.

Leach et al. (1992) reported that students of all ages were more likely to rely upon macroscopic, external characteristics visible to the unaided eye to classify organisms, and less likely to consider internal physiological or cellular characteristics.

**Ways to use this question**

Students should complete the questions individually. This could be done as a pencil and paper exercise. Alternatively, you could use the presentation with an electronic voting system or mini white boards for question 1 and take verbal feedback from students for question 2.

*Differentiation*

You may choose to read the questions 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**

*Question 1*

Animals: cow, human, invertebrate, jellyfish, mammal, vertebrate, whale, worm

Plants: flower, grass, seed, tree, vegetable, weed

*Questions 2 & 3*

The most able students will use cellular features to distinguish between animals and plants; i.e. that plant cells have cell walls and chloroplasts (or can make their own food), while animal cells lack these features (and cannot make their own food).

Common misunderstandings used to classify organisms include: that all animals live on land, have four legs and fur; that humans are special and not animals; that all plants are green, have leaves and roots, and grow in the ground (or on land); and that trees, flowers, weeds, vegetables and seeds are separate categories from ‘plants’.

**How to respond - what next?**

If there is a range of answers, you may choose to respond through structured class discussion. Ask one student to explain why they gave the answer they did; ask another student to explain why they agree with them; ask another to explain why they disagree, and so on. 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 the use of cellular features (rather than macroscopic or external features) to classify organisms as plant or animal, the following BEST ‘response activity’ could be used to help build understanding though small group discussion. It could be used in follow-up to this diagnostic question:

* Response activity: The blob!

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Images: cow – pixabay.com/TAPIRUS (1992098); tree – pixabay.com/OpenClipart-Vectors (576847)

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