**The blob!**

Scientists have discovered a new organism.

It looks like a green blob!

The scientists want to classify the organism.

**To work on in your group**

* Look at the features in the table below.
* Talk about which features help you to classify the organism as an animal or a plant.
* Decide which box to tick for each feature.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature** | | The feature… | | |
| …suggests it is an **animal** | …suggests it is a  **plant** | …does not help you to decide |
| **1** | It is green. |  |  |  |
| **2** | It does **not** have roots. |  |  |  |
| **3** | It does **not** have fur. |  |  |  |
| **4** | It does **not** have legs. |  |  |  |
| **5** | It is soft and squidgy. |  |  |  |
| **6** | Its cells have a cell wall. |  |  |  |
| **7** | Its cells can make their own food. |  |  |  |
| **8** | Its cells contain chloroplasts. |  |  |  |

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

|  |
| --- |
| **Response activity** |
| **The blob!** |

**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. |
| Activity type: | Discussion, classifying/sorting |
| Key words: | classification |

This activity can help develop students’ understanding of the use of cellular features (rather than macroscopic or external features) to classify organisms as plant or animal, though small group discussion. It can be used in response to the following diagnostic question:

* Diagnostic question: Animal or plant?

**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 this activity in pairs or small groups. The focus of the activity should be on group discussion to decide which box to tick for each feature.

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 pairs; or by allocating specific roles to students in each pair.

After their discussions, each pair should be prepared to report the key points of their discussion to another pair, or to the class.

*Differentiation*

The quality of the group discussions can be improved with a careful selection of groups; or by allocating specific roles to students in 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.

**Expected answers**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Feature** | | The feature… | | | Note |
| …suggests it is an **animal** | …suggests it is a  **plant** | …does not help you to decide |
| **1** | It is green. |  |  | ✓ | 1 |
| **2** | It does **not** have roots. |  |  | ✓ | 2 |
| **3** | It does **not** have fur. |  |  | ✓ | 3 |
| **4** | It does **not** have legs. |  |  | ✓ | 4 |
| **5** | It is soft and squidgy. |  |  | ✓ |
| **6** | Its cells have a cell wall. |  | ✓ |  | 5 |
| **7** | Its cells can make their own food. |  | ✓ |  |
| **8** | The cell contains chloroplasts. |  | ✓ |  |  |

Students should get the idea that, often, macroscopic or external features do not provide enough evidence for correct classification, and organisms can be more accurately classified using cellular features. More able students could be introduced to the idea that the information stored in the genome of cells provides evidence that can be used to classify organisms even more accurately.

Notes:

1. Students must not assume that green = plant. Not all plants are green (e.g. some trees have red or purple leaves all year round), and some animals are green (e.g. frogs).
2. Students must not assume that roots = plant, and no roots = animal. Some plants (e.g. green algae) do not have roots.
3. Students must not assume that lack of fur means it’s not an animal. Most animals do not have fur (only one animal group – the mammals – has fur).
4. Students must not assume that lack of legs and being soft/squidgy means it’s not an animal. Invertebrates such as jellyfish, molluscs and worms do not have legs and are soft and squidgy.
5. At this level, features 6 and 7 should suggest to the students that the organism is a plant. However the answer “does not help you to decide” is also acceptable, as cell walls are present in fungi and prokaryotes (e.g. bacteria) as well as plants, and many prokaryotes can make their own food (though they do not contain chloroplasts).

**Acknowledgments**

Developed by Alistair Moore (UYSEG).

Images: adapted by UYSEG from pixabay.com/OpenClipart-Vectors (2029727)

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