**Classifying into groups**





You have been given pictures of lots of organisms.

You are going to work in pairs to sort the organisms into groups.

**To talk about in your pair**

1. How many groups can you sort the organisms into?
2. What is the rule you will use to sort organisms into each group?
3. Can you give each group a name or title?

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

|  |
| --- |
| **Response activity** |
| **Classifying into groups** |

**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: | Classify organisms into groups according to similarities and differences in their features. |
| Activity type: | Discussion, classifying/sorting |
| Key words: | classification |

This activity can help develop students’ understanding of how biologists classify organisms into groups according to common physical features. It can be used to build understanding through small group discussion in response to the following diagnostic question:

* Diagnostic question: Seaside sorting

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

**What does the research say?**

Leach et al. (1992) found that students aged 7 could assign organisms into groups of their own choosing, but the groups were usually mutually exclusive (such that, for example, “birds” and “animals” would be separate groups) and children struggled to cope with more than two groups at a time. By age 13 most students could work with a group included within another group (e.g. “birds” as a sub-group of “animals”) when prompted, and by age 16 most students used hierarchical groups spontaneously.

Research suggests that students sometimes incorrectly use an organism’s habitat to classify it rather than its physical features; this could lead to misunderstandings and misclassifications such as that penguins and turtles are amphibians rather than birds and reptiles, respectively (Allen, 2014).

Many students do 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; Trowbridge and Mintzes, 1985).

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.

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.

It has been suggested that learning about classification should be coupled with experience of a wide range of living organisms, including in local habitats (Ingram, 2011).

**Ways to use this activity**

Students should complete this activity in pairs. The focus of the activity should be on group discussion to decide how many groups to sort the organisms into, what rule/criterion/feature to use to sort organisms into each group, and what to call each group.

The student pairs should be allowed to approach the sorting/grouping task unprompted – the aim of the activity is to see what kinds of groups they come up with – spontaneously – and whether these are hierarchical (groups within groups) or mutually exclusive groups.

The pairs could be provided with organism cards printed and cut out from the end of this document. These comprise a range of wild and domesticated animals (including humans, other vertebrates, and invertebrates of various types), plants (including a tree, an ornamental flower, a ‘weed’ and a vegetable) and a fungus. Alternatively, the organisms could be substituted with ones that will be more familiar to your students – ideally linked to a visit to a local habitat.

It is through the discussions that students can check their understanding and develop their explanations. Listening in to the conversations of each pair 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.

**Equipment**

For each pair:

* organism cards, printed and cut out from the end of this document (unless substituted for cards or photographs of your own)
* string loops, elastic bands, boxes, paper and pens, or other apparatus that will enable students to indicate boundaries between grouped cards

**Expected answers**

There are no set ‘right’ answers to this activity. The aim of the activity is to see what kinds of groups the students come up with spontaneously without prompting.

Considering the following questions in regard to students’ groupings will provide evidence of learning and common misunderstandings:

* Are the students able to work with more than two groups?
* Are any groups incorrectly mutually exclusive (e.g. “plants” and “trees” as separate groups)?
* Have the students used any hierarchical groups (e.g. “birds” as a sub-group within “animals”)?
* Have the groups been given names or descriptions?
* Can the students explain the rule, criterion or physical feature that they used to group organisms together?
* Have any groupings been made based on names or habitats, rather than physical features?
* Have any organisms been placed in incorrect groups (e.g. centipedes in a group labelled “insects”)?

**Acknowledgments**

Developed by Alistair Moore (UYSEG).

Images: butterfly – Alistair Moore; centipede – pixabay.com/mildcracked (1672189); chaffinch – pixabay.com/Oldiefan (2047097); cow – pixabay.com/wernerdetjen (234835); dandelion – pixabay.com/Elsemargriet (4051105); earthworm – pixabay.com/Natfot (686593); frog – pixabay.com/Couleur (1505377); grass – pixabay.com/geralt (253616); horse chestnut tree – pixabay.com/MabelAmber (3689820); human – pixabay.com/niklback\_ (3093158); mushroom – pixabay.com/Capri23auto (2701682); pea plant – pixabay.com/ruslanababenko (2469465); rose bush – pixabay.com/Arcaion (2386058); spider – pixabay.com/krzysztofniewolny (3991538)

**References**

Allen, M. (2014). *Misconceptions in Primary Science, 2nd* ednBerkshire, UK: Open University Press.

Bell, B. F. (1981). When is an animal, not an animal? *Journal of Biological Education,* 15(3)**,** 213-218.

Ingram, N. (2011). Classification, variation, adaptation and evolution. In Reiss, M. (ed.) *Teaching Secondary Biology.* 2nd ed. London, UK: Hodder Education.

Leach, J., et al. (1992). Progression in conceptual understanding of ecological concepts by pupils aged 5-16. University of Leeds, UK: Centre for Studies in Science and Mathematics Education.

Patrick, P. and Tunnicliffe, S. D. (2011). What plants and animals do early childhood and primary students' name? Where do they see them? *Journal of Science Education and Technology,* 20(5)**,** 630-642.

Trowbridge, J. E. and Mintzes, J. J. (1985). Students' alternative conceptions of animals and animal classification. *School Science and Mathematics,* 85(4)**,** 304-316.

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

✁

|  |  |
| --- | --- |
|  |  |
| Butterfly | Centipede |
|  |  |
| Chaffinch | Cow |
|  |  |
| Dandelion | Earthworm |
|  |  |
| Frog | Grass |

✁

|  |  |
| --- | --- |
|  |  |
| Horse chestnut tree | Human |
|  |  |
| mushroom | Pea plant |
|  |  |
| Rose bush | Spider |