**Is it a bird…?**

**Part 1: Penguin**

Some children talk about how to classify a penguin.

**Ellie**

But it can’t fly, so it can’t be a bird.

**Calvin**

It’s definitely a bird. It has feathers!

**Yasmin**

It has wings but can’t fly. I think it’s a mammal.

**Layla**

It lives on land and in the water, so it’s an amphibian.

Who do you think is correct?

Use the **key** to help you decide.

|  |  |
| --- | --- |
| **A** | Calvin |
| **B** | Ellie |
| **C** | Layla |
| **D** | Yasmin |

**Is it a bird…?**

**Part 2: Bat**

Some children talk about how to classify a bat.

**Calvin**

A bat must be a bird because it can fly.

**Ellie**

I think it’s a bird because it has wings.

**Yasmin**

Mammals can’t fly, so it must be a bird.

**Layla**

It’s a mammal because it has fur not feathers.

Who do you think is correct?

Use the **key** to help you decide.

|  |  |
| --- | --- |
| **A** | Calvin |
| **B** | Ellie |
| **C** | Layla |
| **D** | Yasmin |

**Is it a bird…?**

**Part 3: Whale**

Some children talk about how to classify a whale.

**Ellie**

Are those fins or wings?

**Calvin**

When it jumps out of the sea it looks like it’s flying!

**Yasmin**

It lives under water but it’s a mammal because it doesn’t have scales.

**Layla**

It can swim, so it’s a fish.

Who do you think is correct?

Use the **key** to help you decide.

|  |  |
| --- | --- |
| **A** | Calvin |
| **B** | Ellie |
| **C** | Layla |
| **D** | Yasmin |

**Classification key**

A **key** is a set of questions that can help us to classify an organism into a group.

The simple key below could be used to classify penguins, bats and whales.

Does it have wings?

No

Yes

Does it have feathers?

Does it have gills,

and scales on its skin?

No

Yes

No

Yes

It’s a

**BIRD**

It’s a

**MAMMAL**

It’s a

**FISH**

It’s a

**MAMMAL**

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

|  |
| --- |
| **Diagnostic question** |
| **Is it a bird…?** |

**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: | Use a key to distinguish between and identify organisms in the lab and in the field. |
| Question type: | Talking heads, simple multiple choice, classifying/sorting |
| Key words: | classification |

**What does the research say?**

Research suggests that students sometimes rely upon an organism’s habitat to classify it rather than its physical features (Allen, 2014); this can lead to misunderstandings and misclassifications, such as:

* that penguins and turtles are amphibians rather than birds and reptiles, respectively, because they divide their time between land and water;
* that bats are birds because they have wings and can fly through the air;
* that whales are fish because they live in the sea.

Research has also found that many students need extra help to understand and correctly apply less familiar taxonomic terms such as ‘amphibian’ (Schofield et al., 1984; Braund, 1991; Allen and Choudhary, 2012).

**Ways to use this question**

Students should complete the questions individually, and will need access to the key (which could be a shared printout or could be projected for the whole class to see). The questions could be answered as 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 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.

**Equipment**

For each student:

* access to the key (either as a shared printout or projected for the whole class to see)

**Expected answers**

*Part 1: Penguin*

**A** – Calvin (“It’s definitely a bird. It has feathers!”)

*Part 2: Bat*

**C** – Layla (“It’s a mammal because it has fur not feathers.”)

*Part 3: Whale*

**D** – Yasmin (“It lives under water but it’s a mammal because it doesn’t have scales.”)

**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 are unsure about how to use a key to classify organisms, they could work in pairs or groups to use a key to identify organisms in a local habitat. 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). A range of keys suitable for use with school children can be obtained from:

* Open Air Laboratories (OPAL): <https://www.opalexplorenature.org/identification>
* Field Studies Council: <https://www.field-studies-council.org/publications/fold-out-charts.aspx>

Building a key that other people could use might help develop students’ understanding of the principle of using sets of questions to identify and classify organisms. The following BEST ‘response activity’ provides question cards that can be discussed in pairs and arranged to make a key, and could be used in follow-up to this diagnostic question:

* Response activity: Build a key

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**References**

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

Allen, M. and Choudhary, A. (2012). Animal classification by early years children. *United Kingdom Science Education Research Conference.* National Science Learning Centre, University of York, UK.

Braund, M. (1991). Children's ideas in classifying animals. *Journal of Biological Education,* 25(2)**,** 103-110.

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

Schofield, B., et al. (1984). Science in Schools: Age 13: Research Report No. 2. *Assessment of Performance Unit.* Department of Education and Science, HMSO, London, UK.