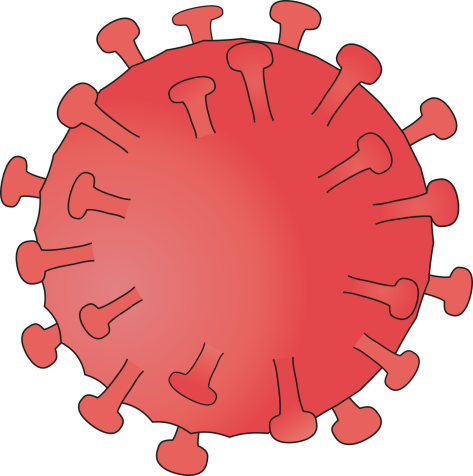
**‘Germs’**

**Part 1**



The statements in the table below are about germs.

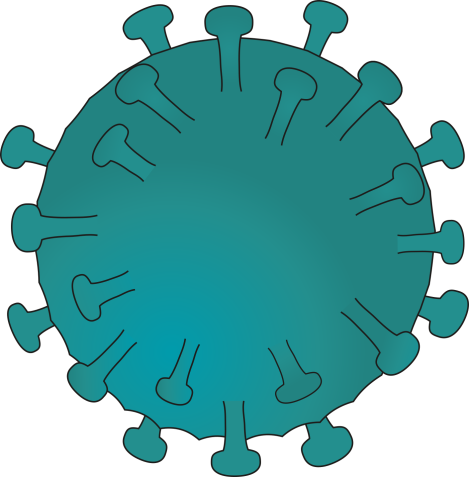
What do you think about each statement?

Tick **one** box for each statement.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Statements** | | I am **sure** this is right | I **think** this is right | I **think** this is wrong | I am **sure** this is wrong |
| **1** | Germs cause diseases. |  |  |  |  |
| **2** | Germs are microorganisms. |  |  |  |  |
| **3** | Germs are pathogens. |  |  |  |  |
| **4** | All germs are the same. |  |  |  |  |

**‘Germs’**

**Part 2**



The statements in the table below are about germs.

What do you think about each statement?

Tick **one** box for each statement.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Statements** | | I am **sure** this is right | I **think** this is right | I **think** this is wrong | I am **sure** this is wrong |
| **1** | Different diseases are caused by different types of germs. |  |  |  |  |
| **2** | Viruses are germs. |  |  |  |  |
| **3** | Bacteria can be germs. |  |  |  |  |
| **4** | Fungi can be germs. |  |  |  |  |

*Biology> Big idea BHD: Health and disease > Topic BHD3: Health and infectious disease > Key concept BHD3.1: Pathogens*

|  |
| --- |
| **Diagnostic question** |
| **‘Germs’** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | The health of humans, other animals and plants can be affected by infection with pathogens, including viruses and some bacteria and fungi. |
| Observable learning outcome: | Recall that ‘germs’ are disease-causing microorganisms also known as pathogens, including bacteria, fungi and viruses. |
| Question type: | Confidence grid |
| Key words: | Health, disease, microorganisms, pathogens |

|  |  |
| --- | --- |
| **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?**

In a study of students aged 12-13 in England, the terms ‘microorganism’ and ‘microbe’ were not used spontaneously to describe organisms such as bacteria that are too small to see with the unaided eye; the term ‘germ’ was most commonly used, followed by ‘bug’ (Maxted, 1984).

The term ‘germ’ is often used indiscriminately without understanding of the existence of (or differences between) separate types of disease-causing microorganisms such as bacteria and viruses. In a classic study of British and American children aged 5-11, all participants referred to a single type of ‘germ’ and were unaware that different diseases are caused by different pathogens (Nagy, 1953). Half of the English 12-13 year-olds in Maxted’s study (1984) suggested that different types of ‘germs’ caused different diseases, while only 9% of students aged 15 in a study in England by Prout (1985) knew that bacteria and viruses were different types of disease-causing agents.

**Ways to use this question**

Students should complete the confidence grid 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 and statements 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**

*Part 1*

1. Germs cause diseases – **right**
2. Germs are microorganisms – **right** (but see note, below)
3. Germs are pathogens – **right**
4. All germs are the same – **wrong** (there are different types of germs/pathogens, including viruses, some bacteria and some fungi)

Note: older or more able students might find it interesting to explore the issue of whether viruses should be classified as (micro) organisms. Viruses display some but not all of the seven characteristic processes of living organisms; furthermore, a big idea in biology is the cellular basis of life, and viruses are not made of cells. Should they be considered organisms if they would not, by those definitions, be considered alive?

*Part 2*

1. Different diseases are caused by different types of germs – **right**
2. Viruses are germs – **right**
3. Bacteria can be germs – **right**
4. Fungi can be germs – **right**

**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 germs, including what they are, the different types of germs/pathogens, and that different types of pathogens cause different diseases, the following BEST ‘response activity’ enables students to explore their ideas through small group discussion, and could be used in follow-up to this diagnostic question:

* Response activity: Pathogens

**Acknowledgments**

Developed by Alistair Moore (UYSEG).

Images: Adapted by UYSEG from pixabay.com/Pixaline (2833622)

**References**

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