**Only humans?**



Which statement about diseases is correct?

|  |  |
| --- | --- |
| **A** | Only humans can get diseases. |
| **B** | Only humans and other animals can get diseases. |
| **C** | Only humans, other animals and plants can get diseases. |
| **D** | All organisms can get diseases. |

*Biology > Big idea BHD: Health and disease > Topic BHD1: What are health and disease? > Key concept BHD1.2: Disease*

|  |
| --- |
| **Diagnostic question** |
| **Only humans?** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | The good health of organisms can be compromised by infectious and non-infectious diseases, which can be caused by germs, lifestyle, environment, or information in the genome. |
| Observable learning outcome: | Recall that the good health of all organisms can be compromised by diseases. |
| Question type: | Simple multiple choice |
| Key words: | Health, disease |

|  |  |
| --- | --- |
| **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. |

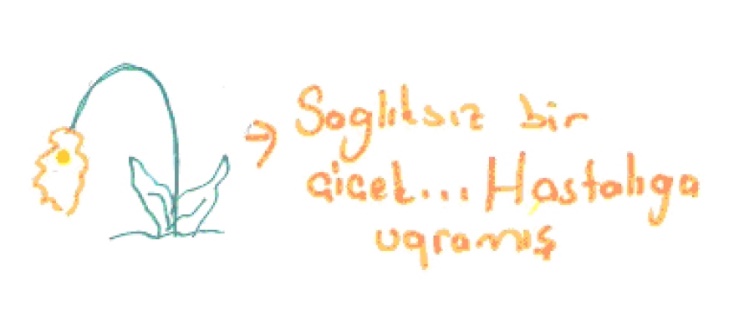
**What does the research say?**

When children aged 14-15 in Turkey were asked to draw and write about disease (Isik, Çetin and Özarslan, 2017), the major themes in their answers were:

* names of specific diseases (most commonly measles, followed by flu, cold and cancer)
* causes of disease (most commonly microbes [58% of answers in which a cause was mentioned], malnutrition [15%], cigarettes and alcohol [11%], and dirty environment [9%])
* consequences of disease (most commonly fatigue, being sick, death and pain).

Similar results were observed when children aged 8-11 in Hungary were asked to draw and write about causes of disease (Piko and Bak, 2006).

One student out of 81 in the Turkish study drew a “faded flower” that was said to be “sick”; all other answers pertained to humans.



“A faded flower. It is sick.” *(from Isik, Çetin and Özarslan, 2017)*

Learning about plant diseases is important due to the interdependence of organisms; for example, plant disease has a significant impact on human food security. It has been estimated that plant pests and pathogens are responsible for approximately 12.5% of global crop losses (Oerke, 2006), and for losses of up to 42% of the annual production of the six most important food crops (Guest, 2012).

In England, the current National Curriculum programme of study for science does not explicitly require students to learn about plant diseases until age 14, a requirement that was introduced for the first time in 2014 (Department for Education, 2013b; 2013a; 2014).

Curriculum development work undertaken by the Royal Society of Biology in the UK (McLeod, 2018) and the American Association for the Advancement of Science (AAAS Project 2061, 2009) advocates learning about the causes of both infectious and non-infectious diseases in science lessons from age 5. A focus only on disease in humans would provide an undesirably restricted view, and could lead to (or reinforce) the misunderstanding that only humans get diseases.

**Ways to use this question**

Students should complete the question individually. This could be a pencil and paper exercise, or you could use the PowerPoint presentation with an electronic voting system or mini white boards.

*Differentiation*

You may choose to read the question and answers 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**

The expected answer is **D** - All organisms can get diseases.

**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 struggle with the idea that plants can get diseases, the class could be asked to suggest recent examples of outbreaks of plant disease that they have heard of, such as ash dieback, or to research historical examples, such as potato blight. They could also be taken out to explore the local area around the school for signs of common plant diseases such as bramble rust or powdery mildew; the following BEST ‘response activity’ describes just such an activity, and could be used in follow-up to this diagnostic question:

* Response activity: Plant disease detectives

If students struggle with the idea that organisms other than animals and plants can get diseases, the following video could be used to challenge their thinking. It presents an engaging, cartoon-like introduction to bacteriophages (viruses that attack bacteria). The first few minutes could be used with students aged 11-14.

* Video: <https://www.youtube.com/watch?v=YI3tsmFsrOg>

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Images: character wearing face mask – pixabay.com/DYOON\_IMAGE (3855761)

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