**A distant Sun**



The Sun looks big in the sky.

When we can see it, it is very bright.

**What would the Sun look like if it was two times further away?**

**C** The same

**D** Smaller

**A** More yellow

**B**

Smaller and more yellow

*Physics > Big idea PES: Earth in space> Topic PES1: Solar System and beyond > Key concept PES1.3: Night sky, stars and galaxies*

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| **Diagnostic question** |
| **A distant Sun** |

**Overview**

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| Learning focus: | The Sun is one of billions of stars in our galaxy and our galaxy is one of many billions of galaxies in the universe. |
| Observable learning outcome: | * Explain why Sun looks bigger and brighter than other stars |
| Question type: | Diagnostic, simple multiple choice |
| Key words: | Sun |

**What does the research say?**

It can be tempting to keep work on the Solar System simple and descriptive when in fact it is conceptually demanding (Osborne, 2011). For example, when we observe the sky it appears that the Earth is bigger than the Sun and the Moon, which are both small in the sky; and the stars appear smaller than the Sun and the Moon.

This question investigates students’ understanding of what the Sun looks like from a long way away. This idea contributes to the understanding that stars are like the Sun, even though stars are only visible as tiny points of light.

**Ways to use this question**

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

The answers to the question will show you whether students understood the concept sufficiently well to apply it correctly.

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.

*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.

**Expected answers**

Answer D is correct

**How to respond - what next?**

The more distant a star becomes, the smaller it appears because it takes up a smaller proportion of our field of view. Even at greater distances a star is still visible as the same colour.

Some students may link more distant stars with a colour change because they understand that they are dimmer at a distance. In the laboratory the light bulbs in ray lamps become more yellow and then more red as they are dimmed. The colour of a star is determined by its surface temperature.

If students have misunderstandings about the apparent size or colour of a more distant Sun, it can help to model the effect: it is easy to see that as a person or an object is moved further away it looks smaller; torches with different coloured filters can be seen to keep the same colour even at a very great distance.

**Acknowledgments**

Developed by Peter Fairhurst (UYSEG).

Images: Peter Fairhurst (UYSEG).

**References**

Osborne, J. (2011). Earth in Space. In Sang, D. (ed.) *Teaching Secondary Physics.* London: Hodder Education.