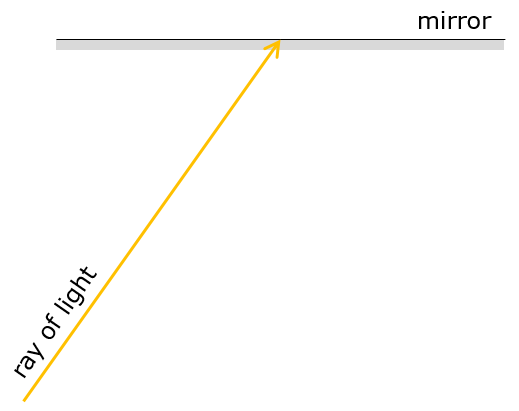
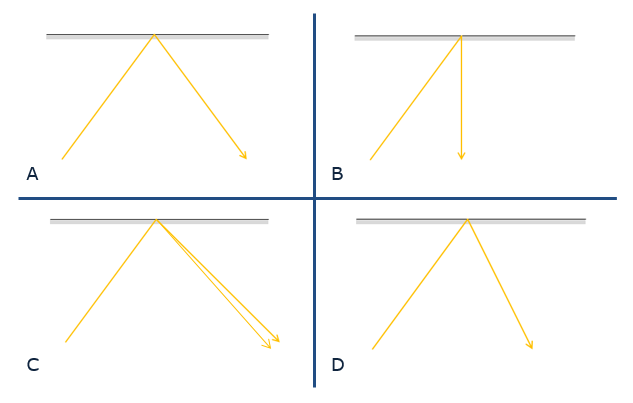
**Which way?**

A ray of light reflects off a flat mirror.



Which picture shows how the ray of light reflects?



*Physics > Big idea PSL: Sound, light and waves > Topic PSL1: Sound and light > Key concept PSL1.2: Characteristics of light*

|  |
| --- |
| **Diagnostic question** |
| **Which way?** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Light is reflected from all surfaces, and off a flat mirror it is reflected in a single direction. |
| Observable learning outcome: | Predict the direction in which flat mirrors reflect light. |
| Question type: | Simple multiple choice |
| Key words: | Reflect, ray |

**What does the research say?**

When light reflects off a mirror Anderson and Smith (1986) found that, out of 125 ten and eleven year olds, just under half correctly predicted that the angle it reflects at is the same as the angle it hits the mirror, 28% thought light reflected at a different angle and 7% that more than one ray is reflected.

This question checks how students think a ray of light reflects off a flat mirror.

**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 answer**

Answer A

**How to respond - what next?**

Answers B and D are likely to be the most common errors. D is close to the right answer. Students may have experience of balls bouncing off walls at these angles if the ball had some spin on it.

A minority of students may answer C.

If students have misunderstandings about how light reflects off a flat mirror, then investigating what actually happens is quite straight forward with the use of ray lamps. The following BEST ‘response activity’ could be used in follow-up to this diagnostic question:

* Response activity: Reflecting angles

NB The rays of light reflect off the silvering on the back of a mirror. This has been shown in the diagrams. There is also a very faint reflection off the front of the glass, which is usually not seen.

**Acknowledgments**

Developed by Peter Fairhurst (UYSEG).

Images: UYSEG

**References**

Anderson, C. W. and Smith, E. L. (1986). Childrens' conceptions of light and colour: developing the concept of unseen rays. *Annual meeting of the American Educational Research Association.* Montreal, Canada.