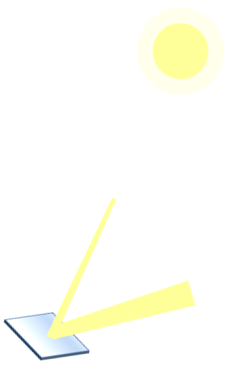
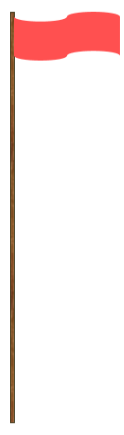
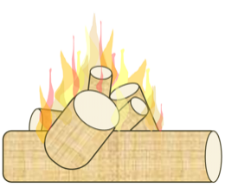
**Desert island rescue**

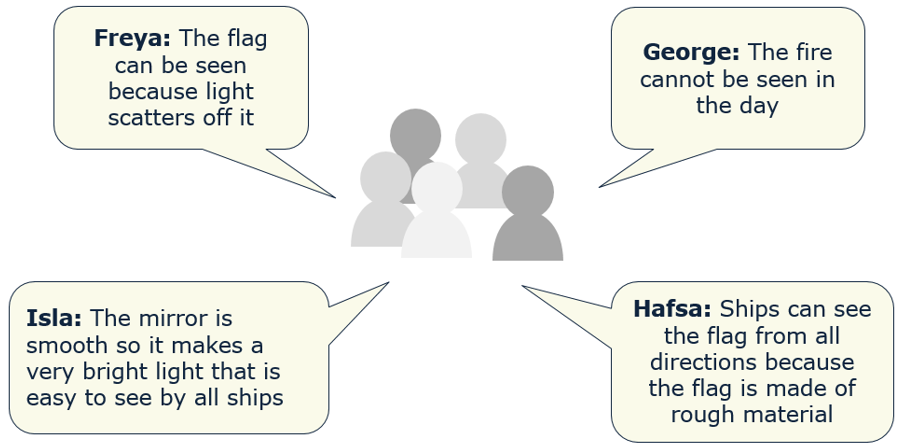
Freya and her friends are stuck on a desert island.

****They want to be seen by a ship.



****

The friends are discussing what they should do to be seen.

****

**To answer**

1. Who do you think is right?

*Explain your answer*

1. What mistakes do you think the other students made?

*What would you say to them to help them to understand?*

|  |  |
| --- | --- |
| **Freya:** The flag can be seen because light scatters off it | **George:** The fire cannot be seen in the day |
| **Isla:** The mirror is smooth so it makes a very bright light that is easy to see by all ships | **Hafsa:** Ships can see the flag from all directions because the flag is made of rough material |

|  |  |
| --- | --- |
| **Freya:** The flag can be seen because light scatters off it | **George:** The fire cannot be seen in the day |
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*Physics > Big idea PSL: Sound, light and waves > Topic PSL1: Sound and light > Key concept PSL1.2: Characteristics of light*

|  |
| --- |
| **Response activity** |
| **Desert island rescue** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Light is reflected from all surfaces, and off a flat mirror it is reflected in a single direction. |
| Observable learning outcome: | Explain how light reflects off rough surfaces. |
| Activity type: | Talking heads |
| Key words: | Reflect, ray, scatter |

This activity can help develop students’ understanding by addressing the sticking-points revealed by the following diagnostic question:

* Diagnostic question: Rough reflection

**What does the research say?**

When light reflects Anderson and Smith (1986) found that, out of 125 ten and eleven year olds, about 60% described light bouncing off only mirrors and not off other opaque objects. Just 20% thought light did bounce off opaque objects, with only 2% suggesting it is scattered.

This activity gives students the opportunity to discuss how light reflects differently off a rough surface compared to a mirror.

**Ways to use this activity**

Students should complete this activity in pairs or small groups, and the focus should be on the discussions. The statements are also provided as cut-out cards for students to physically organise.

Students should work together to follow the instructions on either the worksheet or the PowerPoint. Giving each group one worksheet to complete between them is helpful for encouraging discussion, but each member should be able to report back to the class. Listening in to the conversations of each group will often give you insights into how your students are thinking.

If there is disagreement when you take feedback, a good way to progress might be 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*

The quality of the discussions can be improved with a careful selection of groups; or by allocating specific roles to students in the each group. For example, you may choose to select a student with strong prior knowledge as a scribe, and forbid them from contributing any of their own answers. They may question the others and only write down what they have been told. This strategy encourages contributions from more members of each group.

**Expected answers**

Freya and Hafsa are correct, because the light reflects off the rough surface in all directions.

George is partially correct: because the Sun is so bright the light from the fire is much harder to see during the day.

Isla is wrong. The mirror is very good at *reflecting* light (it does not *make* light) in just one direction. This would be seen as a very bright light, but only if it was aimed at a ship.

**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.