

Teacher guide to British Science Week activity: Upper key stage 2

Explore

- Take the class outside and organise pupils into groups of five.
- Ask pupils to collect a range of natural materials and place them next to the bowl of water.

Question

- Write the question prompt ‘Which ones...?’ on the flipchart and read it aloud.
- Ask the pupils to think of at least one question using the same structure. Encourage them to consider:
 - the natural materials they have collected;
 - the equipment available (the bowl of water);
 - their knowledge of materials and properties explored so far.
- Ask pupils to share their questions within their group.
- Invite groups to share one question with the class and record on the flipchart.
- Repeat this process using the following prompts:
 - ‘What happens if...?’
 - ‘Do these act differently...?’
 - ‘Is there a pattern...?’
 - ‘Why can/do...?’
 - ‘How does...?’
- Add ‘How does changing the shape of a natural object affect floating and sinking?’ to the flipchart as a model question.

Assess

- Invite the pupils to underline questions on the flipchart using different colours:
 - ‘which’ questions;
 - ‘what’ questions;
 - ‘do’ questions;
 - ‘is’ questions;
 - ‘why’ questions;
 - ‘how’ questions;
 - easy-to-test questions (can be tested using a scientific enquiry type);
 - hard-to-test questions (cannot be tested using a scientific enquiry type).
- Explain that scientists do not test every question; they choose questions that can be investigated.

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- Optional: to extend thinking, select a few questions and discuss which scientific enquiry type could be used to test each one.

Focus question

- Introduce focus question: **'How does changing the shape of a natural object affect floating and sinking?'**
- Explain that this 'how' question can be tested using the enquiry type 'pattern-seeking'.
- Define floating (stays on top of water) and sinking (goes to the bottom).

Test

- Invite one pupil at a time to choose a material.
- Ask the class to predict whether it will float or sink.
- Place the material in the water and ask the pupils to observe carefully.
- Ask the pupils to stand if their prediction was correct.
- Next, change the shape of the material where possible by rolling or bending it (for example, leaves, sticks, soil or sand). For stones, use two stones of clearly different shapes.
- Ask the class to vote again on whether the material will float or sink. Place it in the water and ask pupils to observe what happens.
- Optional: to extend skills, ask the pupils design a table and record results on their whiteboards.
- Repeat with a range of materials.
- Optional: run the experiment in groups of five, with each group using their own bowl of water.

Reflect

- Use think, pair, share for the following questions with their group:
 - What did we find out? (Changing the shape of some materials, such as leaves, can make them sink.)
 - How easy was it to test our question? (It was easy for soft materials that could be changed; it was harder for rigid materials such as rocks.)
 - What new questions do we have now?
- Explain that answering questions often leads to new questions.

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Extend

- Ask pupils to:
 - write a conclusion;
 - evaluate the experiment, commenting on fairness and reliability.
- Alternatively, provide groups with their own bowl of water and allow them to choose one further question to investigate (see web page for examples).