

The boat full of holes

Background

Students are presented with a boat made of margarine with holes in the hull. They are convinced that it will take in water and sink.

Challenging this conviction, using simple materials, encourages students through a series of hypotheses and experiments. The boat full of holes conflicts with students' expectations and provokes a wonder followed by an immediate urge to seek a logical explanation. Students develop their understanding and construct their own knowledge.



You will need...

- ✓ a bowl of water
- ✓ a pack of margarine
- ✓ a knife
- ✓ a pin
- ✓ "Night light" candles

Follow these steps

1. Present the margarine boat full of holes to students. The reaction is often sceptical – students assume they are being tricked or cheated.
2. Encourage students to develop one or more hypotheses and carry out experiments. For example:
 - the holes don't go all the way through – shine a torch through the hull of the boat

- there is something transparent in or on the holes allowing light through, but not water – blowing through the holes and feeling the air coming through the other side of the holes.
3. Challenge the class to a competition: construct a boat of a given amount of margarine with the largest possible number of holes in the bottom. Students document their project with photos and video. The winning boat design is voted by the class.
 4. Ask students to investigate which factors determine whether the boat takes in water or not – size of holes; distribution of the holes; the construction material (margarine or night-light casing); the

weight of the boat (or its cargo), etc.

5. Students present their findings to the rest of the class.

So what happened?

Students learn to observe, make predictions, formulate and revise hypotheses, design and carry out experiments, repeat and re-design tests. They also learn how to communicate their findings, present their results, and share their ideas with others.

What next?

Students can carry out some research to find out more about the properties of water that allow the boat to float, and why water has these properties.