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Using groupwork: floating and sinking

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Walton Hall, Milton Keynes

MK7 6AA

First published 200X. [Second edition 200Y. Third edition ....] [Reprinted 200Z]

Edited and designed by The Open University.

Typeset by [name and address of typesetter if applicable or The Open University].

Printed and bound in the United Kingdom by [name and address of printer].

ISBN XXX X XXXX XXXX X

X.X

Contents

What this unit is about

This unit looks at how simple actions such as allowing students to talk to each other can help them understand scientific concepts better. It focuses on ideas related to water, with an emphasis on floating and sinking. This provides a suitable context to explore how to make the best use of groupwork in the classroom.

Even with large classes, simple tasks like talking and working together are possible without major reorganisations of the classroom. The benefits in terms of aiding student learning are great. This unit explores different ways of organising and working with groups in large or small classes, and how groupwork enhances students' enthusiasm and motivation for science.

What you can learn in this unit

- How to use groupwork to help students explore ideas more deeply.
- Why groupwork is a good strategy to use to enhance participation and creativity.
- How to plan and use groupwork effectively to help students predict, explore and hypothesise about why things float or sink.

Why this approach is important

Capturing and maintaining learners' interest is key to motivating them to want to know more about the world around them. Many students are shy of speaking in large groups and so remain silent, not asking questions if they do not understand. Encouraging more students to participate more actively in their lessons will make a big difference to their achievements. Using groupwork will achieve this.

1 Using groupwork to explore ideas

Many students have half-formed ideas about why things float and sink that they have developed through experience. Perhaps they have never had the concepts relating to why things float or sink explained well, or have never had the opportunity to talk about why things really float and sink.

Understanding such a basic concept is quite important for health and safety reasons. For example, many people who transport goods and people around their community using the local waterways, rivers and the sea need to understand the principles.

Groupwork allows students to talk legitimately about their ideas and share both good and half-formed ideas with others. Together, such groups can share their understanding and test out ideas that they are not sure about by doing investigations. The reason that groupwork rather than pair work might be better in some instances is that if all your students have half-formed but different understandings about floating, then they are more

likely to reach a better understanding with more elements to integrate together. Your role as a teacher is to help the students link together their ideas, organising them into the accepted understanding of why things float or sink. Talking to a small group while others are working on another task means that you can support these students in clarifying their thinking by asking questions and providing relevant information.

Now read Case Study 1, about how a teacher explored early ideas about floating and sinking with her young students in Class I.

Case Study 1: Using small groups to explore early ideas

Mrs Khanday teaches Class I and tries to offer her class a stimulating environment by providing times when students can choose what they do. Over time she has gathered together materials that she can put out for the students to play with. She has made dolls out of scraps of fabric and made clothes so that students can role play with them. She also has a big plastic tub that she fills with water and puts toys and containers in for the students to enjoy water play. She describes how she joined a group of students playing in the water.

I had organised a session for my students to choose what they did. There were lots of different things for them to do. I decided I was going to stay with the water tub to listen and interact with the children as they played with the toys and containers that I had put in the water. I wanted to explore their ideas about the properties of water and especially why things float. They were playing with stones and putting them into the different containers.

As they played they were talking to each other. Two girls were putting one stone in each of their containers and floating them across the tub. As I asked them what they were doing, they said they were taking people across the river and the boys were carrying stones from the quarry across to the road. One boy said: ‘If I put all the stones in this pot, it will be quicker.’ He did this and the tub sank. The other boy said that you have to do it one stone at a time. At this point one of the girls said that there should only be one person ‘because that’s how my dad takes people across the river in my village’ [Figure 1].

Figure 1 Men crossing the river.

They then talked about what was best, so I asked them what would happen if they tested their tubs to see how much they would hold. I asked them if they could find out. One boy put all his stones into his tub, as he did not think that his would sink like his friend's. His tub did sink, so I asked what would happen if he put a stone in one at a time. As he did this, we tried counting each one. Some students were better at counting than others, but this provided a good opportunity for them to practice their counting skills.

The boat sank and I suggested they could count the number of stones again to check. I asked them what would happen if they put just six stones in the tub? Would it float or sink? The group of five students was divided, with two saying it would still sink and the rest that it would float. It floated, and so after that I suggested they tried the different sized foil tubs I had collected to see if they all sank with the same number of stones.

My students played for a long time, testing their ideas, and then returned to their role play of ferrying people across the river. The stones became people crossing back and forwards across the river. There was much talk about what they were also taking or what they were going to do on either side of the river. There was much discussion about not overloading the boat or it would sink. The students were fully involved in exploring the idea of floating and sinking within the context of their story and role play, and working together as a group.