

Quicksand

Contents

- Guidance notes
- Career links
- Learning objectives
- Activity 1: what is the best way to escape from quicksand?

Acknowledgements

This resource was originally developed by Liverpool John Moores University to support outreach work delivered as part of the Chemistry for All project.

To find out more about the project, and get more resources to help widen participation, visit our Outreach resources hub: rsc.li/3CJX7M3.

Guidance notes

This activity should take approximately one hour to complete in full. It was initially created for 14–16 year-old learners but can be adapted to suit other age groups.

Download the PowerPoint presentation, technician notes and student workbook that accompany this resource at rsc.li/3PhT8f2.

Read our health & safety guidance, available from rsc.li/3IAmFA0, and carry out a risk assessment before running any live practical.

The safety equipment suggested is in line with CLEAPSS requirements. For non-hazardous substances, wearing lab coats can help to protect clothes. The safety rules might be different where you live so it is worth checking local and school guidance.

In this activity, learners make a non-Newtonian fluid, known as ooze, using cornflour and water. Learners explore properties to answer the question: what is the best way to escape from quicksand?

The PowerPoint should be used to explain what non-Newtonian fluids and colloids are and provide the link to quicksand.

Career links

Consumer products technician

Slide 4 of the PowerPoint provides the first career link, also available from rsc.li/3HR7C31. Highlight the use of chemistry in designing materials and products. Watch the video and introduce learners to Robert, a consumer products technician, who studies the behaviour of different materials to develop and improve the properties of products.

Environmental chemist

Slide 6 of the PowerPoint provides the second career profile, also available from rsc.li/3X33pyG. Link your lesson to green careers by introducing James, an environmental chemist. He helps to protect the environment by assessing the risks to life from certain chemicals in soil, water and air.

Quicksand: teacher notes

Available from rsc.li/3PhT8f2

You will need to introduce the meaning of the term colloid using the notes on **Slide 8**. It is sufficient at this level to describe colloids as mixtures in which the solid particles remain suspended throughout the liquid and do not settle to the bottom of the container.

If time is available, explore the properties of non-Newtonian fluids further using the Custard resource, available from rsc.li/3zcvpLy.

Learning objectives

- Follow instructions for making a non-Newtonian fluid.
- Describe the properties of a non-Newtonian fluid.
- Apply information about the properties of a non-Newtonian fluid to another context.

Activity 1: what is the best way to escape from quicksand?

Get learners to make and explore ooze in small groups or pairs. There are suggestions for how learners might discover the properties of ooze in the student workbook. They need to apply what they learn to the question of how to escape from quicksand.

You could set a time when groups are to feed back their answers – along with justifications for their responses. Encourage learners to write about the properties of non-Newtonian fluids as they complete the practical activities.

Use the challenge work in the student workbook to reinforce learning and to extend learners' interest. They could make a poster or other form of presentation about non-Newtonian fluids, including additional examples they research.

Answers

- (a) If a force is applied quickly, the ooze will resist movement and become more viscous, behaving like a solid. The ooze flows like a liquid when a gentle force is applied.
- (b) To escape from quicksand, you should try swimming towards firm ground very slowly. The more slowly you move, the less the quicksand will resist your movement.

Challenge

- i. You could walk on ooze by running quickly over it as it would then behave like a solid.
- ii. Running would apply a force quickly, stopping you sinking into the ooze.
- iii. There are many non-Newtonian fluids. Examples include ketchup, honey, toothpaste, some types of paints, blood, melted butter and shampoo.