

### **Pre-lesson preparation, materials and equipment**

The LEARN ABOUT WOOL factsheet *Properties of wool* will give you ample background information to carry out this lesson and answer a range of questions posed by students.

This activity will involve applying droplets of coloured water onto cotton and wool socks. Demonstrate this activity before allowing students to investigate for themselves. Before carrying out the demonstration clearly explain to students they must remain seated during the demonstration and listen to all instructions.

A student worksheet *Resist that stain* has been provided for you to distribute to students for recording their predictions and observations from this lesson.

### **Useful resources:**

LEARN ABOUT WOOL factsheets

- [Properties of wool](#)

Useful links

- [Wool fibre facts and benefits](#)

### **Materials and equipment**

- Enough white cotton and wool socks to share among small groups of students.
- Eye droppers
- Food colouring
- Water and jugs
- Newspaper or cotton tea towels to place on tables to soak up any spilt water
- LEARN ABOUT WOOL student worksheet *Resist that stain*
- Science journal to record student observations

### Lesson objective:

- To allow students to investigate and compare the stain-resistant (moisture-repellent) capacity of wool compared with cotton and draw conclusions about the suitability of these textiles for a range of everyday uses.

### Students will have the opportunity to:

- test the stain-resistant capacities of wool compared with cotton
- consider the implications of wool's ability to repel water in a range of everyday uses.

### Setting the context

While the core of the wool fibre can absorb up to a third of its dry weight in moisture, the surface of the fibre has a waxy coating that repels liquids. This surface layer is not easily removed by washing or processing. Water droplets on the surface of wool clothing will bead and roll off instead of being absorbed into the fabric, as occurs with cotton, allowing it to resist many common everyday stains.

### Lesson focus

The focus of this lesson is to encourage students to think about the link between the stain resistance property of a fibre and the implications for its end use.

### Introduction

As a class, review the student's science journals and discuss the observations students have made so far about wool including the physical features that help wool protect sheep under a range of weather conditions and the features we can't see or feel, such as fire resistance.

Explain to students that wool has some other unique features we can't see, but we can test for, such as water repellence and stain resistance. Ask students why this property might be useful. Encourage discussion with questions such as:

- "Has an ice-block ever dripped while you were eating it?"
- "What happened?"
- "Have you ever trodden in water when you were wearing socks?"
- "What happened to your feet?"

### Body of lesson

1. Distribute the student worksheet *Resist that stain* to students and explain that you will ask them to predict what will happen when you drop coloured water using an eye dropper onto the cotton socks then the wool socks. Ask them to record their predictions before and after they have observed the demonstration.
2. Lay each of the socks on some newspaper or a tea towel on the table. Ask students to predict what will happen when the water is placed on the socks and get them to record their prediction in the *My predictions* column on their worksheets.
3. Ask a volunteer student to use the eye dropper, draw up water from the jug and slowly place a droplet on the cotton sock. The sock will absorb the water immediately. Ask the students to observe what happens to the water and record their observations in the *My observations* column on their worksheet.
4. Repeat the process with the wool sock. The droplet of water will sit on the surface of the wool sock and not be absorbed. You can then use the cotton sock to absorb the water droplet from the wool sock.
5. Ask a student to come forward and feel both socks and describe how they feel. The wool sock will still feel dry, while the cotton sock will be wet where it has absorbed the water.
6. Ask students to describe what happened during the demonstration. Discuss whether what happened matched their predictions.
7. Organise students into small groups of three or four students and allow them to replicate the activity in their groups.
8. As you go around each group ask students to describe again what is happening. Encourage them to think about what might happen if they spilt a drink while wearing a wool t-shirt and what would happen if they were wearing a cotton t-shirt. Encourage students to think about other items of clothing that might be made of cotton or wool, such as jumpers and hoodies (sweaters). Ask students to imagine what might happen if they were wearing these clothes on a bushwalk in foggy or misty weather. Encourage students to discuss in small groups and report their findings back to the class.

**NOTE:** *Wool is the preferred fibre for many outdoor activities for its water-repellent qualities as well as its ability to wick sweat away from the skin and help regulate body temperature.*

## Conclusion

Ask students to develop a paragraph to describe the water and stain-repellent properties of wool and record this in their science journals under the heading *Is wool stain resistant?*

Explain that during the next lesson you will be considering how the properties you have been investigating influence the way we use wool in a range of everyday products.

## Links to the Australian Curriculum:

- Natural and processed materials have a range of physical properties that can influence their use. ([ACSSU074](#))
- Science involves making predictions and describing patterns and relationships ([ACSHE061](#))
- Represent and communicate observations, ideas and findings using formal and informal representations ([AC SIS071](#))
- Compare results with predictions, suggesting possible reasons for findings ([AC SIS216](#))