

## Unit overview

This unit helps students explore the properties of Australia's most iconic natural fibre — wool.

Some students may have experience with wool through clothing or home furnishing, such as blankets. However many Foundation year students may not be aware of the source of wool textiles (sheep), the range of uses and the unique properties of wool, which make it an ideal textile for a wide range of uses.

This unit of work aims to determine students' prior knowledge of the properties of wool, increase their appreciation for these properties and raise their awareness of how the properties of materials influence their end use.

In this unit of work, students will have the opportunity to develop skills in sorting and grouping materials on the basis of observable properties, such as texture and feel, flammability and water absorption.

Students also will investigate the different forms of clothing used for different activities and explore how the unique properties of wool make it suitable for a wide range of clothing products.

This unit of work also starts the process of students recognising that observation is an important part of exploring and investigating the things, while

allowing them to share observations with others and communicating their experiences.

A class science journal is used to record the students' learning journey and provides for meaningful literacy modelling. It is used to review and organise observations and ideas, and can include images and student contributions.

Hands-on experiences and sharing observations with others are key ways to create meaningful, shared understandings, while individually students draw their observations and identify wants and needs in a role-play game.

## Cross-curriculum priority:

### Sustainability

Early lessons about the interdependence of animals, plants and people.

### Links with the Australian Curriculum

This *Properties of wool* unit links to all three strands of the Australian Curriculum: Science — Science understanding, Science as a human endeavour and Science inquiry skills.

The table below outlines the sub-strands covered in this unit of work.

Strand	Sub-strand	Code	Content descriptions
Science understanding	Chemical sciences	<a href="#">ACSSU003</a>	Objects are made of materials that have observable properties
Science as a human endeavour	Nature and development of science	<a href="#">ACSHE013</a>	Science involves exploring and observing the world using the senses
Science inquiry skills	Questioning and predicting	<a href="#">ACSI014</a>	Pose and respond to questions about familiar objects and events
	Planning and conducting	<a href="#">ACSI011</a>	Participate in guided investigations and make observations using the senses
	Processing and analysing data and information	<a href="#">ACSI233</a>	Engage in discussions about observations and represent ideas
	Communicating	<a href="#">ACSI012</a>	Share observations and ideas

## Achievement standard

The sequence of the lessons in this unit of work provides opportunities to gather information about students' understanding related to the sections in bold in the achievement statement below:

By the end of the Foundation year, students **describe the properties and behaviour of familiar objects**. They suggest how the environment affects them and other living things.

Students **share and reflect on observations, and ask and respond to questions about familiar objects** and events.

Source: [Australian Curriculum, Assessment and Reporting Authority \(ACARA\)](#)

## Background information

People have been using wool for thousands of years to make clothing and textiles, furnishings and insulation. Australia produces 90% of the world's fine apparel wool.

Wool is a natural fibre produced by sheep. As wool grows out from the sheep's skin, it forms groups of wavy fibres called staples. This natural crimp (wave) gives wool its elasticity (springiness). Wool feels soft and slightly greasy before it is washed or processed. The natural oil in wool (lanolin) coats each fibre. Wool can keep things cool and it can keep things warm. Wool is soft, strong, lightweight, stain-repellant and fire resistant.

The natural properties of wool make it an ideal fibre for a wide range of everyday uses. Depending on the length and fibre diameter (fineness) of a wool fleece, it can be processed through either the woollen or worsted processing system.

Woollen-spun woven fabrics are generally thick and heavy. They are ideal for warm winter jackets and coats. These fabrics are generally wind-proof and can repel light rain, so are good to wear when playing outside in winter.

Knitted fabrics made from woollen-spun yarn are generally heavier and bulkier than worsted-spun knitted fabrics. They make great soft, warm jumpers, scarves, beanies, socks and cardigans.

Worsted processing produces fine yarns, which can be woven to produce smooth, light-weight fabrics. These fabrics are used for clothes such as business suits, trousers and skirts.

Worsted-spun woven fabrics are ideal to wear in warm weather or inside, where they keep you cool and comfortable.

Fine worsted-spun yarns produce super-soft knitted fabrics that feel great next to your skin. These fabrics are incredibly versatile — they are used for baby clothes, underwear, t-shirts and sportswear, leggings, dresses and other lightweight knitwear.

Worsted-spun knitted fabrics are ideal for wearing every day — they are great for travelling as they are soft, cool, comfortable, light-weight and don't need ironing.

More background information on the properties of wool can be found in the LEARN ABOUT WOOL [online resource library](#).

## Class science journal

During this unit of work you are encouraged to record student observations and the results of investigations in a class science journal.

A class science journal is used for a number of purposes.

- to record student ideas including prior knowledge, observations and statements of learning
- to model scientific text types, such as labelled diagrams, lists, drawings, simple tables and graphs, mind maps and other appropriate graphic organisers
- to list activities for group work or free-choice activities
- to record the class' learning journey, including photos and printed worksheets
- to showcase to others the learning that has been undertaken during the unit.

A class science journal can be easily made from large pieces of art or painting paper stapled on one side. Ideally it should be the size of a commercial 'big book' used for shared reading. Alternately, you could create a digital version.

Ensure writing is large and easy to read, so all students can see the words from where they sit.

Students also can have their own journal to record their observations and ideas. A scrapbook makes an ideal student science journal.

Source: [Education Services Australia \(2013\)](#)

## Classroom preparation and resources

In early childhood, children learn best through play-based activities — they learn by exploring and investigating. This unit of work has been developed to be used in conjunction with the freely-available online [LEARN ABOUT WOOL resource library](#), which contains a range of relevant factsheets, images, articles and engaging short videos.

A hardcopy version of the LEARN ABOUT WOOL kit is freely available by emailing [teacherskit@wool.com](mailto:teacherskit@wool.com) and contains samples of wool from the raw fibre through various stages of processing to yarn and fabric samples. These samples are integral to the tactile explorations outlined in this unit of work.

Throughout this unit of work you could:

- display the [Sam the Lamb poster](#) and [LEARN ABOUT WOOL Wool processing](#) posters, showing the journey from farm to fashion.
- display the LEARN ABOUT WOOL kit fibre, yarn and fabric samples in a basket.
- allow students to explore the LEARN ABOUT WOOL primary factsheets and The Workboot Series — Story of Wool book (Kondinin Group).
- Read with students a range of stories about sheep, some examples include: *It's time to sleep you crazy sheep* by Alison Ritchie, *One sneaky sheep*, (A touch-and-feel fluffy tale), *Pete the Sheep*, by Jackie French and Bruce Whatley or *Click go the shears*, illustrated by Charlotte Lance.
- encourage students to use vocabulary associated with wool production found in the resources.

### Additional resources

In addition to the samples provided in the LEARN ABOUT WOOL kit, collect and display a basket of wool clothes and furnishings alongside samples of wool fabric and yarn.

Try to ensure a representative sample of items from each type of processing system (read the [Different types of wool fabrics](#) factsheet for some ideas).

To complement your classroom display and enhance this lesson, you may like to ask students to bring in one or two of their favourite items of clothing or furnishings/bedlinen. Make sure all students' items are clearly labeled.

The activities in this unit of work require a range of equipment. Each lesson plan will identify the particular items required to successfully carry out the lesson.

## Unit snapshot

Lesson	At a glance
Lesson 1: What is wool?	<ul style="list-style-type: none"><li>To provide a hands-on shared experience about what different materials feel like.</li><li>To explore what students already know about wool, where it comes from and how it is used in everyday products.</li><li>To draw out questions students may have about wool.</li></ul>
Lesson 2: Wool — taking a closer look	<ul style="list-style-type: none"><li>To allow students to investigate the observable features of the wool fibre in more detail.</li><li>To discuss how these features make wool a useful fibre for everyday products.</li></ul>
Lesson 3: Does wool burn?	<ul style="list-style-type: none"><li>To allow students to observe and compare the flammability of a range of common fabrics and draw conclusions about the suitability of these fabrics for a range of everyday uses.</li></ul>
Lesson 4: Is wool stain resistant?	<ul style="list-style-type: none"><li>To allow students to investigate the capacity of wool and cotton to resist stains and draw conclusions about the suitability of these textiles for a range of everyday uses.</li></ul>
Lesson 5: How do the properties of wool influence its end use?	<ul style="list-style-type: none"><li>To allow students to reflect on their observations regarding the properties of wool and draw conclusions about the suitability of wool for a range of everyday uses and activities.</li></ul>

## Safety in the classroom

Learning to use materials and equipment safely is central to working scientifically. It is important, to review each lesson before teaching to identify and manage safety issues specific to a group of students.

The following guidelines will help minimise risks:

- Be aware of the school's policy on safety in the classroom and for excursions.
- Carry out activities beforehand to identify potential risks.
- Caution students about potential dangers before they start any activity.
- Clean up spills immediately as slippery floors are dangerous.
- Instruct students never to taste, smell or eat anything unless they are given permission.
- Discuss and display a list of safe practices for science activities.

## Pre-lesson preparation, materials and equipment

The LEARN ABOUT WOOL factsheets and videos listed below provide ample background information to carry out this lesson and answer a range of questions posed by students.

A range of additional resources is available in the LEARN ABOUT WOOL online resource library.

### Useful resources:

LEARN ABOUT WOOL factsheets

- [What is wool?](#)
- [How wool grows](#)
- [Inside a wool fibre](#)
- [Properties of wool](#)
- [Wool — the natural fibre](#)
- [Different types of wool fabrics](#)

Video

- [Sam the Lamb — What is wool?](#)

Useful links

- [Enviro-stories library](#)
- [Bitesize UK | Design and technology fibres](#)

Useful books

- *The Story of Wool book* (Kondinin Group)
- *It's time to sleep you crazy sheep*, Alison Ritchie
- *One sneaky sheep, (A touch-and-feel fluffy tale)*
- *Pete the Sheep*, Jackie French and Bruce Whatley
- *Click go the shears, illustrated by Charlotte Lance*

## Materials and equipment

- AWI LEARN ABOUT WOOL kit fabric and fibre samples
- A range of objects made from various materials (e.g. wood, metal, polystyrene, plastic, glass, rubber, cotton, wool, lycra)
- Cardboard boxes to hold objects so students cannot see the objects while they feel them.
- A range of clothing and furnishings made from wool, cotton and other fibres (socks, blankets, jumpers, t-shirts, pyjamas, sportswear, baby clothes etc). Try to include a range of wool items ranging from worsted-spun woven and knitted (e.g. T-shirts and tailored pants or skirts) through to woollen-spun woven and knitted fabrics (e.g. heavy winter coats and jumpers — see the [Different types of wool fabrics](#) factsheet for ideas).
- Class science journal
- Student worksheet — *Properties of materials*

### Lesson objective:

- To capture students' interest and introduce them to the language used to describe the properties of everyday materials.
- To explore what students know about the origins of everyday fabrics they are familiar with.
- To introduce students to the concepts of 'natural' and 'synthetic' fibres.
- To draw out questions from students about where wool comes from and what it is used for.

### Students will have the opportunity to:

- explore and make observations about a range of materials
- discuss the different uses for fabric/textiles (e.g. clothing, bedding and furnishings) and investigate the sources of the textiles used in a range of everyday products (e.g. animals, plants and petrochemicals).
- explore the difference between natural and synthetic fibres
- identify the source of wool.

### Setting the context

Many students will have little knowledge about, or experience with, the origin of the textiles (fabrics) used in everyday items of clothing and furnishing. They may not understand the difference between 'natural fibres' and 'synthetic fibres' or appreciate the different properties of a wide range of fibres. This lesson will allow students to explore a range of textiles and fibres and their observable properties (such as texture, strength, elasticity).

### Lesson focus

The focus of this lesson is to spark students' interest, stimulate their curiosity, raise questions for inquiry and gain an understanding of their existing beliefs about the textiles and fibres they come into contact with every day. These existing ideas can then be taken account of in future lessons.

### Introduction

Divide students into small groups and encourage them to explore the range of objects in the 'touch and feel' boxes (where the items are hidden from view and the students can only feel the contents of the box). Ask students to share their observations as they explore the items.

Encourage them to describe the way the items feel.

When each group has had the opportunity to feel the items, ask students to return to their seats and share their observations. Write their descriptions in a class science journal. Ask students if they can guess what the items are and how they are drawing their conclusions.

### Body of lesson

1. Explain to students that different objects are made from different materials, which have different 'properties'. Write the word 'properties' in the class science journal. Explain that the word properties can be used to describe 'the way an object looks, feels, smells, tastes or behaves in certain situations'.
2. Allow students to complete the worksheet *Properties of materials*. Ask students why they think each of the items in the worksheet has been made using these materials. Guide the discussion with questions, such as:
  - "What would happen if the jumper was made of paper instead of wool?"
  - "Why do you think bottles are made of glass or plastic and not paper?"
  - "What would it feel like wearing thongs made of wood or metal?"
  - "What would happen if coins were made of chocolate instead of metal?"

### Conclusion

Explain to students that during this unit of work you are going to investigate the properties of one of Australia's most important fibres — wool — and how these properties influence the way we use wool in a range of everyday products.

Ask students if they know where wool comes from and if necessary, explain that wool comes from sheep (you could read to students the information on the LEARN ABOUT WOOL factsheet [What is wool?](#) and [How wool grows](#), in particular students may be interested in the Did you know? facts about wool on each factsheet).

Ask students if they can guess which items in the 'touch and feel' boxes were made from wool. Identify the wool items in the collection of objects the students have been exploring and review their descriptions of these items, asking when they might wear or use these items and why.

## Extension activity

Explain to students that wool is a 'natural' fibre. Ask students to guess what that might mean and write their predictions in the class journal under the heading **Natural fibres**. Using the factsheet [Wool the natural fibre](#), as a reference, explain to students that the clothes they wear each day can be grouped into 'natural' and 'synthetic' fibres. Talk about other 'natural' fibres, such as cotton and silk and 'synthetic fibres' such as polyester and lycra using samples from the earlier investigation as examples.

You might like to allow students to explore some of the stories on the [Envirostories website](#) — Our Farmers Our Future, such as [Fluffy's getting shorn](#) and [My life on a sheep farm](#) — or share stories such as, *It's time to sleep you crazy sheep* by Alison Ritchie, *One sneaky sheep*, (*A touch-and-feel fluffy tale*), *Pete the Sheep*, by Jackie French and Bruce Whatley or *Click go the shears* illustrated by Charlotte Lance.

## Links to the Australian curriculum:

- Objects are made of materials that have observable properties ([ACSSU003](#))
- Science involves exploring and observing the world using the senses ([ACSHE013](#))
- Respond to questions about familiar objects and events ([AC SIS014](#))
- Explore and make observations by using the senses ([AC SIS011](#))



# PROPERTIES OF MATERIALS

LEARN  
ABOUT WOOL

Help Sam the Lamb by drawing a line joining the objects below to the words that describe them. See if you can draw a line from each object to the word that describes the material it is made from.

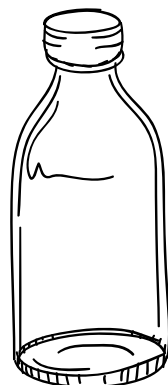


bendy

soft

shiny

see through



glass

wool

rubber

metal

Name: .....



## Pre-lesson preparation, materials and equipment

The LEARN ABOUT WOOL factsheets and links listed below provide ample background information to carry out this lesson and answer a range of questions posed by students.

A range of additional resources is available in the [LEARN ABOUT WOOL online resource library](#).

To allow students to see the wool fibre more closely you will need to provide access to magnifying glasses and/or a microscope. If using a microscope you will need to set up a sample slide before the lesson so children can see the fibre without needing to adjust the microscope or set up the microscope so the slide can be seen on through an image projector onto a screen at the front of the classroom.

Students will not be able to observe the microscopic scales on the wool fibre, which are only visible under an electron microscope, but these can be seen on the front of the LEARN ABOUT WOOL kit [Inside a wool fibre](#) factsheet and [Structure of a wool fibre](#) poster.

## Useful resources:

LEARN ABOUT WOOL factsheets

- [What is wool?](#)
- [Wool production in Australia](#)
- [How wool grows](#)
- [Inside a wool fibre](#)
- [Properties of wool](#)

Videos

- [Sam the Lamb — What is wool?](#)
- [The innovator](#)

LEARN ABOUT WOOL poster

- [Structure of a wool fibre](#)

Useful link

- [Science Learning Hub: Wool fibre structure and properties](#)

Useful book

- *The Story of Wool book (Kondinin Group)*

## Materials and equipment

- AWI LEARN ABOUT WOOL kit greasy (raw) wool fibre sample. If possible access an entire fleece for display in the classroom and for students to explore (touch and feel).
- Class journal to record student reflections
- LEARN ABOUT WOOL student worksheet:
  - *Looking at wool more closely*
- Magnifying glasses and /or microscopes
- Videos:
  - [Sam the Lamb — What is wool?](#)
  - [The innovator](#)
- LEARN ABOUT WOOL factsheets:
  - [How wool grows](#)
  - [Inside a wool fibre](#)
- LEARN ABOUT WOOL poster:
  - [Structure of a wool fibre.](#)

### Lesson objective:

- To allow students to investigate the raw wool fibre more closely .
- To draw out questions from students about how the physical (observable) features of greasy (raw) wool make it a useful for a range of everyday products.

### Students will have the opportunity to:

- explore and make shared observations about the wool fibre
- gain an appreciation of how the physical properties of the wool fibre contribute to the final properties of the wool product.

### Setting the context

The wool fibre has a number of structural features that give wool its unique properties as a fibre and textile. The diameter (micron) of the wool determine how fine the final yarn and fabric will be, the crimp (wave) gives wool its natural insulation properties.

The grease that surrounds each wool fibre (lanolin) is removed during processing and used in a range of beauty products.

Each wool fibre is covered in tiny scales, which are important in making felts and traditional wool cloth.

### Lesson focus

The focus of this lesson is to spark students' interest, stimulate their curiosity, raise questions for inquiry and gain an understanding of their existing beliefs about wool. These existing ideas can then be taken account of in future lessons.

### Introduction

Review the class journal descriptions from Lesson 1 and discuss the observations students made about the wool products they explored during this lesson.

Ask students what they can remember about wool from the previous lesson (e.g. "where does wool comes from?"). Record their answers in the class journal under the heading *What we know about wool*. If necessary, remind students wool is a natural fibre produced by sheep.

### Body of lesson

1. Explain to students that wool has some unique features, called 'properties', which help protect sheep in all kinds of weather (review from Lesson 1 the meaning of 'properties'). Play the [Sam the Lamb — What is wool?](#) video. Discuss with students what kinds of properties they think wool might have? Encourage discussion by asking questions like:
  - "How does wool protect sheep from cold weather?"
  - "How does wool protect sheep from wet weather?"
2. Show students the [Wool production in Australia](#) poster and explain the red and green areas are where most of the sheep in Australia are kept for wool production. Discuss with students the types of weather common in these areas during different seasons: for example, Tasmania is very cold in winter, central NSW is very hot in summer. Ask students what sort of conditions sheep might need protection from during the seasons (e.g. sun, wind, rain, snow). Explain that their wool fleece has properties that help protect sheep from all these weather conditions. Explain to students they are going to have a closer look at samples of raw (greasy) wool, share their observations with the class and record them using drawings and words.
3. Distribute to students the *Looking at wool more closely* worksheet. Ask students to predict what they think wool looks like up close and draw their predictions in the table on the worksheet under the heading '*Before a close look*'.
4. Allow students to explore the raw (greasy wool) fibre sample provided in the hard copy LEARN ABOUT WOOL kit, or a wool fleece if you have been able to access one. Encourage students to try and stretch a section of the wool staple and feel how strong the fibre is. Ask if they can see the wrinkles (crimp) in the wool staples or whether the wool feels greasy. Ask students to share their observations as they explore the raw fibre. Encourage them to describe the way the items look, feel, and smell. Add the students' descriptions to the class science journal under the heading *Looking at wool more closely*.

5. Using the information on the [How wool grows](#) and [Inside a wool fibre](#) factsheets and the [Structure of a wool fibre](#) poster as a reference, explain to students the how physical properties of wool they have just been exploring including: the crimp (waves), the staple (it's length and strength) and the lanolin (grease) all help protect the sheep from the weather.
6. Ask students to compare and describe the differences between their own hair and the samples of raw wool they have been investigating. Draw students' attention to the *Did you know?* and *Fun facts* on the [How wool grows](#) and [Inside a wool fibre](#) factsheets, which compare human hair and wool. If possible, display these factsheets on a smartboard or screen for the whole class to see.
7. Allow students to explore further the wool fibre using a magnifying glass and/or microscope and ask them to draw what they see on their worksheets under the heading *After a close look*. Help students apply basic labels to their diagrams including: wool staple (as a heading) and crimp (to indicate the waves).
8. Discuss how the features of wool they have been investigating in this lesson might relate to the wool items they investigated in Lesson 1 (e.g. if wool helps to keep sheep warm when it is cold and cool when it is hot, wool clothing can do the same for people).

## Conclusion

Play the video [The innovator](#). Ask students to think about the types of weather conditions and activities in which they might choose to wear wool. Encourage students to explain their choices. Note students' response in the class journal.

Explain that during then next few lessons you will be investigating further the unique properties of wool and how these properties influence the way we used wool in a range of everyday products.

## Links to the Australian curriculum:

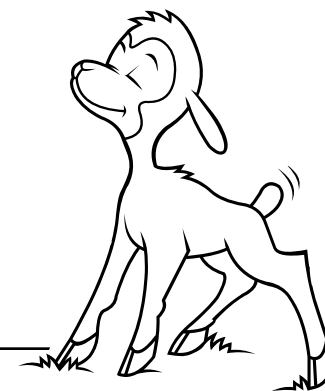
- Objects are made of materials that have observable properties ([ACSSU003](#))
- Science involves exploring and observing the world using the senses ([ACSHE013](#))
- Pose and respond to questions about familiar objects and events ([ACIS014](#))
- Participate in guided investigations and make observations using the senses ([ACIS011](#))
- Share observations and ideas ([ACIS012](#))
- Engage in discussions about observations and represent ideas ([ACIS233](#))

# LOOKING AT WOOL MORE CLOSELY

LEARN  
ABOUT WOOL

*Before a close look*

*After a close look*



Name: .....



## Pre-lesson preparation, materials and equipment

The LEARN ABOUT WOOL factsheet [Properties of wool](#), combined with the suggested resources listed below will give you ample background information to carry out this lesson and answer a range of questions posed by students.

A student worksheet *Does wool burn?* has been provided for you to distribute to students for recording their predictions and their observations from this lesson.

## Useful resources:

LEARN ABOUT WOOL kit factsheet:

- [Properties of wool](#)

Video:

- [Sam the Lamb – Does wool burn?](#)

Additional resources:

- IWTO: [Wool and fire](#) factsheet
- IWTO: [Wool and flame resistance](#) factsheet

## Materials and equipment

- Class journal to record student reflections
- Video:
  - [Sam the Lamb – Does wool burn?](#)
- LEARN ABOUT WOOL student worksheet:
  - *Does wool burn?*

### Lesson objective:

- To allow students to observe and compare the flammability of a range of common textiles and draw conclusions about the suitability of these textiles for a range of everyday uses.

### Students will have the opportunity to:

- observe the flammability of wool compared with a range of natural and synthetic fibres
- consider the implications of flammable fibres in a range of everyday uses.

### Setting the context

Wool's chemical structure makes it naturally flame resistant. It is a highly-trusted natural fibre in public areas such as hotels, aircraft, hospitals and theatres.

Wool is harder to ignite than many common textile fibres. While cotton catches alight at 255°C, the temperature must reach 570–600°C before wool will ignite; while polyester melts at 252–292°C and nylon succumbs at an even lower 160–260°C, wool never melts so it can't stick to the skin like many common synthetics.

### Lesson focus

The focus of this lesson is to encourage students to think about the link between the properties of a fibre and the implications for its end use, in particular why wool is a safe fibre to wear or to use in home furnishings.

### Introduction

Review the class science journal 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.

Explain to students that wool has some unique features we can't see, but we can test for, such as flammability.

Ensure students understand that flammability describes whether or not a material will burn easily or not. Explain to students they will be watching a video about the flammability of a range of fabrics.

### Body of lesson

1. Distribute the student worksheet sheet *Does wool burn?* to students and explain you will be asking them to predict what will happen when each of the fabrics (textiles) is exposed to a flame. They will need to record their predictions before the video demonstration and their observations after they have watched the video demonstration.
2. Start the video [Sam the Lamb — Does wool burn?](#) stopping before each fabric is exposed to the flame. Ask students to predict what will happen when each fabric is exposed to the flame and circle the corresponding option on their worksheet.
3. Following each demonstration, ask students to describe what happened during the demonstration. Discuss whether what happened matched their predictions. Ask students to record what happened on their worksheet by circling the appropriate option.
4. Repeat this process for each fabric type.
5. In light of the results of this activity, discuss with students the relative safety of each of the fabric types in the event of a fire. Ask students to complete their worksheet by circling the safest (least flammable) option shown at the bottom of the sheet. Discuss with students the implications of this experiment in regards to the safety of furnishings and clothing, such as children's pyjamas, drying clothes on a heater or near a fire, or furnishings such as curtains, floor coverings and bedding.

### Conclusion

Ask students to help you write a sentence to describe the fire-resistant properties of wool and add this to your class science journal under the heading *Is wool flammable?*

Explain that during the next few lessons you will be investigating further the unique properties of wool and how these properties influence the way we use wool in a range of everyday products.

### Links to the Australian curriculum:

- Science involves exploring and observing the world using the senses ([ACSH013](#))
- Pose and respond to questions about familiar objects and events ([ACSI014](#))
- Explore and make observations by using the senses ([ACSI011](#))
- Share observations and ideas ([ACSI012](#))
- Engage in discussions about observations and represent ideas ([ACSI233](#))

# DOES WOOL BURN?

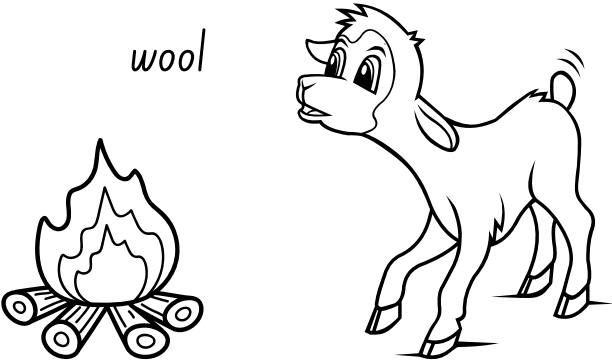
Fabric type	My predictions		My observations	
polar fleece	crumble	burn slowly	crumble	burn slowly
	burn quickly	melt	burn quickly	melt
cotton	crumble	burn slowly	crumble	burn slowly
	burn quickly	melt	burn quickly	melt
wool	crumble	burn slowly	crumble	burn slowly
	burn quickly	melt	burn quickly	melt

Draw a circle around the name of the fabric you think is the safest if there is a fire.

polar fleece

wool

cotton



Name: .....





## 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 on 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 their observations from this lesson.

## Useful resources:

LEARN ABOUT WOOL kit factsheets:

- [Properties of wool](#)

## Materials and equipment

- Enough white cotton and wool socks to share among small groups of students.
- Eyedroppers
- 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*

### 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 properties of a fibre and the implications for its end use.

### Introduction

Review the class science journal 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 you will be asking them to predict what will happen when you drop coloured water onto the cotton socks and wool socks. They will need 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 and tell students you will place a droplet of coloured water on each sock and ask them to observe what happens to the water.
3. Ask students to predict what will happen when the water is placed on the socks and get them to circle the corresponding option on their worksheet.
4. Using 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. 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. Ask students to record what happened on their worksheet by drawing what they observed.
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 split a drink while wearing a wool T-shirt, 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.

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

### Conclusion

Ask students to help you develop a sentence to describe the water and stain-repellent properties of wool and include this in your class journal.

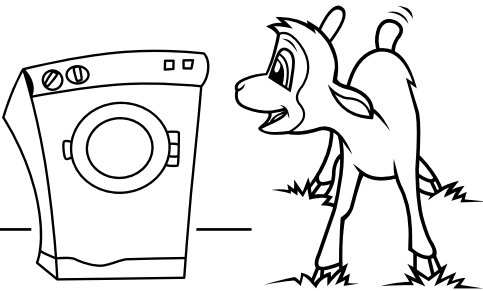
Explain that during the next lesson you will be considering how the properties you have been investigating influence the way we used wool in a range of everyday products.

**Links to the Australian curriculum:**

- Science involves exploring and observing the world using the senses ([ACSH013](#))
- Pose and respond to questions about familiar objects and events ([ACSI014](#))
- Explore and make observations by using the senses ([ACSI011](#))
- Share observations and ideas ([ACSI012](#))
- Engage in discussions about observations and represent ideas ([ACSI233](#))

# RESIST THAT STAIN

Fabric type	My predictions (Circle the answer below that matches your prediction.)	My observations (Draw what you observed when the coloured water was dropped onto the fabric.)
wool	absorb the coloured water  repel the coloured water	
cotton	absorb the coloured water  repel the coloured water	



Name: .....



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

The LEARN ABOUT WOOL factsheet [Properties of wool](#), combined with the suggested teacher reference resources listed below will give you ample background information to carry out this lesson and answer a range of questions posed by students.

This activity will involve asking students to reflect on what they have learnt about the properties of wool during the past few lessons and encouraging them to think about how these properties influence the suitable end uses for wool.

### **Useful resources:**

LEARN ABOUT WOOL kit factsheets:

- [Properties of wool](#)
- [Different types of wool fabrics](#)

Sam the Lamb videos

- [Sam the Lamb — Properties of wool](#)

The Woolmark Company videos

- [The innovator](#)
- [Merino the baby wool](#)
- [Merino Activewear](#)
- [Merino wool in sports and activewear](#)

PIEFA video:

- [Exploring Australian approaches to producing cotton, timber and wool](#)

## **Materials and equipment**

- Video:
- [Sam the Lamb — Properties of wool](#)
- LEARN ABOUT WOOL kit factsheets:
  - [Properties of wool](#)
  - [Different types of wool fabrics](#)
- A range of wool clothing and furnishings from Lesson 1
- Backpacks and suitcases
- Class journal to record student reflections

## Lesson objective:

- To allow students to reflect on their observations regarding the properties of wool and draw conclusions about the suitability of wool for a range of everyday uses and activities.

## Students will have the opportunity to:

- consider the implications of wool's unique properties and draw conclusions about its suitability in a range of everyday uses.
- take part in informal and guided discussions relating to their observations
- use drawings to represent observations and ideas and discuss their representations with others
- communicate ideas through role play and drawing.

## Setting the context

Wool's range of unique properties make it an ideal fibre for many everyday applications. Wool is soft, comfortable, safe and environmentally sound.

During this lesson and possibly through their own experience, students will see wool used in a range of contexts.

## Lesson focus

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

## Introduction

Using the class journal, reflect with students what they now know about wool — where it comes from, how it feels, and some of its hidden properties (e.g. fire and stain resistance).

Explain to students that during this lesson they are going to think about some of the ways wool can be used in everyday items of clothing and furnishings, such as curtains and bedding.

## Body of lesson

1. Using the [Properties of wool](#) and [Different types of wool fabrics](#) factsheets as reference guides, review with students the different properties of wool they have investigated (e.g. softness, fire resistance) and some they may not yet be aware of (e.g. breathable, renewable, biodegradable etc).
2. Draw students' attention to the *Did you know?* and *Fun facts* on the factsheets, which expand upon how these properties are applied in end products (such as sportswear).
3. Show students the [Sam the Lamb — Properties of wool](#) video and discuss the concepts shown in the film with students. Ask questions such as:
  - "Why is wool clothing good for sportswear?"
  - "What makes wool safe to wear?"
  - "What makes wool comfortable to wear?"
4. Using the class science journal as a prompt, ask students what they have learnt about the properties of wool during the past few lessons. Encourage them to think about how wool feels, whether wool is a 'safe' fibre in the case of a fire and what happens when wool is exposed to water. Ask students if they have any wool clothing at home and when they might wear wool clothing.
5. Explain to students they are going to explore how wool might be used in a range of everyday situations through a role-play activity. Divide the class into small groups (3 – 4 students) and provide each group with one of the following scenarios — a trip to the snow | bushwalking or going to the park on a cold day | going to a bonfire night | playing football or riding a bike in summer | buying clothes or bedding for a newborn baby.
6. Ask students to sort through the range of items provided and pack a suitcase or bag with items that will be suitable for their given situation. Tell them they will need to explain to the rest of the class the situation they are in and why they have chosen those particular items. For example, the group going skiing might select layers of wool items such as t-shirts, long-sleeved pull-overs and a wool jacket and the group playing football or riding a bike in summer might choose a wool t-shirt to protect them from the sun and keep them cool while they are active. If you do not have access to a wide range of wool items students could draw items that would suit their scenario and label them.

7. When students are ready ask each group to present to the class. Encourage them to explain their situation, describe the items they have chosen and why they have chosen these items. Draw out from the students the particular properties of wool that have led them to make these choices during their presentation.

## Conclusion

Regroup in front of the class science journal or mind map. On the right-hand page write the heading, *Properties of wool*. Ask students to name one property of wool they have investigated during this unit.

Ask the students the following questions:

- “Where does wool come from?”
- “Is wool a natural or synthetic fibre?”
- “In what ways does wool protect sheep?”
- “What does wool feel like?”
- “Is wool flammable?”
- “Could you wear wool on a rainy day?”
- “Why is wool good to wear in summer and winter?”

## Extension activity

Ask students to draw a picture of themselves wearing or using their favourite wool item from the collection that has been on display during the unit of work on the properties of wool. Beside their drawing ask students to write a list of properties, from class science, that relate to why they like this particular item (e.g. soft, warm, safe etc). Students can share their drawings with the class and explain why they chose this item.

## Links to the Australian curriculum:

- Pose and respond to questions about familiar objects and events ([ACSYS014](#))
- Share observations and ideas ([ACSYS012](#))
- Engage in discussions about observations and represent ideas ([ACSYS233](#))