

Pre-lesson preparation, materials and equipment

The LEARN ABOUT WOOL online resource library, 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. [The Woolmark Learning Centre Wool Appreciation Course Module 5](#) is a useful resource which provides more detailed background information on how wool is spun into yarn.

Useful resources:

LEARN ABOUT WOOL factsheets

- [From farm to fashion](#)
- [Inside a wool fibre](#)

LEARN ABOUT WOOL poster

- [Structure of a wool fibre](#)

Useful link

- [Wool fibre animation Discovering wool](#)

Useful book

- *The story of wool* (Kondinin Group)

Videos

- [Wool fibre animation Discovering wool](#)
- [How to spin yarn using a drop spindle](#)
- [How to use a spinning wheel](#)
- [AWI spinning video](#)

Materials and equipment

- Sufficient quantity of wool top for class
- Scissors
- LEARN ABOUT WOOL kit fibre, yarn and fabric samples
- Class science journal
- *The story of wool* book (Kondinin Group)
- LEARN ABOUT WOOL factsheets
 - [From farm to fashion](#)
 - [Inside a wool fibre](#)
- LEARN ABOUT WOOL poster
 - [Structure of a wool fibre](#)
- Video
 - [Wool fibre animation Discovering wool](#)

Lesson objective

To allow students to manipulate wool by spinning and record the process through which they physically changed the raw wool sample into yarn.

Students will have the opportunity to:

- manipulate wool using twisting
- discuss their observations as a whole class to identify similarities and differences in their investigations
- share their work with others.

Lesson focus

The focus of this lesson is to allow students to explore the way wool can be physically changed by twisting and used to create everyday products.

Setting the context

Spinning is the process that twists the wool fibres together to produce a strong yarn ready for knitting or weaving. There are two main types of yarn:

- Woollen-spun yarns are hairy and contain more short fibres and tend to be used for jumpers and blankets.
- Worsted-spun yarns use longer fibres to produce smoother yarns, which are used in products like suits and next-to-skin knitwear.

By investigating the structure of the wool fibre using digital resources, students will develop an understanding of the how the wool fibre can be processed into yarn. They will learn how to undertake these processes by hand and participate in activities allowing them to create their own yarn samples.

Students can then create their own yarn with a partner. They can then compare their creations with those in the LEARN ABOUT WOOL kit. Each student can record the stages of their creative process in an accordion book to complete this lesson.

More background information on wool processing can be found in the LEARN ABOUT WOOL online resource library or the [Woolmark Learning Centre Wool Appreciation Course](#).

Introduction

Using the class journal, reflect with students what they now know about wool — where it comes from and how it is processed into yarn and fabric.

Explain to students that during this lesson they will have the opportunity to create their own wool yarn using their hands.

Body of lesson

1. Show students the wool fibre animation: [Discovering wool](#). Point out the key features of the structure of the wool fibre, taking particular note of the scales on the surface of each fibre. Reinforce this feature by referring students to the LEARN ABOUT WOOL poster [Structure of a wool fibre](#) and the factsheet [Inside a wool fibre](#). Explain that the scales (also known as cuticle cells) are important for protection, felting behaviour and handle (feel) of wool products. The shape of the surface scales varies with the type of animal. The number of layers of scales on the surface of the fibre also varies with the type of animal, with sheep having ~2-3 layers, while human hair can have up to 10 layers. The scales overlap and are layered in a single direction. This arrangement gives animal fibres their unusual frictional properties. Explain to the students that they are able to feel the scales on the surface of their own hair by taking one or two strands of hair from their head and stroking the hair up and down with their fingers. They should be able to feel the resistance is greater when the fibre is stroked towards its base (their scalp), than when the fibre is stroked towards its tip. This characteristic of the wool fibre means that when wool is wet and agitated, the scales contribute to the friction between the fibres, resulting in entanglement of the fibres and is seen as a thickening or matting of the woollen fabric. This change is permanent and cannot be reversed.
2. Explain to students that they will be using wool top for this practical activity. Ask students if they can recall which part of the wool processing journey top is produced. If necessary, reinforce the stage at which wool top is produced by replaying the *Wool processing* video, stopping after the top-making stage. Wool top is produced from raw fleece (also known as greasy wool) shorn from the sheep which is then washed (scoured) to remove contaminants. This wool is then carded, gilled and combed, resulting in a collection of aligned fibres, without twist, ready for spinning. The structure of the wool fibre with the presence of surface scales is also a feature of the spinning process. The friction between the fibres keeping them together as they are twisted increases the strength of the yarn and allows it to withstand the strains of subsequent processing such as weaving and knitting.
3. Allow students to watch the instructional videos on hand spinning listed at the beginning of this lesson. Divide the students into pairs and distribute a small amount of wool top and scissors to each pair.
4. Students can work with a partner and see if they can draw out a small piece of wool top and twist it without breaking

it, with the partner holding one end and twisting at the same time. As they undertake the activity, encourage them to think about how the wool is being changed from wool top to yarn. What are some of the actions they are taking which are changing the shape of the wool top?

5. Students could have a class competition to see which pair can create the longest piece of 'spun' yarn. Alternatively, they could see which pair's yarn is the strongest (greatest tensile strength) by attaching weights to the end of the yarn and determining the breakpoint.
6. Show students the [AWI spinning video](#) and discuss the differences between the method they used to create their yarn and how yarn is manufactured on an industrial scale. Compare this with the methods shown in the hand-spinning videos (spindle and spinning wheel techniques). Record their observations in a class science journal or on the board, under the heading *Spinning- differences and similarities*.

Conclusion

Encourage students to compare their spun products to the spun yarn samples from the LEARN ABOUT WOOL kit. Ask them to identify the similarities and differences between their creations and those commercially manufactured. These can be recorded in the class science journal or on the board.

Extension activity

If you can access a spinning wheel or spindle, demonstrate the process of hand spinning to the class. A community member, skilled in woollen crafts such as spinning, can be invited into the classroom to share their work.

Students can revisit *The story of wool* (Kondinin group) for more examples of the spinning process.

Links to the Australian Curriculum:

- Everyday materials can be physically changed in a variety of ways ([ACSSU018](#))
- Science involves observing, asking questions about, and describing changes in, objects and events ([ACSHE021](#))
- Participate in guided investigations to explore and answer questions ([ACSI025](#))
- Represent and communicate observations and ideas in a variety of ways ([ACSI029](#))
- Use materials, components, tools, equipment and techniques to safely make designed solutions ([ACTDEP007](#))
- Explore the characteristics and properties of materials and components that are used to produce designed solutions ([ACTDEK004](#))