

Summary of learning goals

- To use direct comparison to order a collection of objects from shortest to longest. Students order their collection using a variety of strategies, and record and talk about their results appropriately.

Australian Curriculum: Mathematics (Foundation)

ACMMG006: Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language.

Summary of lessons

Who is this sequence for?

- This sequence has been written as an introduction to measurement. Students do not need to have prior experience in making direct and indirect comparisons. They should be able to count with one-to-one correspondence to at least 20.

Lesson 1: Five Woolly Worms

Students are provided with a bag of 'worms' (i.e. pieces of wool). They use direct comparison to order their worms from shortest to longest, then create another two woolly worms to add to their collection.

Lesson 2: Drawing Worms

Students use chalk to draw three wiggly worms on concrete. They then compare the lengths of the worms using informal units or indirect comparison.

Reflection on this sequence

Rationale

A key concept in measurement is that objects have multiple attributes that can be measured. This sequence focuses students' attention on the attribute of length. The students initially measure length using direct comparison and then move to using indirect comparison. Comparing items directly helps students develop an understanding of length. Indirect comparison requires the students to use appropriate informal units to compare the length of objects. Using direct and indirect comparison allows students to order the length of objects and build associated language.



reSolve mathematics is purposeful

- This sequence focuses on a substantial mathematical idea: that shapes or objects have attributes that can be measured. Length is one of these attributes. Students explore this idea through a hands-on context that is imaginative and engaging.



reSolve tasks are inclusive and challenging

- The task begins with students directly comparing the length of their 'worms'. This shared experience helps facilitate the more abstract task of comparing lengths using indirect comparison.



reSolve classrooms have a knowledge-building culture

- The class builds a shared understanding of how to measure length accurately, using direct and indirect comparison.

Acknowledgements

These lessons were adapted from: McDonough A, Cheeseman J & Clarke D, 2003, *Woolly worms: teaching notes*. In: Bright G & Clements D, eds, *Classroom activities for learning and teaching measurement*, pp. 3–6, National Council of Teachers of Mathematics, Reston, VA.

Five Woolly Worms

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About this lesson

Students are provided with a bag of 'worms' (i.e. pieces of wool). They use direct comparison to order their worms from shortest to longest, then create another two woolly worms to add to their collection.

Australian Curriculum: Mathematics (Foundation)

ACMMG006: Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language.

Mathematical purpose

- Students use direct comparison to order students' collection of woolly worms from shortest to longest.

Learning intention

- To use a variety of strategies to compare lengths.



Time

A lesson of approximately 1 hour.



Vocabulary

- compare
- length
- measure



Resources

- Wool of different colours/thicknesses/textures, cut into 10–30 cm lengths and sorted into bags, each containing three different lengths (one bag per two students)
- Extra wool for students to make their own worms

How long are your worms?

Introduce the context of worms to the students.



Resources: Provide each pair of students with a bag containing three woolly worms of different lengths and different colours.

Before students handle the worms, ask them to look at the worms in their bag and guess which worm they think is the longest and which is the shortest.

Ask students to remove the worms from the bag, compare their length and order them from shortest to longest.



Teacher notes:

Look at the strategies that the students are using.

- Are students straightening the wool?
- Do they align the ends of the wool to enable direct comparison?

Making woolly worms

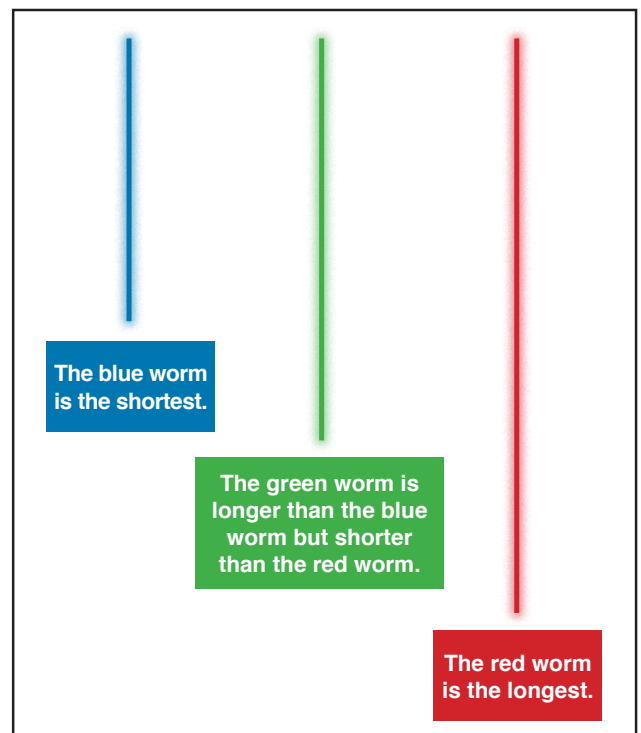


Resources: Provide the students with wool and ask them to make two more woolly worms. Explain that one of these worms must be longer than the longest worm in the bag, and that the other must be longer than the shortest worm in their bag but shorter than the longest worm in their bag. Ask students to decide where to cut the wool to make their worms, without directly comparing them with the worms in their bag.

Ask students to order their collection of five worms from shortest to longest. *Do the two new worms fit into the correct place?*

Have students explain how they know they have their worms in the correct order. Again, observe the strategies that the students use.

Have students record their work. They might draw a picture of their worms ordered from shortest to longest.



Comparing worms

Ask students to compare their woolly worms with another group's worms. Ask them to identify the longest worm and the shortest worm in the joint collection. Ask them to informally describe how much longer the longest worm is than the shortest.

As a class, use direct comparison to work out who has the longest worm and who has the shortest worm. Use this time to discuss and model ways of comparing lengths, including straightening the worms and lying them side-by-side with one end aligned.

Where to next?

In Lesson 2: Drawing Worms students draw worms on concrete and devise strategies to identify the longest and shortest worms.

Drawing Worms

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About this lesson

Students use chalk to draw three wiggly worms on concrete. They then compare the lengths of the worms using informal units or indirect comparison.

Australian Curriculum: Mathematics (Foundation)

ACMMG006: Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language.

Mathematical purpose

- To use informal units or indirect comparison to measure length.

Learning intention

- To compare the lengths of wiggly worms that are drawn on the ground.



Time

A lesson of approximately
1 hour.



Vocabulary

- compare
- length
- measure



Resources

- chalk
- appropriate space to draw on concrete
- a selection of objects that can be used as informal units of measure (e.g. cubes, ice-cream sticks or paperclips)
- string

Which is longest?

Have students draw three **wiggly** worms on concrete with chalk. The more wiggly the worms, the harder they will be to measure.

Ask the students to use their own strategies to work out which worm is the longest and which is the shortest.

Strategies might include:

- measuring with an informal unit, such as cubes, ice-cream sticks or paperclips
- using a piece of string (or previous woolly worms) to compare lengths.

Observe how students measure.

- Do they measure the length of the worm starting from one end and count each unit?
- Do students align the informal material without gaps and/or overlaps?

Have students record their findings.

Reflection

Have students share their strategies for finding the length of their worms. Discuss with students which worms were hardest to measure and which were easiest.

Discuss with students which measuring units were 'best' to use. For example, it is easy to count the number of ice-cream sticks but it is hard to line up ice-cream sticks along a wiggly worm; and it is easier to line up paperclips but it is harder to count them.