

# Perplexing perimeters

## Information about the unit

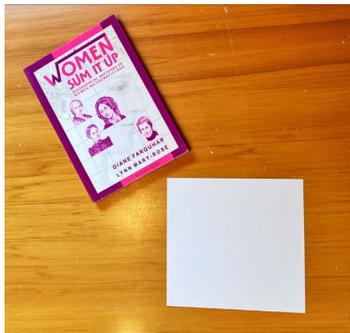
[Perplexing Perimeters](#) - nzmaths link

In this unit the students develop a sense of the size of a centimetre and metre as they construct their own "rulers". Students come to recognise the exactness of the measurement needed as they calculate the perimeter of objects.

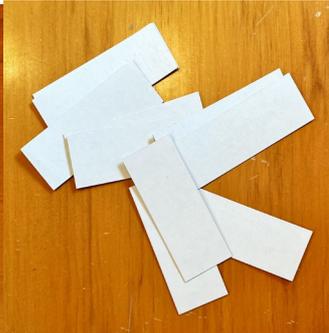
## Resources required

- book and card cut to a similar perimeter
- strips of heavy card (exactly 10cm long) - one per participant
- centimetre cubes
- centimetre rulers
- rolls of adding machine tape - cut into approx 3 metre lengths, for pairs, write on

## Equipment examples



Book plus card



10cm strips of card



cm rulers and cm cubes



adding tape

## Preparation

This workshop has a sequence of activities that all participants are involved in. There are two activities followed by wrap up questions.

# Activity 1

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## Resources

- book and card cut to a similar perimeter to the book
  - strips of heavy card cut to exactly 10cm
  - centimetre cubes (Cuisenaire rods are usually 1cm wide/high - use the “1” if possible, but others can be used as well)
  - centimetre rulers
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In this session participants will make their own centimetre rulers so that they can measure the perimeter of objects in the classroom.

1. Explain to your participants that two pet ants, Anton and Antonia, are having a race. Anton will race around the perimeter of this book and Antonia will race around the perimeter of this card.
  - Is the race fair?
  - Is it longer around the perimeter of this book or the card?
  - Can anyone tell me what perimeter means? (The perimeter of an object or shape is the measure around its edges.)
  - How could we find out which perimeter is longer?
2. Explain that the participants are going to make their own centimetre rulers.
  - What is a centimetre?
  - Can you show me with your fingers how big a centimetre is?
  - Can you find me something that is one centimetre long? (Centimetre cube, width of a pencil, thickness of a book, width of a fingernail, point to markings on a ruler)
  - Why are they called centimetres?  
Students may know that centi- is the prefix for ‘one hundredth’ so one metre is divided up into 100 centimetres, just like one dollar is divided into 100 cents.
3. Use a metre ruler to explain the relationship between metres and centimetres, if necessary
4. Give the participants a 10 centimetre long strip of card.
  - How long do you think this strip is?
  - How could we check? (Use a ruler, line centimetre cubes along the strip.)
5. Can you think of things that are this tall, wide or long?
6. Discuss how they can use the centimetre cube (unit place value block) to make centimetre markings on the strip.
  - What will the strip look like then?
7. Ask: Should we put the marks at the end or in the middle of the centimetres? (The markings are at the end of the unit and those units may need subdivision into smaller units, such as mm).
8. Talk about where the number markings are positioned and why they are at the “end” of each centimetre. Talk about where the “0” would go and how this relates to the “0” on commercially produced rulers.

- Why is having a zero mark important? (Zero is the conventional baseline to start measuring from)
- Why are numbers put on the ruler at all?



- Remind the participants that the problem is to compare the perimeters of the book and the card. Anton and Antonia are awaiting a decision.
  - How can you keep track of the measurement? (Record and then add the length of the sides later.)
  - Do you need to measure all of the sides?
  - What's the smallest number of sides you need to measure?
- Ask the participants to measure the sides to find the perimeter of the book and card.
  - Ask them to share their strategies - link this to number - provides a good opportunity to practice and share strategies for adding and multiplying numbers.
  - How did you combine the numbers?
- In pairs get participants to find two objects - books or similar - that have very similar perimeters. They can use their 10cm rulers to help them.

## Activity 2

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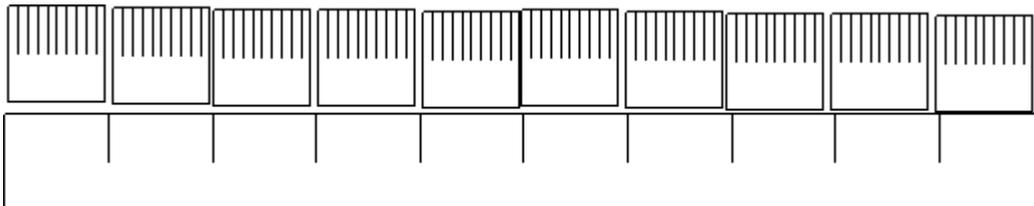
### Resources

- adding tape (or similar) - cut into approx 3 metre lengths
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In this session participants will make their own 3 metre tape to use for measuring larger perimeters.

- Tell your participants that you would like to know if the perimeter of the classroom is larger or smaller than the perimeter of **XXXXX** - this needs to be decided for the venue - select an area that is similar in size to the classroom.
  - How could we find out which is larger?
  - Are our centimetre rulers appropriate for this? Why not?
  - What could we use? (metres)
  - How many of our centimetre rulers make a metre?
  - How do you know?

- Line 10 of the rulers end to end to show a metre.



- Place a strip of adding machine tape, or other long paper strip, alongside the rulers and discuss how it can be used to make markings on the tape.

4. Give each pair of participants a 3-metre strip of paper and tell them that they are going to use their 10 cm ruler to create a metre measuring tape.
5. Circulate as the participants construct their tape.
  - How many centimetres in a metre?
  - How do you write centimetre?
  - What does this line mean on your tape?
  - Is it at the end of the metre or in the middle?
  - How many centimetres are there in 2 metres?
  - What objects would you choose to measure with the tape rather than the ruler?
  - How accurate is your tape? Why?
6. Remind the participants of the question that was posed at the start of the session and ask the participants to compare the perimeters of the two spaces.
  - How can you keep track of the measurement? (Record and then add the length of the sides later)
  - Do you need to measure all of the sides?
  - How accurate do you need to be? (As the question posed was one of comparison the level of accuracy will depend on how close the perimeters of the two objects are.)
7. If the measurement requires parts of metres to be used then discuss ways of recording these.  
1 m 20 cm                      120 cm
8. Provide other opportunities to use the metre strip to measure other perimeters, e.g.:
  - What are the perimeters of tables in this room? (Comparing perimeters is very interesting when the tables are different shapes, e.g. circles, trapeziums.)
  - What is a good perimeter if four people are going to work at a table?
  - Does the shape of the table matter?

## Wrap up

Where does this fit within the curriculum?

How can I use it with my students?

What adaptations would I make for it to fit my class?

Ask participants to pack the equipment up and then collect in. They can take their centimetre and metre rulers that they made with them.