

1 MILLIMETRE = 1 CUBIC CENTIMETRE, CONVERT BETWEEN LIQUID UNITS.

INVESTIGATIONS OVERVIEW PAGE

THIS PAGE IS A SUMMARY OF THE INVESTIGATIONS THAT STUDENTS MAY ENGAGE IN TO DEEPEN THEIR RELATIONAL UNDERSTANDING. INVESTIGATIONS WITH INSTRUCTIONS TO STUDENTS FOLLOW ON SUBSEQUENT PAGES.

- Children sit in pairs or small groups with a moisturiser box and jar to measure volume and capacity in cubic centimetres and millilitres. They measure the volume of the box in cubic centimetres. They convert the cubic centimetres to millilitres. They measure the volume of the jar in millilitres using displacement. They convert the millilitres to cubic centimetres. They explain relationship between the volume of the box and the volume of the jar. They measure the capacity of the jar in millilitres. They convert the millilitres to cubic centimetres. They fill the jar with water to the stated volume of moisturiser. They explain the relationship between the volume of the box, the volume of the jar, the capacity of the jar and the volume of moisturiser. **Reflection: What is the relationship between cubic centimetres and millilitres?**
- In pairs, children select numbers of millilitres or litres. They record a metric measurement chart and a place value chart as necessary. They convert between millilitres and litres, by multiplying / dividing by 1000. **Reflection: How can we use multiplicative place value to convert between litres and millilitres?**
- In pairs, children select numbers of litres or kilolitres. They record a metric measurement chart and a place value chart as necessary. They convert between litres and kilolitres by multiplying / dividing by 1000. **Reflection: How can we use multiplicative place value to convert between litres and kilolitres?**
- In pairs, children select numbers of kilolitres or megalitres. They record a metric measurement chart and a place value chart as necessary. They convert between kilolitres and megalitres by multiplying / dividing by 1000. **Reflection: How can we use multiplicative place value to convert between kilolitres and megalitres?**
- In pairs, children select numbers of millilitres, litres, kilolitres or megalitres. They record a metric measurement chart and a place value chart as necessary. They convert their number of millilitres, litres, kilolitres or megalitres to another unit of measurement by multiplying / dividing by 1000 or 1 000 000. **Reflection: How can we use multiplicative place value to convert between millilitres and litres and kilolitres and megalitres?**
- Children have a medicine measuring cup of about 30 millilitres. They fill the medicine measuring cup to 25 millilitres. They select 5 cubic centimetres and make a model to submerge. They submerge the model and note the volume of water displaced – 5 millilitres - as the volume of the volume of the model - 5 cubic centimetres. They then identify that 1 millilitre has a volume of 1 cubic centimetre. **Reflection: What is the relationship between cubic centimetres and millilitres?**
- In pairs, children select boxes and jars to measure volume and capacity in cubic centimetres and millilitres. They measure the volume of the box in cubic centimetres. They convert the cubic centimetres to millilitres. They measure the volume of the jar in millilitres. They convert the millilitres to cubic centimetres. **Reflection: What is the relationship between cubic centimetres and millilitres?**
- Children sit in pairs or groups. They have a price list from a garden centre that sells mulch by the cubic metre. They work out the volume of mulch needed in a garden of specified size, for example, 10 square metres, to a depth of 10 centimetres. **Reflection: How large is a cubic metre?**
- In pairs, children calculate the volume of water needed to fill a fish tank, for example, 1 metre by 50 centimetres to a depth of 70 centimetres. Children calculate

the capacity in cubic centimetres, then convert to millilitres. They convert their volume of water between kilolitres, litres and millilitres using multiplicative place value. **Reflection:** [What is the relationship between cubic centimetres and millilitres? How can we use multiplicative place value to convert between millilitres and litres and kilolitres and megalitres?](#)

- Children research to find the volume of water used in one flush of a toilet (or use the average volume of 6 litres per flush). They count the number of times they flush a toilet in one day / week. They convert the amount between millilitres and litres. They calculate the total volume of water flushed by the whole class and convert between millilitres, litres and kilolitres. They calculate the total volume of water flushed by the whole school and convert between millilitres, litres, kilolitres. They calculate how many days it would take before the school has flushed a megalitre of water. **Reflection:** [How can we use multiplicative place value to convert between millilitres and litres and kilolitres and megalitres?](#)
- Children calculate the volume of water needed to fill a swimming pool, 3 metres by 7 metres by 1.5 metres. They convert between millilitres, litres, kilolitres and megalitres. **Reflection:** [How can we use multiplicative place value to convert between millilitres and litres and kilolitres and megalitres?](#)
- In pairs, children investigate the capacity of a large fish tank and the volume of water a large fish tank would hold if filled to an appropriate depth. For example, the tank's dimensions may be 1 metre by 50 centimetres by 75 centimetres. Children calculate the volume of water in cubic centimetres, then convert to millilitres. Children mark an appropriate water level and repeat. **Reflection:** [What is the relationship between cubic centimetres and millilitres? How can we use multiplicative place value to convert between millilitres and litres and kilolitres and megalitres?](#)
- In pairs, children investigate how long it would take to fill a fish tank, after measuring the capacity of a large fish tank and the volume of water a large fish tank would hold if filled to an appropriate height. They measure the rate of flow of water from the tap in appropriate units, for example, ... millilitres per 10 seconds. **Reflection:** [What is the relationship between cubic centimetres and millilitres?](#)
- In pairs, children have rectangular containers with different dimensions. They calculate, then measure, the depth of 1 litre of water in containers with different dimensions. **Reflection:** [What is the relationship between cubic centimetres and millilitres?](#)
- Children keep a diary of their shower times for a week. They also measure the flow of water from their shower in 10 seconds. They add together the total volume of water used. They convert to cubic centimetres. They draw a scale model of rectangular container that would have that volume. **Reflection:** [What is the relationship between cubic centimetres and millilitres?](#)
- Children draw the containers and calculate the depth of 1 litre of water in containers with different dimensions for example:
 - a container with a base of 5 cm x 10 cm and height 40 cm
 - a container with a base of 20 cm x 10 cm and height of 15 cm
 - a container with a base of 30 cm x 7 cm and height of 10 cm

Reflection: [What is the relationship between cubic centimetres and millilitres?](#)

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Sit in pairs or small groups.

Have a moisturiser box and jar.

Measure the volume of the box in cubic centimetres.

Convert the cubic centimetres to millilitres.

Measure the volume of the jar in millilitres using displacement.

Convert the millilitres to cubic centimetres.

Explain relationship between the volume of the box and the volume of the jar.

Measure the capacity of the jar in millilitres.

Convert the millilitres to cubic centimetres.

Fill the jar with water to the stated volume of moisturiser.

Explain the relationship between the volume of the box, the volume of the jar, the capacity of the jar and the volume of moisturiser.

Reflection: What is the relationship between cubic centimetres and millilitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Select a number of millilitres or litres.

Record a metric measurement chart and a place value chart.

Convert between millilitres and litres by multiplying or dividing by 1000.

Reflection: How can we use multiplicative place value to convert between litres and millilitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Select a number of litres or kilolitres.

Record a metric measurement chart and a place value chart.

Convert between litres and kilolitres by multiplying or dividing by 1000.

Reflection: How can we use multiplicative place value to convert between litres and kilolitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Select a number of kilolitres or megalitres.

Record a metric measurement chart and a place value chart.

Convert between kilolitres or megalitres by multiplying or dividing by 1000.

Reflection: How can we use multiplicative place value to convert between kilolitres and megalitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Select a number of millilitres, litres, kilolitres or megalitres.

Record a metric measurement chart and a place value chart.

Convert your number of millilitres, litres, kilolitres or megalitres to another unit of measurement by multiplying or dividing by 1000 or 1 000 000.

Reflection: How can we use multiplicative place value to convert between millilitres, litres, kilolitres and megalitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Have a medicine measuring cup of about 30 millilitres.

Fill the medicine measuring cup to 25 millilitres.

Select 5 cubic centimetres and make a model.

Submerge the model and note the volume of water displaced as the volume of the volume of the model.

Identify the volume of 5 millilitres in cubic centimetres.

Identify the volume of 1 millilitre in cubic centimetres.

Reflection: What is the relationship between cubic centimetres and millilitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Select boxes and jars to measure volume and capacity in cubic centimetres and millilitres.

Measure the volume of the box in cubic centimetres.

Convert the cubic centimetres to millilitres.

Measure the volume of the jar in millilitres.

Convert the millilitres to cubic centimetres.

Explain the relationship between the volume of the box and the volume of the jar.

Reflection: What is the relationship between cubic centimetres and millilitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Calculate the volume of water needed to fill a fish tank 1 metre by 50 centimetres to a depth of 70 centimetres.

Convert between cubic centimetres and millilitres.

Convert the volume of water between kilolitres, litres and millilitres using multiplicative place value.

Reflection: What is the relationship between cubic centimetres and millilitres? How can we use multiplicative place value to convert between millilitres and litres and kilolitres and megalitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Research to find the volume of water used in one flush of a toilet (or use the average volume of 6 litres per flush).

Count the number of times you flush a toilet in one day / week.

Convert the volume between millilitres and litres.

Calculate the total volume of water flushed by the whole class.

Convert between millilitres, litres and kilolitres.

Calculate the total volume of water flushed by the whole school.

Convert between millilitres, litres, kilolitres.

Calculate how many days it would take before all of the children in the school have flushed a megalitre of water.

Reflection: How can we use multiplicative place value to convert between millilitres and litres and kilolitres and megalitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Calculate the volume of water needed to fill a swimming pool, 3 metres by 7 metres by 1.5 metres.

Convert from cubic centimetres and millilitres.

Convert between millilitres, litres, kilolitres and megalitres.

Reflection: How can we use multiplicative place value to convert between millilitres and litres and kilolitres and megalitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Investigate the capacity of a large fish tank and the volume of water a large fish tank would hold if filled to an appropriate depth.

For example, the tank's dimensions may be 1 metre by 50 centimetres by 75 centimetres.

Calculate the capacity in cubic centimetres, then convert to millilitres.

Mark an appropriate water level and calculate the volume of water in cubic centimetres, then convert to millilitres.

Reflection: What is the relationship between cubic centimetres and millilitres? How can we use multiplicative place value to convert between millilitres and litres and kilolitres and megalitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Investigate how long it would take to fill a fish tank, after measuring the capacity of a large fish tank and the volume of water a large fish tank would hold if filled to an appropriate height.

Measure the rate of flow of water from the tap in appropriate units, for example, ...millilitres per 10 seconds.

Reflection: What is the relationship between cubic centimetres and millilitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Have large rectangular containers with different dimensions.

Calculate, then measure, the depth of 1 litre of water in the containers with different dimensions.

Reflection: What is the relationship between cubic centimetres and millilitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Keep a diary of your shower times for a week.

Measure the flow of water from your shower in 10 seconds.

Calculate the total volume of water used in the week.

Convert to cubic centimetres.

Draw a scale model of rectangular container that could contain that volume of water.

Reflection: What is the relationship between cubic centimetres and millilitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Visualise large rectangular containers with different dimensions.

Draw the containers and calculate the depth of 1 litre of water in the containers with different dimensions for example:

- a container with a base of 5 cm x 10 cm and height 40 cm
- a container with a base of 20 cm x 10 cm and height of 15 cm
- a container with a base of 30 cm x 7 cm and height of 10 cm

Reflection: What is the relationship between cubic centimetres and millilitres?

1 Millimetre = 1 Cubic Centimetre, Convert between Liquid Units.

Sit in pairs or groups.

Have a price list from a garden centre that sells mulch by the cubic metre.

Work out the volume of mulch needed in a garden of specified size, for example, 10 square metres, to a depth of 10 centimetres.

Reflection: How large is a cubic metre?