

# Mixing concrete

## What you will learn

When you have finished this section, you should be able to:

- Measure the correct amounts of water, cement, sand and rock
- Mix concrete by hand
- Mix concrete in a mixer



## Things you need before you start

### Materials

Water, cement, sand and rock

### Tools

Shovel, bucket

A board or wheel-barrow

Mechanical concrete mixer

## Introduction

Before you can mix your concrete, you need to:

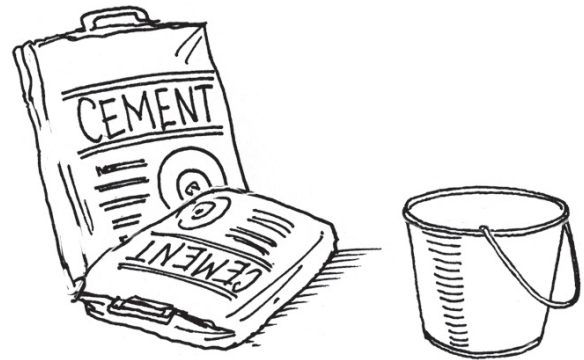
- Know the type of concrete you are making and the right amounts of water, cement, sand and rock you need
- Know the amount of concrete you need
- Get all the material and equipment together.

## Measuring materials

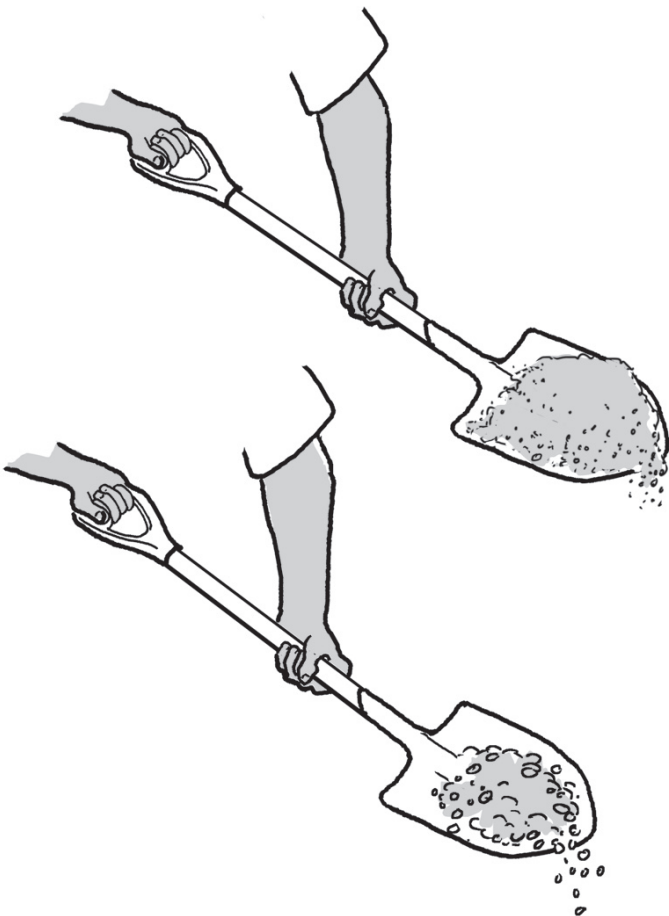
Use a bucket or a box to measure

It is important to get the **right** amounts of cement, sand, rock and water.

A shovel is **not good** for measuring.



A shovel of cement is not the same size as a shovel of rock



Here are the quantities you need for the different types of concrete:

**General purpose** concrete is best for most jobs that will not take big loads or wear — such as footpaths

**Paving concrete** is better for jobs that will take more load, such as large slabs, roadways. It uses more cement, so it is stronger — but it costs more.

**Bedding concrete** is good for jobs like fence posts where strength is not too important. It uses less cement so it is cheaper.

Use for the concrete	proportions (by volume)	amount per bag of cement	quantities for a 50 litre concrete mixer (1 bucket = 9 litres)	quantity for a hand mix (1 bucket = 9 litres)
General purpose footpath	cement 1 sand 4 20mm rock 4	0.165 cubic metres	cement 12kg 1 bucket sand 35 litres 4 buckets rock 35 litres 4 buckets water (approx) 7.5 litres	cement 0.5 bucket sand 2 buckets rock 2 buckets water 3.7 litres
paving roads	cement 1 sand 3 20mm rock 3.5	0.135 cubic metres	cement 15kg 1.25 bucket sand 35 litres 4 buckets rock 35 litres 4 buckets water (approx) 7.5 litres	cement 0.7 bucket sand 2 buckets rock 2 buckets water 3.6 litres
bedding fence posts	cement 1 sand 4.5 20mm rock 4.5	0.200 cubic metres	cement 10kg 0.75 bucket sand 35 litres 4 buckets rock 35 litres 4 buckets water (approx) 7.5 litres	cement 0.4 bucket sand 2 buckets rock 2 buckets water 3.7 litres

# Mixing

Concrete can be mixed

in a mechanical concrete mixer



or

by hand on a board or in a wheel-barrow



A common size of concrete mixer will make 50 litres in one load (or 'mix'). You will need about 20 mixes to make 1 cubic metre of concrete. Check on the size of mixer you have.

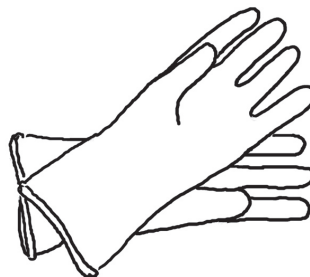
A 'mix' by hand on a board or wheel-barrow is about half the size of the mixer — about 25–30 litres. You will need about 30–40 hand mixes to make 1 cubic metre.

Hand mixing is **very** hard work, so only use it for very small jobs, or if you have a lot of helpers!

## ! Safety note

- Avoid getting cement or wet concrete on your skin if you can. The cement will dry your skin and can cause alkaline 'burns'.

**Wear boots and gloves if at all possible.**

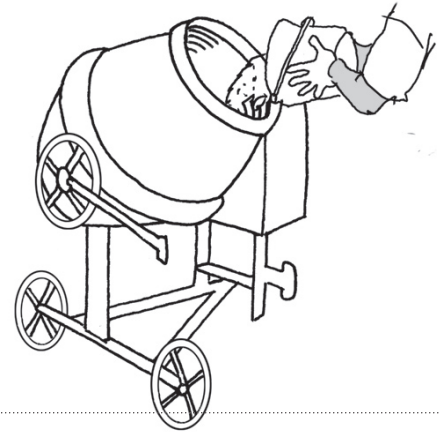


**Also avoid breathing cement dust — it can harm your lungs.**

## Using a concrete mixer

A concrete mixer does a better job than mixing by hand — and it's not such hard work!

Mixers can be run by petrol, diesel or electric motors. Find out how to operate your mixer correctly and safely.



1. Start or turn on the mixer



2. Put in about  $\frac{2}{3}$  of the water you need

3. Add the stone/rock, then the sand and then the cement



4. Mix together until it all looks the same

5. Add the rest of the water a bit at a time until you get a mix that is workable but not too wet. Use the least water you can

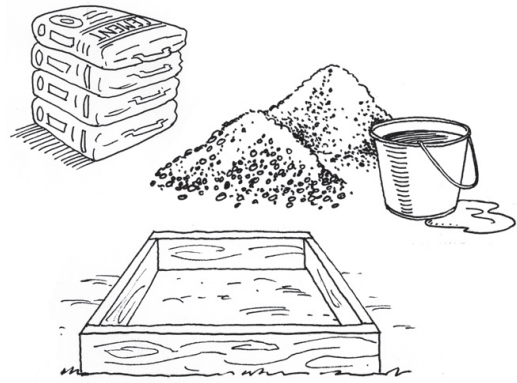
6. Mix for another 2 minutes

7. Pour out and make the next batch.

Don't forget to wash out the mixer as soon as you have finished.

# Mixing by hand

Hand mixing is really hard work. It is best if you only use it for small amounts.



1. Measure all the sand, cement and rock/stone into a wheel-barrow or onto a board.



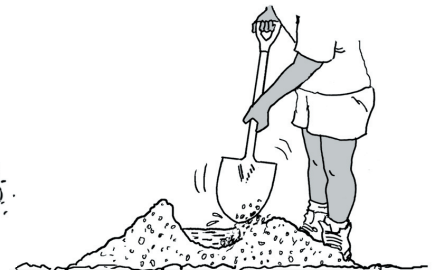
2. Mix them together until it all looks the same colour.



3. Gather it all into a heap and make a hollow in the middle.



4. Add the water slowly into the hollow and mix in the material.



5. Make into a heap again, add more water and mix.

6. Do this until you have a mix that is workable but not too wet.

7. Keep turning and mixing for about 2 minutes.



8. Use the concrete and make the next batch.

## Activity

Work with other students on your project.

1. Work out what type of concrete, and how much you need.
2. Work out the quantities of cement, sand and rock and water.
3. If you have a concrete mixer, find out how to work it correctly and safely.
4. Collect everything together.

When your formwork is built and you are ready to start laying your concrete, mix your first 'mix'.

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