Worms at Work

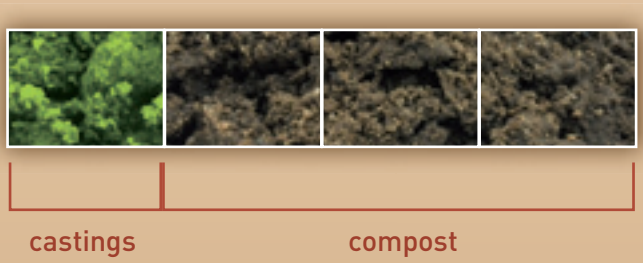
You need ★ a calculator

TECHNOLOGY **It's possible to work with nature to turn waste into something useful.**

Activity One

A worm farm is a useful way to get rid of food and paper scraps. As they eat the scraps, the worms produce fertiliser that can be used to help plants grow. Sara investigates how the product from worm farms is used.

1. Worms produce "castings". Castings look like soil but contain extra nutrients. Combining castings with three times as much compost makes a good seed-raising mix.



   a. How many kilograms (kg) of compost should be mixed with 2 kg of castings?

   b. If the students have 12 kg of compost, how many kilograms of castings should they add?

2. The liquid that drains out from the base of a worm farm ("worm tea") is an excellent fertiliser, but it is too strong to use on its own.

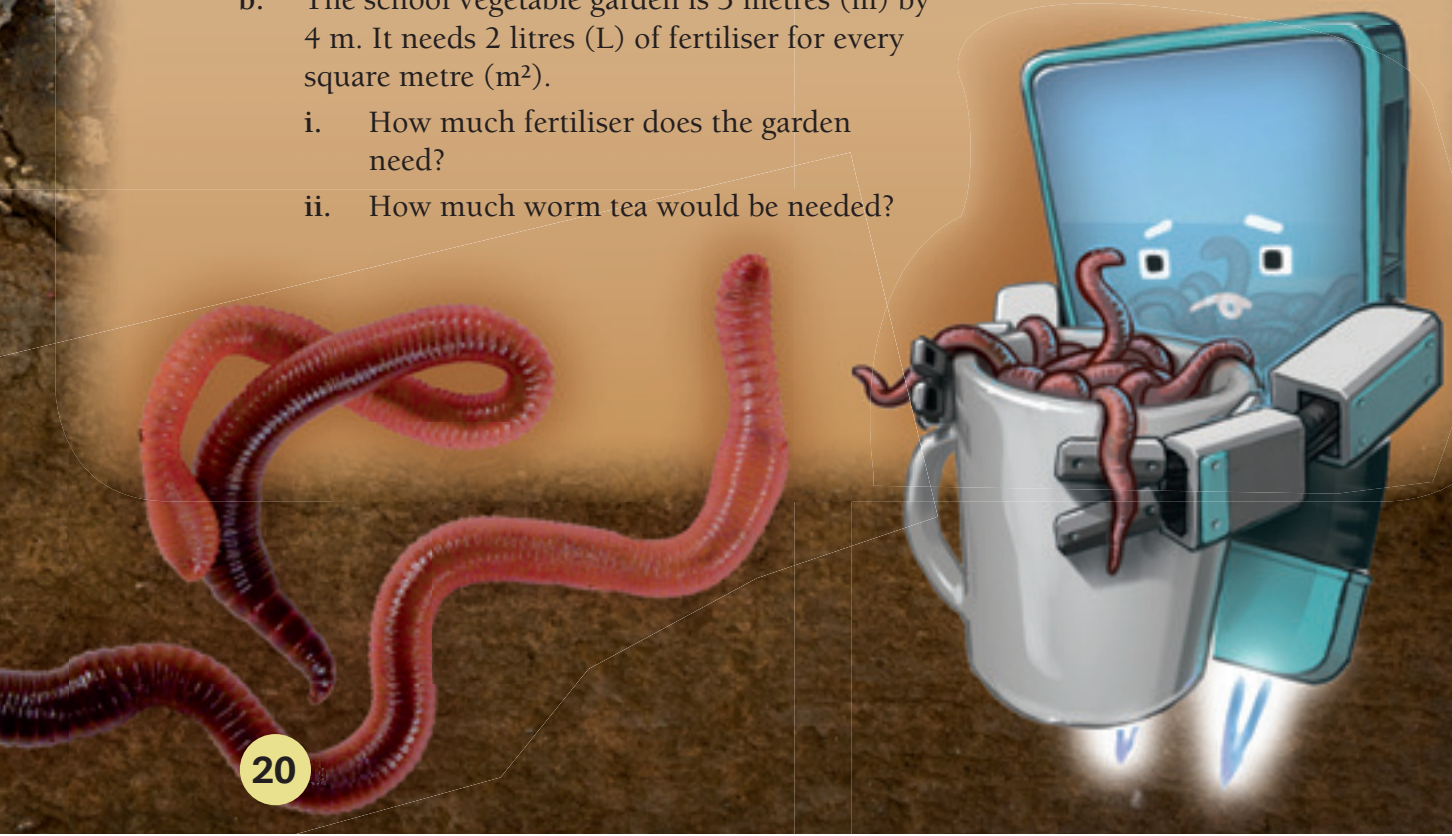
   Sara finds out that 1 part of worm tea should be mixed with about 9 parts of water.

   a. How much water should be added to 100 millilitres (mL) of worm tea?

   b. The school vegetable garden is 3 metres (m) by 4 m. It needs 2 litres (L) of fertiliser for every square metre (m^2).

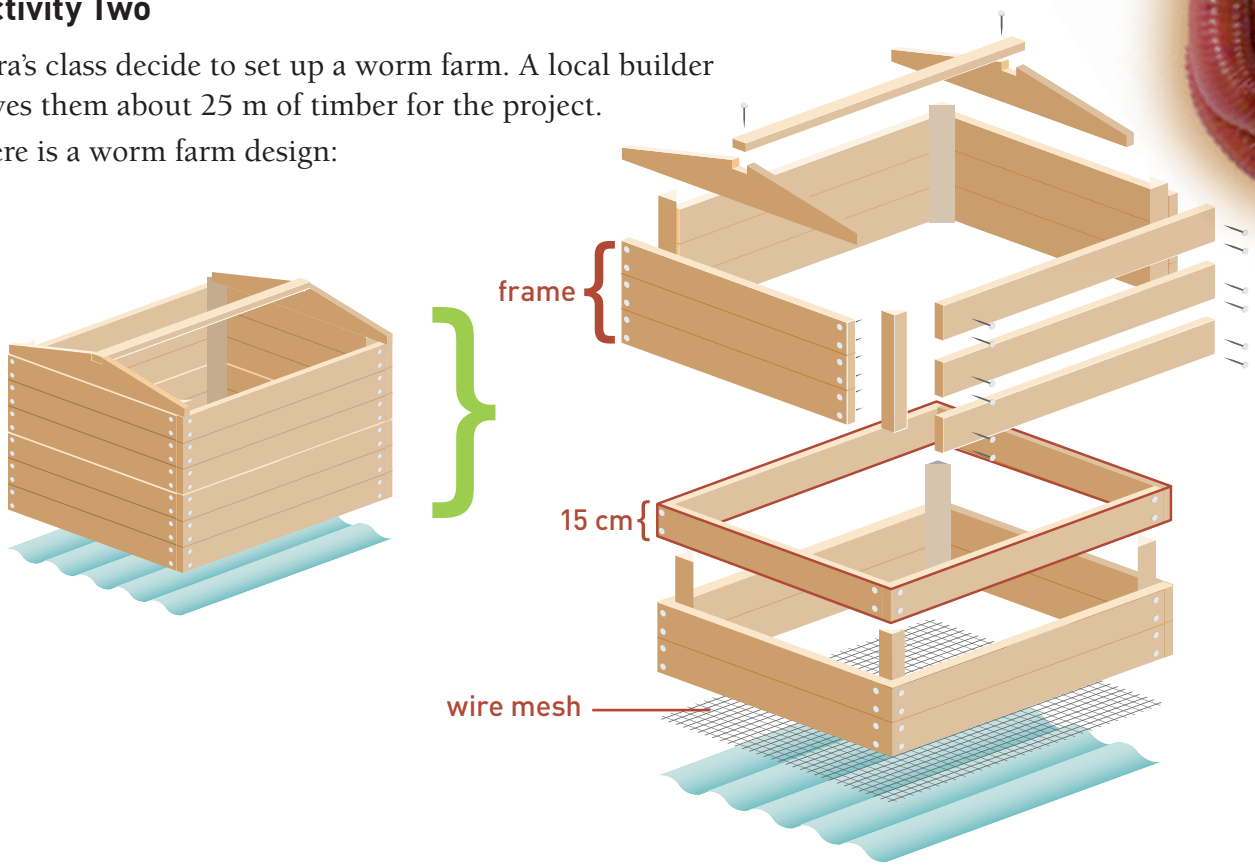
      i. How much fertiliser does the garden need?

      ii. How much worm tea would be needed?



Activity Two

Sara's class decide to set up a worm farm. A local builder gives them about 25 m of timber for the project.
Here is a worm farm design:



1. The students need to decide what dimensions to use for their worm farm. The sides are made from two "frames" (see diagram).
   - **a.** Work out how much timber the students can use for each frame.
   - **b.** Draw diagrams to show possible dimensions for the frames.
   - **c.** Work out the area of wire mesh that would be needed for each design.

2. **a.** How high will the sides of the worm farm be?
   b. Using your dimensions from question **1**, what volume of worms and waste can your worm farm hold?

Activity Three

Mali's parents want to buy some land for a commercial worm farm. They plan to sell worms and fertiliser. The farm will have about 30 million tiger worms. Mali's parents plan to have 18 worm beds, each 60 m by 1.5 m long.

1. Find the total area of the worm beds.
2. Estimate how many worms there would be in each square metre.
3. Estimate the amount of land Mali's parents will need for the worm farm. Remember that people need to be able to walk between the beds to feed the worms.

Focus Using ratios and calculating volume