

The Right Mix



You need a classmate

a calculator

Activity One

Jenna and Toni find that the thermostat on the hot water tank in their home is set so that water comes out of the tap at 60°C . The temperature of the cold water varies. Today it is 12°C . They use a 10 litre bucket to measure water into the bath ...

If we mix a bucket of cold water and a bucket of hot water, the temperature should be halfway between 12°C and 60°C .

$\frac{1}{2}$ of 12 and $\frac{1}{2}$ of 60.
That's $6 + 30 = 36^{\circ}\text{C}$.

Now if we mix 2 buckets of cold water with 1 of hot ...

We could add the temperatures of the water in the buckets together and divide by 3.

$$12 + 12 + 60 = 84.$$

$$84 \div 3 = 28^{\circ}\text{C}.$$

We could take $\frac{1}{3}$ of the temperature of each bucket and add the resulting numbers together.
 $4 + 4 + 20 = 28^{\circ}\text{C}$.

Jenna

Toni

1. Use both the sisters' strategies to work out the temperature of the water when:
 - a. 3 buckets of cold are mixed with 1 of hot
 - b. 4 cold are mixed with 1 hot
 - c. 3 cold are mixed with 2 hot.
2. Discuss with a classmate:
 - a. which strategy you prefer and why
 - b. why it is that both strategies give the same result.

3. What would the temperature of the water in the bath be if it contained:
 - a. 5 buckets of cold water and 3 of hot?
 - b. 8 cold and 6 hot?
4. The girls have measured 10 buckets of water into the bath. Its temperature is now 31.2°C .
 - a. How can you tell that the bath contains more cold water than hot?
 - b. How many buckets of each are in the bath?

Activity Two

When it is ready to use, the bath should have about 150 litres in it – no more. Jenna and Toni like the water at different temperatures, and so does their little sister, Mary:

I like my bath lukewarm.
About $30\text{--}32^{\circ}\text{C}$ suits me best.

I like my bath nice and warm,
but not hot. $33\text{--}36^{\circ}\text{C}$ is ideal.

I like my bath hot.
 $37\text{--}40^{\circ}\text{C}$ is right for me.



How many more 10 litre buckets of cold and/or hot water would the girls need to add to the bath described in Activity One, question 4, so that it would suit:

- a. Mary?
- b. Jenna?
- c. Toni?

