Can I create an algebraic expression that describes a simple relationship?

Exploring the relationship between °C and °F

Starter activity

Children need a calculator each. Write on the board:

£1 = $1.4 (replace with approximate current conversion rate)

Q: What would £2 be worth in dollars? How do you know?

Establish that, if you have double the number of pounds, you will have double the number of dollars.

Encourage children to use a calculator where necessary to complete this table:

£	1	2	3	7	10	35	P
$							

After a couple of minutes, compare answers.

Q: If you had to explain to someone how to find the value in dollars for a given amount of pounds, what would you say?

Take suggestions.

Q: How could we record this relationship?

Share suggestions. Make sure that you include answers such as:

Dollars = Pounds × 1.4   or D = P × 1.4

Explain to children that you can write P × 1.4 as 1.4P

Main teaching activity

Explain that, in this session, you are going to investigate the relationship between two units of temperature.

Q: What two units are commonly used to measure temperature?

Establish that temperature is sometimes measured in °Celsius (°C) and sometimes in °Fahrenheit (°F).

Q: What month do you think is usually hottest in England and roughly what would the average temperature be in that month?

Discuss suggestions. Go to a website such as www.worldclimate.com/ and select London. This gives the average monthly temperature for London in °C and °F.

If you have a thermometer to hand, you could predict and check the temperature inside and outside the classroom.

Explain that in many parts of the world, the temperature is given in °C whereas in the UK we often use °F, so we need to be able to convert between the two.

Give children this formula for converting °C to °F:

$$F = C \times 9 \div 5 + 32$$

Q: To convert a temperature from °C what is the first operation you need to do?

Establish that first you multiply it by 9. Draw out the first step of the function diagram below. Continue to build up steps together until you have drawn out the whole function diagram:

°C	× 9		÷ 5		+ 32	°F
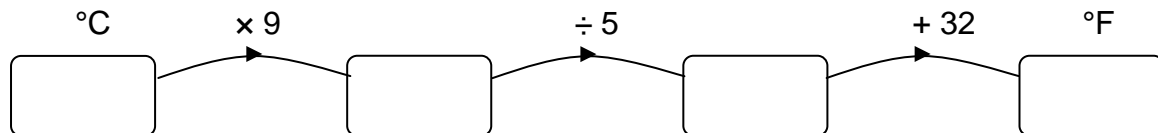
Ask children to check that this works with the temperatures for the hottest month in London. They should use their calculators.

Give out copies of the table on the 'Temperatures around the world' handout. Explain that you want children to find the missing temperatures.

Give children five minutes to work individually or in pairs, using the formula given.

As the first child reaches the Cairo example, bring the class back together and look at the example.

Q: What is different?

Establish that in this example, you are given a temperature in °F and asked to convert it to °C.

Q: Look again at the formula for converting °C to °F. How might you use it to do the conversion the other way round? Talk with a partner.

Take some suggestions.

Explain that you want to work out the inverse, in other words, how to change °F into °C, so you need to work backwards.

Together work backwards from right to left putting in the inverse operations:

°C	× 9		÷ 5		+ 32	°F
	÷ 9		× 5		− 32	
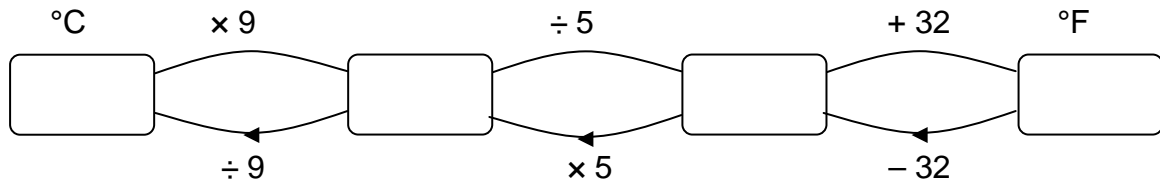
Establish that to convert °F to °C, you need to work from right to left using the inverse operations, that is – 32, then × 5, then ÷ 9.

Ask children to continue to complete the table of temperatures.

Extension challenge

There is one temperature that is the same in °F and °C. Use trial and improvement and your calculator to try to find it.

Plenary

Explain that there are some common temperatures that you know, for example the freezing and boiling points of water.

Q: What are these temperatures?

Ask children to work in pairs to give these temperatures in both °C and °F. They should discuss their methods.

Share suggestions.

If any child completed the challenge activity, ask them to explain what they found and how they worked this out.

Temperatures around the world

Name:

The table shows the average temperature in July in cities around the world.

Work out the missing temperatures using the relationship: F = C × 9 ÷ 5 + 32

Place	Average July temperature in °C	Average July temperature in °F
Paris	18.7	
Bangkok	28.5	
Sydney	17.3	
Lima	14.9	
Wellington, New Zealand	8.5	
Alaska	14.6	
New York	22.8	
Port Stanley	2.6	
Cairo		82.6
Oslo		62.8
Madrid		76.3
Florida	35	
Moscow		65.3
San Francisco	16.4	