To be able to use formulae

MathShed

Starter:

Mega, a taxi app, charges £2.50 as a service fee and £1.50 per mile travelled.

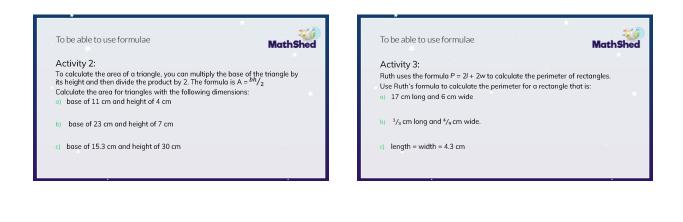How much would a 2 mile taxi journey cost altogether?

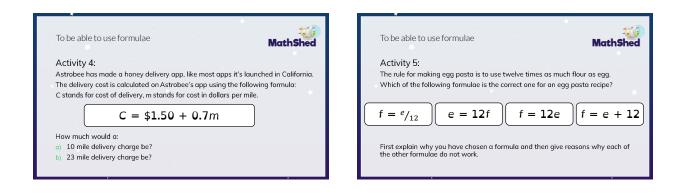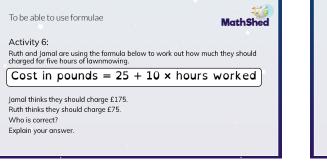**To be able to use formulae**

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Activity 1:

To calculate a person, vehicle or objects speed, you divide the distance it travels by the time taken to travel the distance. The formula is S = d ÷ t

For example, to be an Olympic 100 m sprinter, you need to be able to run at an average speed of 10 metres per second, 100 metres ÷ 10 seconds = 10 m/s.

a) If a fielder throws a ball 200 metres and it lands in 4 seconds, what speed was the ball travelling at?

b) If a cyclist travels around a 400 metre track in 20 seconds, how fast were they travelling?

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Activity 2:

To calculate the area of a triangle, you can multiply the base of the triangle by its height and then divide the product by 2. The formula is $A = {^{bh}}/{_2}$

Calculate the area for triangles with the following dimensions:

a) base of 11 cm and height of 4 cm

b) base of 23 cm and height of 7 cm

c) base of 15.3 cm and height of 30 cm

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Activity 3:

Ruth uses the formula P = 2l + 2w to calculate the perimeter of rectangles.

Use Ruth's formula to calculate the perimeter for a rectangle that is:

a) 17 cm long and 6 cm wide

b) $^1/_3$ cm long and $^4/_9$ cm wide.

c) length = width = 4.3 cm

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Activity 4:

Astrobee has made a honey delivery app, like most apps it's launched in California.

The delivery cost is calculated on Astrobee's app using the following formula:

C stands for cost of delivery, *m* stands for cost in dollars per mile.

$$C = \$1.50 + 0.7m$$

How much would a:

a) 10 mile delivery charge be?

b) 23 mile delivery charge be?

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Activity 5:

The rule for making egg pasta is to use twelve times as much flour as egg.

Which of the following formulae is the correct one for an egg pasta recipe?

| $f = {^e}/{_{12}}$ | $e = 12f$ | $f = 12e$ | $f = e + 12$ |

First explain why you have chosen a formula and then give reasons why each of the other formulae do not work.

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Activity 6:

Ruth and Jamal are using the formula below to work out how much they should charged for five hours of lawnmowing.

Cost in pounds = 25 + 10 × hours worked

Jamal thinks they should charge £175.
Ruth thinks they should charge £75.
Who is correct?
Explain your answer.

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Activity 7:

After completing the question given, write a formula based on the cooking time instructions provided.

11 Here is a rule for the time it takes to cook a turnip.

Cooking time =	30 minutes plus an extra 45 minutes per kilogram

How many minutes will it take to cook a 2 kg turnip?

[ ] minutes

What is the mass of a turnip that takes 210 minutes to cook?

[ ] kg

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Evaluation:

I think all of the sentences shown are examples of algebraic formulae.

$P = 2l + 2w$

$C = \$2.50 + 0.9m$

$s = d \div t$

$50 = 3y + 20$

Do you agree?
Explain your answer.