

Algebra Prior Assessment Questions 3 and 4

Objective: I can use a formula

NC: A1 use simple formulae

Teacher Input Ideas:

The activities suggested are most suited after the children have already learnt about area and perimeter of rectangles, parallelograms and triangles and know that formulae can be used to find these. The following ideas are a refresher and an opportunity to apply skills. If the children have not yet learnt about this, then refer to the measure section on the website for suggestions and assessments regarding this.

Recap area:

- Create shapes with the children.
- Find the area of a cover of a book or a cereal box
- Find the area of different rooms in school
- Find the area of triangles that the children have drawn accurately with protractors.
- Recap what the different formulas are and ensure that the children think of a way to store these. Could they make poems, songs or posters to help them?
- Model how to apply the formula.

Introduce using other formulas:

This should be very practical to introduce the need for a formula and can be linked to everyday situations. You could also apply other skills such as measuring here. Using the ideas on the yellow and green activities, bring in resources to help to introduce the use of formulae and to help the children understand how to solve problems involving these.

Model using a formula and why this is used. Could be linked to design and technology and the children could plan a healthy meal to make using a formula to work out the cooking time. Model how to tackle using a formula.

Practice Activities

Purple Practice: Most suited for children who made errors in Q3 of the prior learning and would benefit from securing understanding of using the formulae for finding the area of different shapes.

Look through the measure section on the website for activities that the children have not completed before for area. Encourage the children to use the formula for finding the area for a rectangle and then they may explore using this to find the area of a parallelogram and a triangle.

Provide the children with rectangles to measure. Children to find the area of these by applying the formula. They can then be given other shapes such as parallelograms or triangles to apply the correct formula to find the area.

Green Practice: most suited for children who made errors in Question 4 of the prior learning assessment and will benefit from exploring simple formula.

This task provides children with different word problems and formulae to use. Some of the word problems could be recreated in the class using resources to help the children. The problems involve real life situations, so encourage the children to discuss how they would approach this problem. Often children are confused with how a formula is expressed so they may need some prompting and discussion time.

There are 2 different sheets with a word problem containing a formula. There are a variety of questions which require the children to use and understand the formula in order to retrieve the answer.

Yellow Practice: most suited for children who demonstrated some accuracy in Question 4 and would benefit from applying other areas of learning to solve problems with formulae.

Children may benefit from consolidating their learning by completing some of the green questions first. The yellow tasks require the children to apply knowledge of converting minutes into hours and minutes and finding 10 % of an amount. The second task also provides the opportunity to reason and prove which calculation is correct.

Mastery

The children are provided with an investigation, where they are to spot patterns to help them to think of a formula that can be used. You may want to provide the children with sticks/straws or children may suggest drawing the houses to help them to explore what happens when they continue the pattern of making houses. The children are provided with key questions to think about when continuing the pattern and a target number of houses so that you can assess which children are understanding the problem and those that require assistance. Encourage the children to verbally say a formula that could be used. Some children may be able to record this using an algebraic equation. See the answers section for more support and suggestions.

Answers:

Green 1:

1) 1 hour and 40 mins

2) 2 hours

3) 10 batteries

Green 2:

1) 650ml

2a) 125g rice

2b) 25 minutes

Yellow 1:

1) 3 hours and 35 mins

2) 20 degrees

Yellow 2:

1) **£1056** ($£960 + 96$)

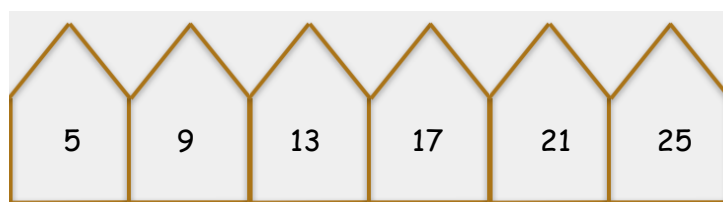
2) **£1320** is correct because $5 \times £240 = £1200$ plus 10% of £1200 is £120, therefore the total is £1320. Daniel calculated 10 % of 4 years (96 pounds) and added this to 5 years of money. He needed to work out 10% of the 5 years of money.

Mastery:

- 1) Children may suggest recording their answers in a table whilst continuing the pattern

Houses	1	2	3	4	5	6
Sticks	5	9	13	17	21	25

Some children may draw images and record



- 2) 5 houses = 21 sticks
3) 12 houses = 49 sticks
4) Suggested formula:

(verbally) 4 sticks per house + 1 stick

or children may use h (house) or n (number of houses)

$$4 \times h + 1$$

$$1 + (h \times 4)$$

5) Children to show understanding and use key vocabulary to explain that the first house uses 5 sticks but the rest of the houses only use 4 as they use a stick from the previous house. Therefore, all the houses use 4 sticks but we need an extra one for the first house. So, we can multiply the number of houses we want by 4 as they will all use 4 sticks and then we need to add 1 more stick as the first house uses 5 sticks.

6) $25 \text{ houses} = 1 + (25 \times 4) = 101$

Sian receives a new toy for Christmas. It requires 4 batteries. She has rechargeable batteries but all of them need charging. On the back of the charger she reads:

1 battery x 25 mins

- 1) How long in hours and minutes will it take Sian to charge all 4 batteries?

- 2) After 20 minutes, Sian realises she has forgotten to switch the charger on at the wall. How long will it take to charge the batteries now?

- 3) Sian's dad decides to charge some batteries later during the day. In total the charger is on for 4 hours and 10 minutes. How many batteries have been charged?

Sunil likes to cook with his mum. They like to make vegetable rice. When measuring the rice and water to cook the rice, they read the back of the packet. It says to use:

**150 ml of water plus 100ml of water per
50g of rice**

1) There are 5 people in Sunil's family. Sunil measures 50 grams person of rice. How much water will he need to measure?

2a) A few days later, Sunil cooks the dish again. He decides to use the rest of the packet of rice. He measures out 400ml of water. How many grams of rice has he measured?

2b) Sunil reads the back of the packet of rice again to see how long to cook the rice for. He sees this formula:

20 mins per 100g

How long will it take him to cook the rice he has measured?

Gary installs boilers into people's houses. When he fits them, he uses this formula to know how long to switch the heating on for to reach the correct temperature.

10 mins per degree + 45 mins

- 1) Gary installs a new boiler at Sally's house. When he switches it on, the temperature is set at 0 degrees. Sally would like the heating to be set at 17 degrees. How long will the heating need to be switched on for, to reach 17 degrees? Use the formula to help. Write the time in hours and minutes.

- 2) At Mr. Plewes house, Gary switches the boiler on and the heating is at 0 degrees. He sets a timer for the heating to be on for 4 hours and 5 minutes. What temperature did Mr. Plewes want the heating to be set at?

Daniel's dad sets up a savings account for Daniel. He has told him that each year he will put £240 into his account. Daniel can choose after how many years he would like to withdraw the money. Daniel's dad will also give him 10% of his total savings. This can be written as a formula:

$$£240 \times \text{number of years} + 10 \%$$

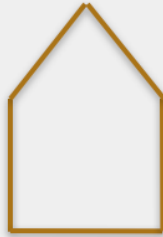
- 1) If Daniel wants to withdraw his money after 4 years, how much will he get?

- 2) Daniel uses the working out from the 4 years to work out how much he will get after 5 years. He calculates:

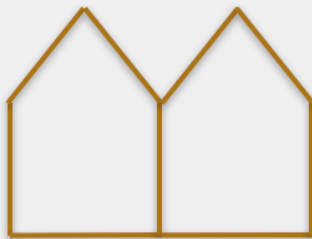
$£240 \times 5 + \text{the } 10 \% \text{ that he worked out for the } 4 \text{ years.}$

He works out he will get £1296. His father has worked out he will get £1320. Who is correct? Explain your answer.

Toby likes to make pentagon house shapes out of sticks. To make one house he uses five sticks.



He wants to make a row of houses so adds some more sticks.



He has added 4 more sticks to make another house.

Investigate:

- 1) Continue adding houses to the row. How can you record the number of sticks used each time? What do you notice?
- 2) How many sticks does he need for 5 houses?
- 3) How many sticks does he need for 12 houses?
- 4) Can you think of a formula to use to work out how many sticks for any number of houses?
- 5) Explain how you have created this formula. Is a partner able to use this formula?
- 6) Use your formula to work out 25 houses. How can you check you are right?