Algebra Prior Assessment Questions 5 and 6

Objective: I can complete and describe a number sequence.

I can use a rule to complete a number sequence.

A2. generate and describe linear number sequences

Teacher Input Ideas:

Create a large input machine or robot. This can be made from paper/boxes or you could use children to be the machine. Remind the children what a formula is and explore the new word rule. Explain that when a formula or a rule is used repeatedly, it creates a number sequence.

Use the machine with the children by inputting a rule. What rule shall we create? You may need to give the children some examples first:

I'm going to place a number in here and each time the machine will do something to the number. Let's start with 250 and we'll ask the machine to add 50. Encourage the children to suggest that the outcome will be 300. We want to continue this to make a sequence, so we'll do the same again. Record the next 5 numbers and explain that these can be called term's too. Repeat with other rules and numbers and encourage the children to record these down as a sequence.

Now display a sequence of numbers and encourage the children to work out what the next 3 terms will be. Then ask the children to say what the rule is. Some children may say its' add 27 each time. Model writing this as n + 27. We have a number and we add 27 each time to that number. We will call the number n.

Repeat with other sequences and encourage the children spot what the rule is.

Practice Activities

Purple Practice: most suited for children who made errors in question 5 of the prior assessment and were unable to complete a linear sequence.

Assess whether the children's gaps were completing linear sequences or halving decimals. If the children require more support with completing linear sequences and spotting the rule, then the purple practise sheet provides the opportunity for the children to work out missing terms and record the rule. Once children are confident encourage the children to record this rule using n.

If children are displaying other errors, create number cards and input/rule cards for the machine you used in the start of the lesson for the children to practise these skills. Such as, halving with decimals.

Green Practice: most suited for children who made errors on question 5b and 6 of the prior assessment and require more support with spotting and applying a rule.

This activity provides the children with the opportunity to apply a given rule and work out the missing terms of a number sequence. The children are then provided with a number sequence and should try to work out what rule has been applied.

Yellow Practice: Most suited for children who will benefit from applying rules using their own suggestions of starting numbers.

For this activity, the children are presented with rule blocks and starting number blocks. The children are to explore different starting numbers and apply the rules to these. They should be able to select suitable ones by trial and error and using knowledge of number facts. For example, for n2 they may decide to start with lower numbers as they know that the number will increase by itself each time. Additionally, the children may choose to select large numbers for the divide by 2 and + 10. Not all starting numbers are suitable for every rule and the children should apply mental strategies and written strategies where appropriate. Children may need to use a calculator when they reach the 4^{th} or 5^{th} term in the sequence for some rules.

Mastery

This mastery task is to further explore their findings and test rules from the mastery task in Question 3/ 4. In the mastery task in Q3/4 the children were required to find the rule for adjoining pentagons. Encourage the children to use these findings to set up other investigations and test their own ideas/rules.

For example:

- What if I try hexagon shaped houses? What do I predict? What do I notice? What has changed? What stays the same? Can I find a rule that can be used here?
- What about other shapes and patterns? Can I explore triangles? What if I want to make a hexagon out of adjoining triangles? How many sticks will be needed? What if I want to create 3 adjoining hexagons? How will I work this out?

Encourage lots of exploration and allow the children to lead their own investigation from their findings from the first investigation. What would they like to know?

Answers:

Purple:

235, 259,283,307, **331, 355,** 379 **(n + 24)**

2880, 1440, 720, 360, **180, 90, 45 (n ÷ 2)**

1250, 1100, 950, **800,** 650, 500, **350 (n – 150)**

676, 689, 702, 715, 728, 741, 754 **(n + 13)**

5.4, 5.9, **6.4,** 6.9, **7.4, 7.9**, 8.4 **(n+ 0.5)**

0.25, 0.5, **1**, 2, 4, **8,** 16 **(n x 2)**

Green:

1a) 4, 12, 16, **18, 19**

1b) 8, 21, **47, 99, 203**

1c) 2, **7, 27, 107, 427**

2a) **n + 11**

2b) **n x 10 – 1**

2c) n

Yellow:

Children to check answers as a group to explore the different combinations that they have tried.

BRICKWORK Mathematics

Purple Practice

LO: I can complete and describe linear number sequences

Look at each number sequence and describe the pattern in each sequence.

235, 259, 283, 307, ___, ___, 379

The rule is

2880, 1440, 720, 360, ___, ___, ___

The rule is

1250, 1100, 950, ___, 650, 500, ___

The rule is

___, ___, 702, 715, 728, 741, 754

The rule is

5.4, 5.9, ___, 6.9, ___, ___, 8.4

The rule is

___, 0.5, ___, 2, 4, ___, 16

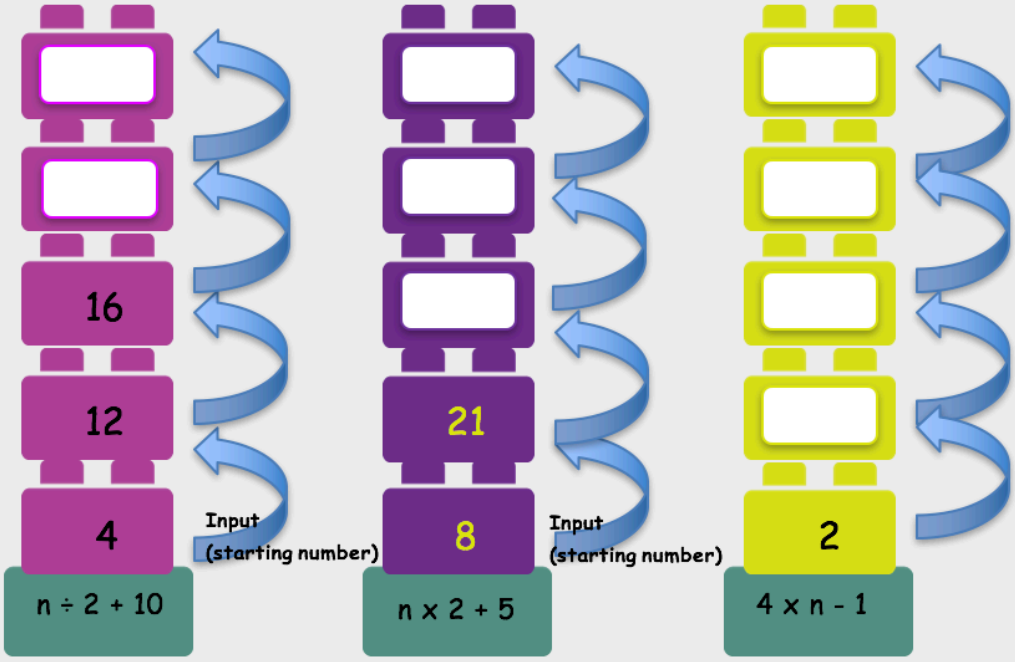
The rule is

BRICKWORK Mathematics

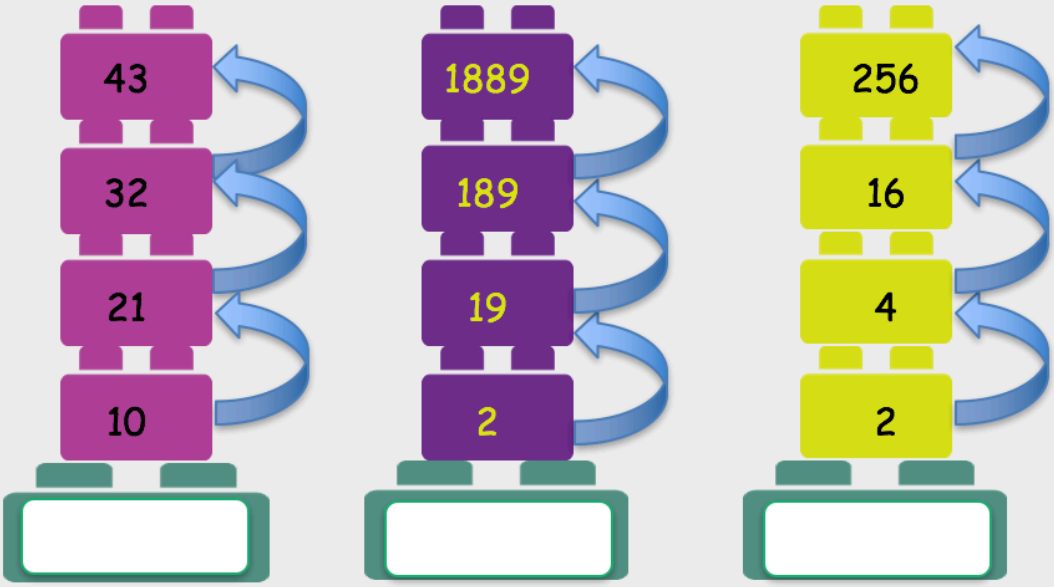
Green Practice

LO: I can use rules and spot rules that have been used in number sequences.

1)Look at the rule placed on each starting block. Use the rule to complete the other blocks in the towers.



2)Now look at the towers below. Write the rule for each tower:



BRICKWORK
Mathematics

Yellow Practice

LO: I can apply a rule to complete a linear sequence.

Look at the different rules on the pink blocks. Pick a yellow block to decide which number would be best to use as a starting number. Explore each rule with different starting numbers. Apply the rule and work out the 5th term in every sequence.

n^2

1

260

1500

$n + 10 \times 2$

4

$n \times 3 - 5$

2

15

$n \div 2 + 10$

60

Challenge:

Can you think of your own starting number and rule for a partner to try?