Notes for parents (1).

The purpose of the activity is to help your child to:

- Recognise patterns in an equation
- Sort numbers into types, such as whole numbers, multiples of three
- Create a general rule for the equation

Here is what to do:

Look at the equation pattern first. Ask your child what they notice. Often children attend to the 'up and down' patterns first rather than the 'across' patterns. Any observations of pattern are useful.

They might say things like:

"The first numbers go 1, 2, 3,.. The second numbers go 2, 3, 4, … The third numbers go 3, 4, 5, …"

"The answers go 3, 6, 9, ..."

The next questions aim at your child looking for relationships across the equations:

What can you say about the numbers that are being added?
(They are consecutive counting numbers. Consecutive means 'one after the other')

What kind of numbers are 6, 9 and 12?
(They are answers to the three times tables. Therefore, they are multiples of three)

Look carefully how your child writes the next equation in the pattern. Are they looking up and down to record the numbers? That shows they are looking more at sequences than the relationships across the equations (consecutive numbers, multiples of nine). If they write with little reference to what is above they may be seeing relationships.

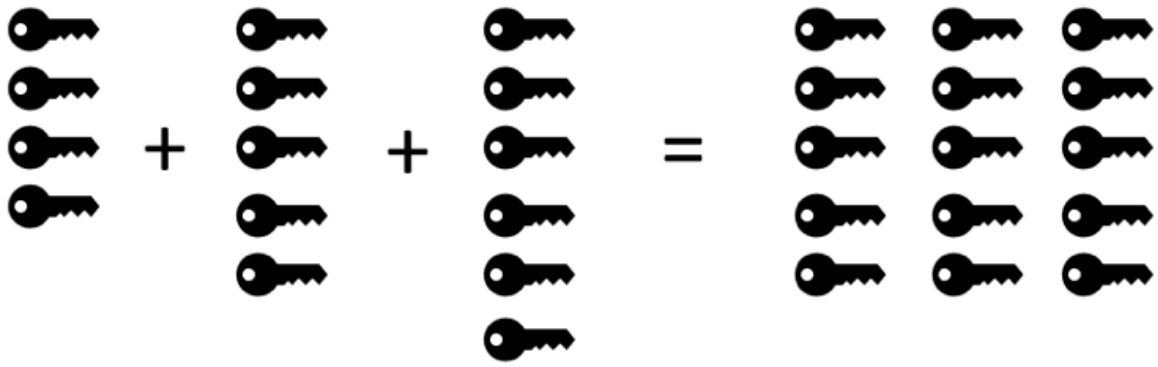
Expect them to record 4 + 5 + 6 = 15.

How did you know the answer would be 15?
Does your child add 4, 5 and 6 or do they know that the answer is the next multiple of three?

You said that the answers are all multiples of three. What do you multiply three by to get 15? Is five in the equation? Where?

You might like to build a model of the equation using real objects, like this:

Notes for parents (2).



What could you do to the collections on the left side to match the right side?
Compensating the collection of four by one from the collection of six creates three collections of five.

The next questions are about applying relationships across the equals sign.

Can you write an equation in this pattern that is a long way down?

Disrupting the sequence of equations requires your child to see that the left side numbers are consecutive and that the answer is the middle number multiplied by three.

For example:

$$20 + 21 + 22 = 63$$

If an equation in this pattern has 50 in the space below, what would the whole equation be?

This requires your child to use 50 as the given value and adjust the other numbers accordingly. 49 is one less than 50, 51 is one more, and 150 is 50 multiplied by three.

$$49 + 50 + 51 = 150$$

Points to note:

Recognising patterns and seeing how those patterns are structured is an important part of mathematics. Asking about similarity and difference is a helpful way to support your child.

If you start with the initial three equations, you might ask:

What is the same about all three equations?
(Three numbers, the numbers are added, the numbers come one after the other, an equals sign, the answer is a multiple of three)

What is different about the three equations?
(All the numbers change)

Notes for parents (3). Activity next page

Changing numbers means that you are dealing with variables, another very important idea in mathematics. The issue is then about pattern in the change.

What is the same about the way the numbers change from one equation to another?
(Each number being added increases by one, the answer increases by three)

Why does the answer increase by three?
(Adding one to each number on the left is the same as adding three)

Reasoning with variables is difficult because the values are not closed off or set. It is still possible to think with values that change but that thinking is relational. That means using "If…then…" thinking. For example:

If the second number is ten ***then*** what are the other two added numbers?

If the second number is ten ***then*** what is the answer?

If…then… thinking is at the heart of algebra. Working with expressions, like 2(a +7) = 2a + 14, involves thinking with a 'thing' (a) without ever giving it a value.

Look at this pattern of equations.

$$1 + 2 + 3 = 6$$

$$2 + 3 + 4 = 9$$

$$3 + 4 + 5 = 12$$

What can you say about the numbers that are being added?

What kind of numbers are 6, 9 and 12?

Can you write the next equation?

Can you write an equation in this pattern that is a long way down?

If an equation in this pattern has 50 in the space below, what would the whole equation be?

$$\_\_ + 50 + \_\_ = \_\_$$