A guide to Maths Mastery at Barnett Wood Infant School

January 2023

What is Mastery?

What does it mean to master something?

- 'I know how to do it'
- 'I can do it without thinking (e.g. driving a car)'
- 'I'm really good at it (e.g. painting a room / picture)'
- 'I can show someone else how to do it'

Mastery of Maths is more…

What does it mean to master mathematics?

It's more than 'mastery'

It is:

- Achievable for all
- The ability to build on something that has already been sufficiently mastered
- Involves deep and sustained learning
- The ability to reason about a concept and make connections
- Being fluent in concepts and procedures

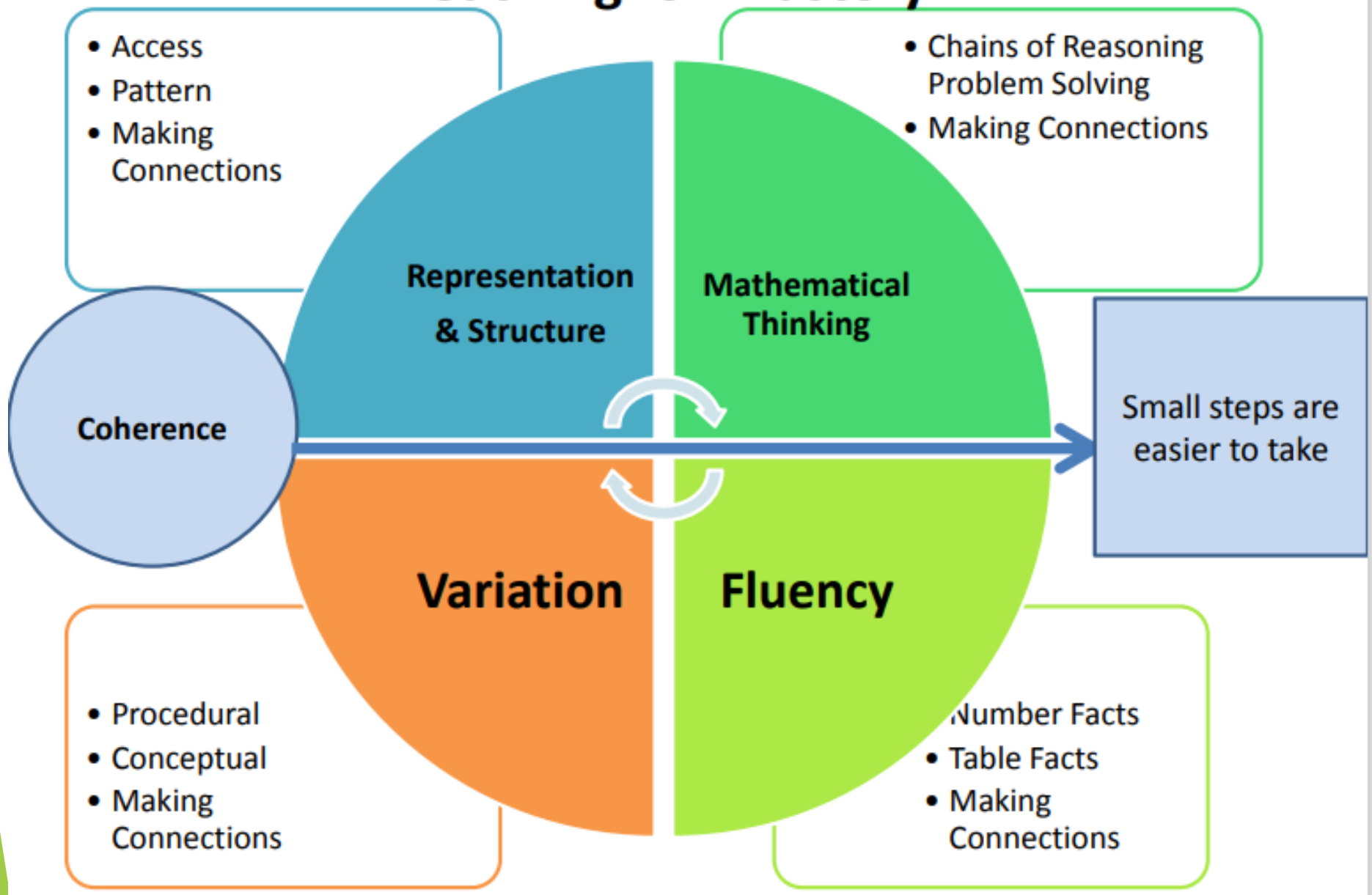
Teaching for Mastery

Maths mastery is developed from the way in which Maths taught in Shanghai.

We teach by breaking down Maths objectives and concepts into the smallest steps, so that every pupil is secure in every new concept before moving on.

We focus upon teaching for fluency, reasoning and problem solving.

Teaching for Mastery



Teaching for Mastery

Pupils will have access to manipulatives so they can physically 'do' the problem.

They then progress onto using pictures and 'seeing' the problem.

Finally being able to use number and mental ability to solve problems.

Early Learning Goals in Reception

There are two Early Learning Goals for Mathematics.

This is what most children in Reception are expected to be able to do by the end of their first year at school.

Number: *Children at the expected level of development will:*

- *Have a deep understanding of number to 10, including the composition of each number: subitise (recognise quantities without counting) up to 5.*

Early Learning Goals in Reception

and…

- *Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10. Including doubles facts.*

Early Learning Goals in Reception

Numerical patterns: Children at the expected level of development will:

- Verbally count beyond 20 recognising the pattern of the counting system
- Compare quantities up to 10 in different contexts. Recognising when one quantity is greater than, less than, or the same as the other quantities.

Early Learning Goals in Reception

and…

- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can distributed equally

Early Learning Goals in Reception

Mathematics:

In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measure.

Early Learning Goals in Reception

Mathematics:

It is important that children develop positive attitudes and interest in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

KS1 Aims

The National Curriculum for Mathematics aims to ensure that all pupils:

- *become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.*

KS1 Aims

- ***reason mathematically*** *by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof, using mathematical language.*

KS1 Aims

- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

KS1 Aims

The aim is for pupils to reach expected level of attainment at the end of Year 2. They do this by achieving the standards set out in the National Curriculum.

How do we teach for mastery?

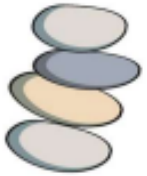
In Reception

- Continuous provision learning
- Whole class input for the small step of learning.
- Child-initiated learning or adult-led learning.
- Adults assess learning by observation, questioning and outcome.

Reception – Spring Phase 4 – Alive in 5!

Comparing Numbers to 5

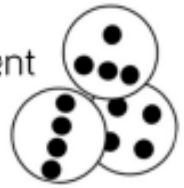
Sand



Make towers of pebbles.
Who can make the tallest tower?
How many pebbles are in each tower?
Does your tower have more or less pebbles than your friend's tower?
Can you each make a tower using the same number of pebbles?

Enhancements to areas of learning

Carpet



Provide a set of dot plates with different arrangements of 0-5 dots.
Can you find a plate with 4 dots?
With more/fewer than 4 dots?
Can you put the plates in order?
One of the plates is missing.
Can you work out which one?

Maths Area

Children use the number shapes, linking cubes and numeral cards to match and compare quantities.
Provide a set of dominoes to explore. Ask the children to compare the number of spots on each side of the domino. Are there the same, more or fewer dots?

Small World

Provide children with the numbers 1 – 5 on cards and various small, similar items such as people, toy cars, plastic animals, etc.
Ask them to show you fewer, the same or more than the number they choose.

In KS1 a typical lesson will include the following:

A Review of previous learning –

- White Rose Flashback 4.
- Four questions a day that help ensure essential skills are regularly revisited to strengthen retention.
- This takes no more than 5-8 minutes including a discussion about answers and methods.

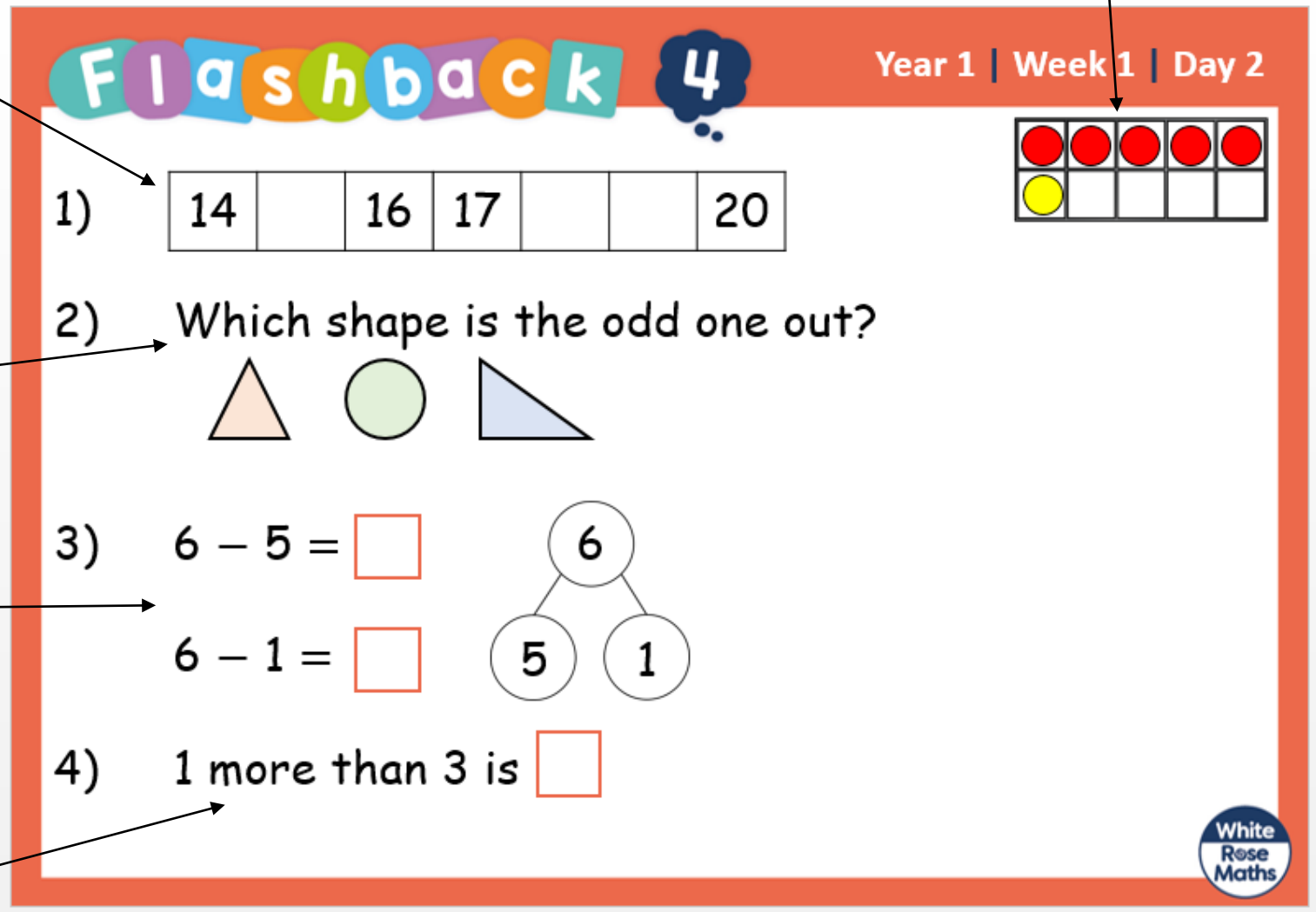
A question from the previous day

Daily practice of number, time or shape.

A question from the previous week

A question from 2-3 weeks ago

A question from last term

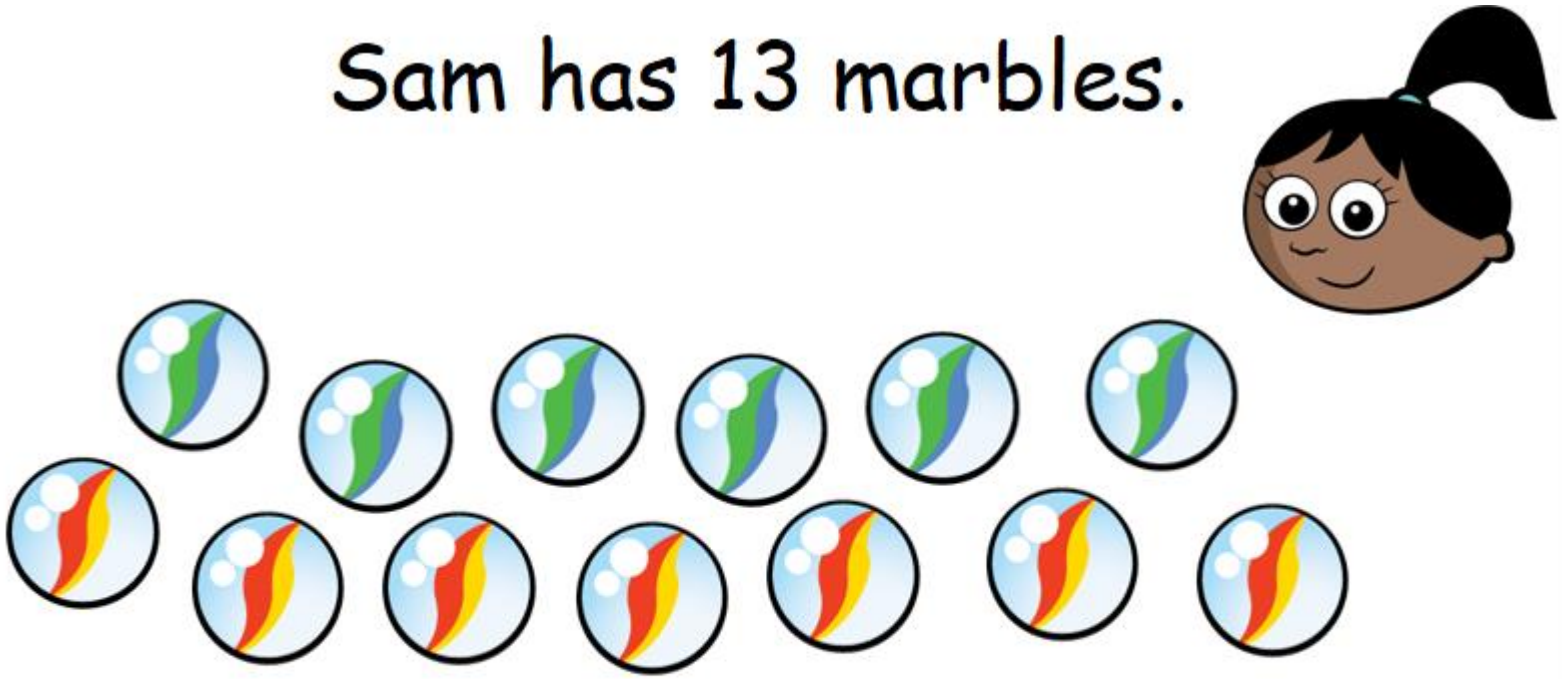


Main part of the lesson 35-40 minutes

- **Teaching input**
- White Rose slides
- Introduces vocabulary, encourages curiosity, generates ideas and makes links with previous learning.
- It also enables teachers to assess understanding through questioning.

Year 1 example

Sam has 13 marbles.

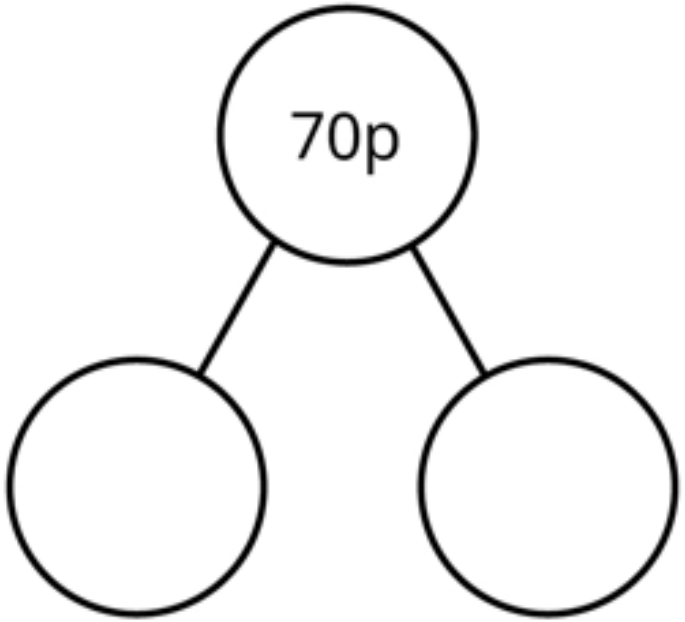


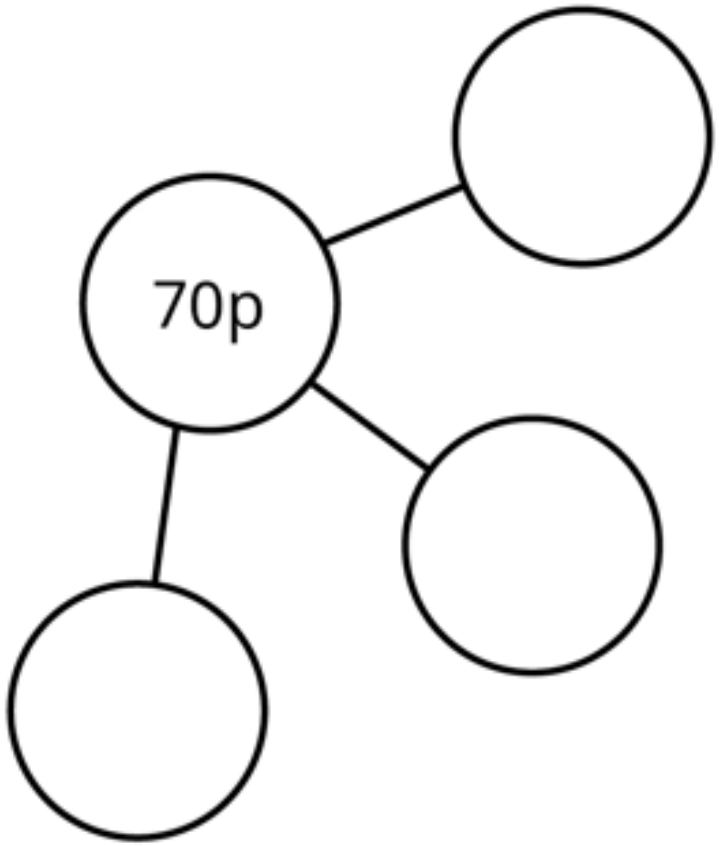
Her friend gives her 1 more.
How many does she have now?

Year 2 example

1 Kim is making 70p in different ways.

a) Complete the part-whole models to show the coins Kim can use.





- *Teaching happens in small steps.*
- *We are embedding an episodic way of teaching where there is a small amount of input and then pupils complete an independent activity that practices the small step.*

- *There is then a mini-plenary when methods and answers are shared.*
- *This allows time to address misconceptions and gauge if progress has been made.*
- *The next small step of learning is introduced and practised.*
- https://www.youtube.com/watch?v=TuVbXzA3pBI 1.05

- During the lesson pupils will apply the knowledge they have just learned to a series of new varied problems (making conceptual and procedural connections)

Plenary

At the end of a lesson, there is a plenary.

The children will apply the knowledge they have gained through the lesson to solve a more complex problem. This can be as a whole class, with a learning partner or individually.

5 Complete the sentences.

a) ☐ is one less than 19

b) ☐ is one more than 11

c) 1 ten and 7 ones is one _____ than 16

4 **a)**

What notes could Ron have?

_____

b) What is the fewest number of notes Ron could have?

Which notes are they?

_____

Any questions?