

Numicon Essentials quick start and lesson guide

This guide gives you a quick way to get started by going straight to the lessons you need. At the end, you'll also find information on the lessons and how they have been designed.

Click [here](#) for a quick start guide to find a lesson.

Click [here](#) for a detailed guide on lesson features.

Click [here](#) for the photo and artwork credits.

Alternatively, you can click below to go to any entry in the contents list.

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Get started – find a lesson

Numicon Essentials gives you the flexibility to select lessons in the way that works best for you. You can pick from the list of all lessons, go from whichever curriculum or scheme you follow, or browse lessons by topic and age range.

**Oxford
OWL**



Please log in or register

Direct links

All the documents have links to take you straight to the lessons. If you haven't logged into Oxford OWL already, you'll be asked to do that first. Then click on the link again to open it.

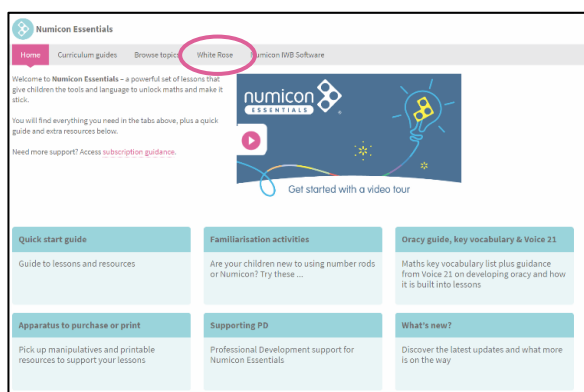
Downloading documents for your planning

You can download any of the support documents to use in your planning.

All lessons available

You can find a full list of all the Numicon Essentials lessons that are currently available [here](#). This chart is organised by topic. Click on any lesson in the list to open it.

White Rose scheme of learning



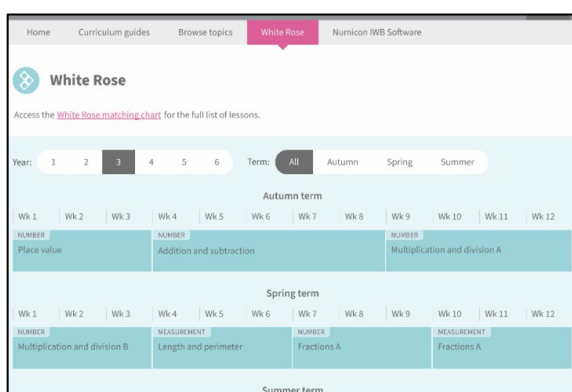
Visual menu

If you are using White Rose as your scheme of learning, just click on the 'White Rose' tab at the top of the page.

Here you can use the visual menu to browse lessons for the year group and term you are teaching.

Any blocks that currently do not contain lessons are greyed out.

Click on the block you are teaching, and the lessons will appear in a list.

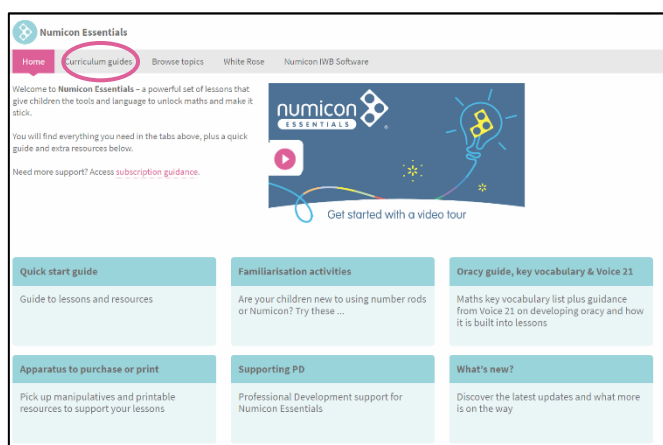


All White Rose matched lessons (overview)

A chart is also available with all the White Rose matched lessons, ordered by year group and by topic strand. You may find this handy for long-term and mixed age planning.

See the link to this at the top of the 'White Rose' tab, find it on the 'Curriculum guides' tab or you can open it [here](#).

Pick lessons matched by curriculum, Ready to Progress or NCETM

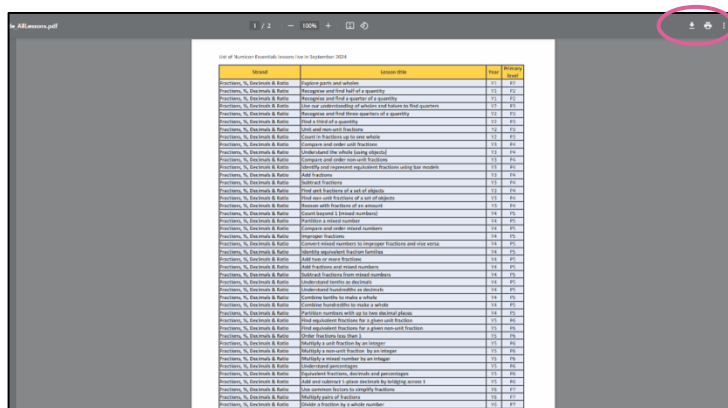
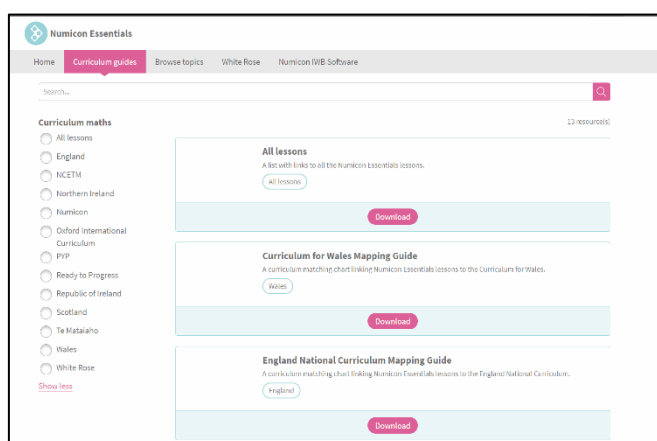


You can pick Numicon Essentials lessons by the curriculum or scheme you follow. Just click on the 'Curriculum guides' tab at the top of the page.

Pick your curriculum or scheme from the list on the left.

The list includes:

- All lessons
- England
- NCETM
- Northern Ireland
- Numicon
- Oxford International Curriculum
- PYP
- Ready to Progress
- Republic of Ireland
- Scotland
- Te Mātaiao
- Wales
- White Rose

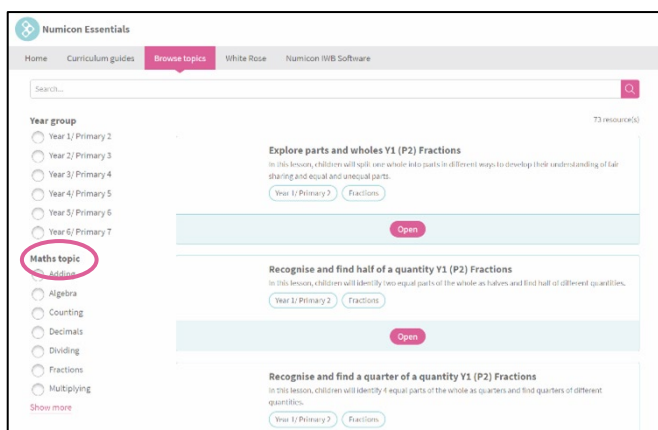
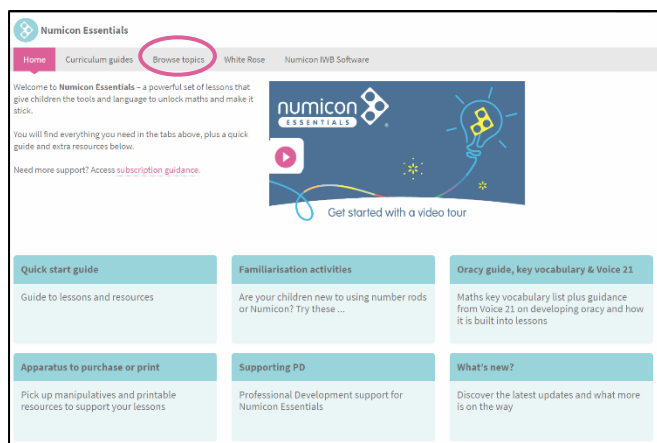


Click on the 'Download' button to open the matching chart in a new tab.

You can use the lesson links directly from the open document or download a copy using the 'Download' icon in the corner.

Browsing topics

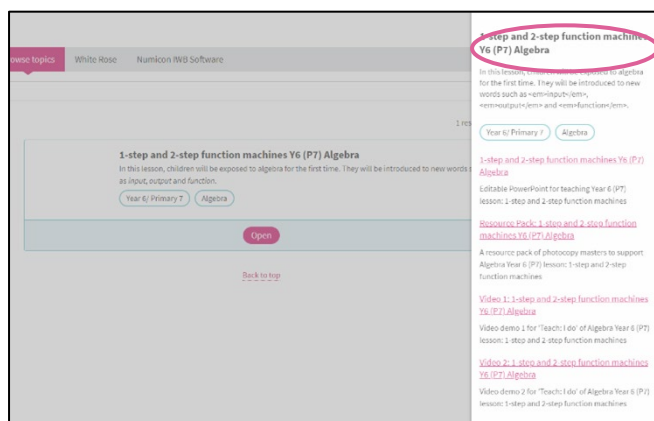
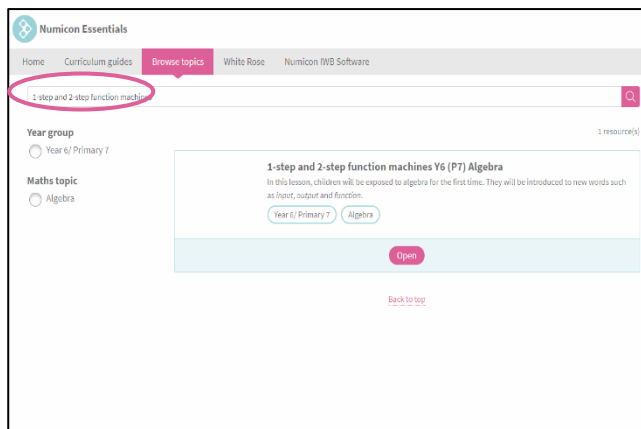
If you would like to search for a specific lesson or topic, click on the 'Browse topics' tab at the top of the page.



This tab helps you to browse by Year group/Primary level and by Maths topic.

Select and explore the options by using the filters on the left.

You can also use the search bar at the top to find a particular lesson by its title or explore available topics.



After clicking open, all the resources for a lesson are displayed in a panel on the right. This includes an editable PowerPoint, a resource pack to download and the teaching videos for the lesson.

Numicon Essentials Lesson Guide

This guide covers the different phases of a Numicon Essentials lesson. The slide colours, icons and familiar phases are designed to help reduce cognitive load for children.

Teacher-facing slides

Learning outcomes

Are children ready?

- I can calculate using 1-step and 2-step function machines to find the output.

Not ready? Try Numicon Essentials: **1-step and 2-step function machines**

Learning outcomes

- I can form algebraic expressions.
- I can use an algebraic letter to represent any number and apply a given function/rule to it.

Lesson summary

In this lesson, children will be introduced to replacing numbers with letters, understanding that '3 more than a number' can be written as, for example, $x + 3$. They will continue to develop this understanding and learn that e multiplied by 2 can be written as $2e$. Children will then revisit function machines and replace the number with a letter. They finish off this lesson working with an input between 1 and 6 plus a letter (e.g. $2e$).

Where next?

- I can substitute a given letter or shape with a given value.

Ready to move on? Try Numicon Essentials: **Substitution**

The 'Learning outcomes' slide highlights the progression in learning.

Where available, relevant Numicon Essentials lessons are suggested for 'Are children ready?' and 'Where next?'

The Lesson summary provides a brief description of what is covered in the lesson.

Curriculum links

White Rose small steps

Year 6 | Spring term | Block 2 – Algebra

This Numicon Essential lesson is used to support the development of algebra making use of Numicon pieces and algebraic tiles. This lesson can be used as an introduction to this White Rose small step.

Step 1 1-step function machines
Step 2 2-step function machines
Step 3 Form expressions
Step 4 Substitution

Curriculum charts

[Cambridge International](#) | [Northern Ireland](#) | [Numicon](#) | [PYP](#) | [Ready to Progress](#) | [Republic of Ireland](#) | [Scotland](#) | [Wales](#)

English National Curriculum

[Curriculum chart](#)

- Use simple formulae.
- Express missing number problems algebraically.

NCETM

[Curriculum chart](#)

The relevant White Rose small step is highlighted, accompanied by brief notes about how the lesson could be used to complement it, for example as an introduction, intervention, replacement or to deepen understanding. Where a lesson covers only part of a small step, or goes beyond it, this will be noted here.

Curriculum matching charts are available through links on this slide.

This slide provides all the key information needed to prepare for the lesson, including resources needed, key vocabulary, sentence stems and things to watch out for.

Lesson essentials



Resources

Numicon pieces | Numicon feely bag or other opaque bag | Counters | Dry-wipe pens | Sticky notes | Numicon spinners (optional) | Print-outs of the two Extend and explore slides

Resource pack (PCMs):

- 1-step and 2-step blank function machines (A3 size printed at 100%, preferably laminated)
- Spinner overlays and cards

Key vocabulary

function machine, multiply, divide, add, subtract, value, input, output, rule, inverse, unknown, algebra, expression, combine, simplify, equals, brackets

Click [here](#) for glossary definitions.

Key ideas and tips

Children will be introduced to an algebraic letter, which will take the place of a number. It is important children make the link between repeated addition and multiplication when forming the expressions.

Sentence stems

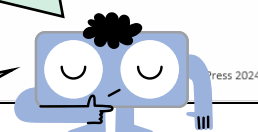
__ + __ + __ + __ + __

This means we have __ and __. We can express this as __ + __.

Watch points and misconceptions

- Children may assume that certain letters always represent specific numbers. For example: a
- Children may not understand that $a \times 3$ and $3a$ represent the same thing.
- Children may misinterpret expressions such as $2a + 3$ as $5a$.

The 'Key ideas and tips' section provides bite-sized bits of subject knowledge.

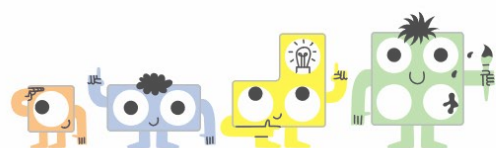


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Any photocopy masters for the lesson are available via the 'Resource pack' link. Where relevant, this will also include answers for worksheets and printable versions of Numicon apparatus.



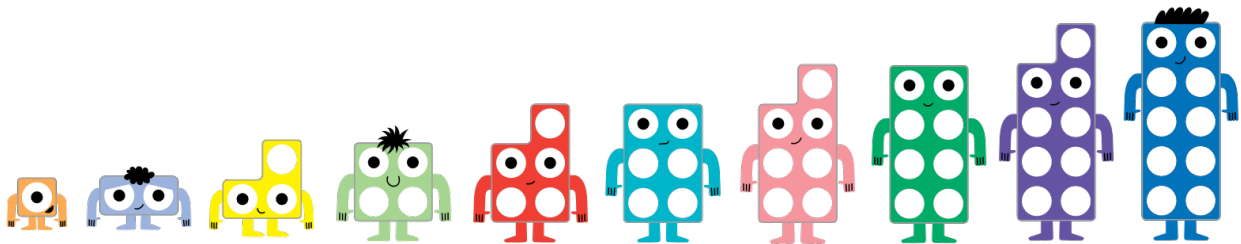
Form expressions



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Opening a PowerPoint in Oxford OWL will offer you a quick snapshot of the lesson content, but please download the lesson before you use it. Downloaded PowerPoint files will have the full range of functionality available and allow you to view features such as the teaching notes. Elements such as the teaching notes are not available when viewing in a browser window.

Numicon characters



The Numicon characters act as guides, giving hints, tips and additional questions for the children.

Child characters



Tia



Ben



Ravi



Molly

Tia, Ben, Ravi and Molly will be familiar to children who have used the Numicon Pupil Books. These characters often appear on the slides, either as the subject of word problems, or as concept cartoons, sharing their thinking, strategies and misconceptions for children to evaluate.



Voice21 grouping icons

The following Voice21 icons appear throughout the lessons in the top right corner of the slides. These suggested arrangements facilitate different types of high-quality oracy in your classroom.



Nest

Ask children to stand apart and whisper ideas to themselves.



Pairs

Children talk to each other.



Trios

Children talk with two others.
Or
Children talk to a partner and the third listens, summarizes and/or critiques.



Traverse

Children stand in parallel lines opposite a partner. They change partners by moving down the line.



Circle

A group of 6 or more children face each other in a circle. They can step inside the circle one at a time to speak to the group.



Fishbowl

Children make an inner and outer circle. Children in the inner circle face each other and the outer circle observe the talk.

To learn more about these oracy groupings or more information about Voice21 and oracy in general, please follow this [link](#).

Child-facing slides

Talk task: The 'Talk task' introduces children to the lesson concept through purposeful oracy. This phase often involves recall of relevant prior learning and key vocabulary.

The Voice21 icons show suggested oracy groupings for an activity. Further explanations of groupings can be found in the slide's notes or [here](#).

Talk task

At Tia's party, each table has a cake of the same size, to be shared equally.

6 children sit at one table. 8 children sit at another.

At which table would each child get the most cake?

Key words

- whole
- part
- equal
- divide
- share
- out of
- more
- less
- greater than
- less than

one-__ is greater than/less than one-__.

Year 3 (P4) Compare and order non-unit fractions

Each slide has key words and phrases that are relevant to that phase of the lesson. The link to glossary definitions can be found on the 'Lesson essentials' slide.

Talk task

Look at the models. Which one does not belong?

Explain your thinking.

A

B

C

D

Key words

- part
- whole
- numerator
- denominator
- unit fraction
- non-unit fraction

Instigate: 'I'd like to start by saying ...'

Build: 'I agree, and I would like to add ...'

Considered ...'

Year 5 (P6 Multiply a unit fraction by an integer

Purple textboxes contain verbal sentence stems to help support children with their reasoning and oracy skills.

Switch on: The main purpose of this phase of the lesson is to help children hook the learning into what they already know. This might take the form of a real-life scenario, game or problem to be explored, or it could be used to help children make explicit links to previous learning.

Switch on

There is one candle on the cake for each birthday Ava has had so far.

How many candles will be on Ava's cake in 10 years from now?

How many candles do you think will be on her cake in 10 more years after that?

What about in another 10 years?

Instigate: 'I think ...'

Probe: 'Why do you think ...'

Challenge: 'I disagree because ...'

Clarify: 'Does that mean ...'

Year 2 (P3 Count in tens from any number)

tens

The purple textboxes can also contain suggested Voice21 discussion stems to help guide children's conversations.

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Teach: I do: The 'I do' phase is where the main concept is explicitly taught. This will include the main manipulative used for the lesson, for example Numicon pieces, Numicon pegs, number rods, interlocking cubes, and so on.

Teach: I do (1)

[Video demo](#)

I set out to walk to my friend's house.

I walk $1\frac{3}{10}$ km and stop at the park for a while.

I walk for another $\frac{4}{10}$ km and stop at a shop.

How far have I travelled so far?

The 'Video demo' button links to a video showing how to model this 'I do' phase. The videos are designed to prepare the teacher to deliver this phase of the lesson live. They could also be used to support children who need a recap.

Year 4 (P5 Add fractions and mixed numbers)

fraction | numerator | denominator | whole | part

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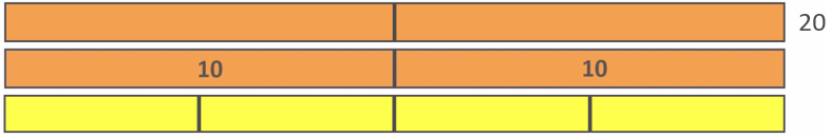
Teach: We do: The 'We do' phase is where the teacher involves the class or group, and they work together on an example or activity closely linked to the one that was presented in the 'I do' phase. Here, children should be guided to use apparatus and/or pictorial representations and narrate their thinking.



Teach: We do



Here is the whole. What is a quarter?

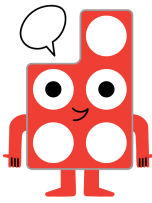


The whole is ____.

Half of ____ is ____.

So a quarter of ____ is ____.

The slides are editable, so you can adapt the lesson to suit your class.



Year 2 (P3 Use our understanding of wholes and halves to find quarters

© Oxf

Hinge: The 'Hinge' phase of the lesson offers an opportunity to assess children's thinking and understanding after the 'I do' and 'We do' phases to check that they are ready to move on to apply the learning independently. This is intended to be a quick check that allows the teacher to view responses from all children.



Hinge



Ravi and Tia think they have worked out the total value of $3y + 6$ when $y = 2$.

Who do you agree with?

$y + y + y +$




Ravi

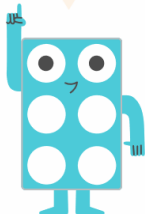
I think the total value of this expression is 9.



Tia

I think the total value of this expression is 12.

3 ... 2 ... 1
Show me!



Year 6 (P7 Substitution

| value | substitute | substitution

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Teach: You do: The 'You do' phase may include one or both of the following:

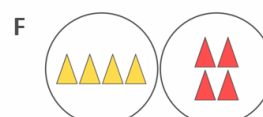
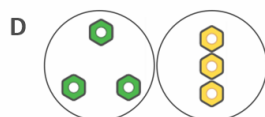
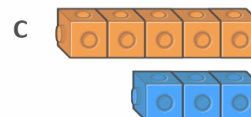
- 1) Practice/ intelligent practice: direct application of the learning from the 'I do'/ 'We do' phases
- 2) applying the learning: applying to a new context, reasoning, problem solving or generalising (mastery).

Teach: You do (1)



Use ✓ if a picture shows halves.

Use ✗ if it doesn't.



Year 1 (P2) Recognise and find half of a quantity

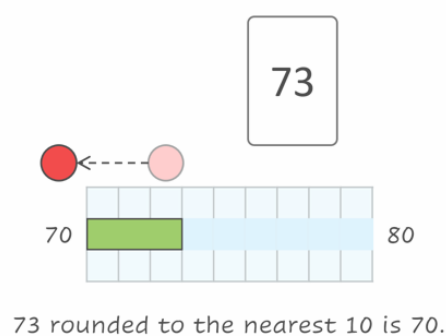
half | halves | halving

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Teach: You do



- Shuffle the number cards and pick one.
- Write the previous and next multiples of 10 either side of your number rod track.
- Find the number rod to match the ones digit. Place it on your track.
- Place a counter above your number.
- Round the number to the correct multiple of 10.
- Move the counter to the correct multiple.
- Write the sentence: __ rounded to the nearest 10 is __.

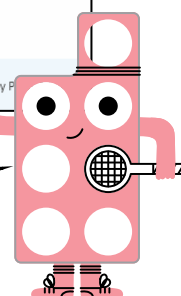


Year 4 (P5) Round to the nearest 10

previous | next | ones | digit

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Where needed, photocopy masters are provided to support the 'You do' phase, for example to give children a structure for recording their work.



Exit: The purpose of the 'Exit' phase is to offer a question that will help assess whether children have achieved the learning outcome(s) for the lesson and to check their thinking and understanding.



Exit



True or false?

When you multiply a unit fraction by an integer, the product is still a unit fraction.



Ravi

Give an example to prove your thinking.

Year 5 (P6) Multiply a unit fraction by an integer

part | whole | multiply | unit fraction | integer | product

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Reflection: This is a self-assessment activity where children can let you know how they feel about this lesson and their level of understanding of the key concept(s).



Reflection



Find the Numicon piece to show how you feel about adding fractions.



Year 3 (P4) Add fractions

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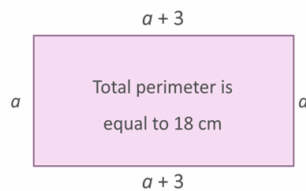
Extend and explore: The 'Extend and explore' phase provides rich, meaningful extension activities. These are intended to be used flexibly to extend the lesson or children's understanding during the lesson, or they can be used as retrieval practice later.



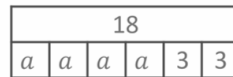
Extend and explore (1)



numicon
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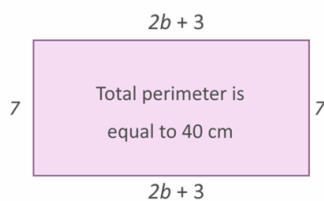


1a) Does this bar model represent the problem?



Explain why.

1b) Use your bar model and apparatus to find the value of a .



2a) Draw a bar model to represent this problem.

2b) Write an equation from your bar model.

2c) Use your bar model and apparatus to find the value of b .

Year 6 (P7) Solve 2-step equations

add | subtract | divide | equation | value | solve

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Extend and explore

numicon
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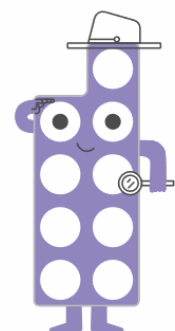
The whole is 12.

How many different ways can you split the whole into **equal** parts?

What about if the whole is 20?

Use apparatus to help you explore.

How many ways can you find?



Az

whole | part | equal | unequal | share | group | fair

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Year 1 (P2) Explore parts and wholes

Notes for teachers and teaching assistants

Teaching notes giving guidance and tips are provided for each child-facing slide. To view the teaching notes, click the Notes up arrow at the foot of the slides.

Year 4 (P5) Partition numbers with up to two decimal places

Teach: You do notes

Resources: Jars (photocopy master), Blank part-whole models (three parts) (photocopy master), coins, Numicon double-sided baseboard laminates (or Numicon double-sided baseboard laminate [photocopy master]), Numicon pieces
Oracy groupings: Trios

Provide trios with copies of the two photocopy masters and ask them to work together to answer the question on the slide.

Say: *Work systematically to find the amount each child could have. Can you find all the possibilities?*

Ask children to use coins (or counters) on the Jars photocopy master to explore the possible combinations, and then record their findings in the part-whole models.

Look and listen for children who:

- work systematically, changing one coin at a time
- understand how to use a part-whole model to partition decimals into ones, tenths and hundredths
- understand how and when to use zero as a place holder.

Watch out for children who:

- misunderstand the link between 10p and £0.10, or between 1p and £0.01
- are unable to use zero as a placeholder.

Answers:

£4.00, £3.10, £3.01, £2.20, £2.11, £2.02, £1.30, £1.21, £1.12, £1.03, £0.40, £0.31, £0.22, £0.13, £0.04.

After allowing children some time, explain that you have some more information regarding how much each child (Ravi, Ben and Molly) has.

- Click to reveal the speech bubbles.

Ask children to use this information to see if they can work out how much each child has from the possibilities they have found.

Answers:

Ravi: £3.10

Ben: £1.12

Molly: £3.01

Assessment opportunities:

Strategy: visual and marking

Mark children's part-whole models.

Resources needed for this phase of the lesson are listed here.

If a Voice21 oracy grouping is recommended for this phase of the lesson, it will be shown here.

You will often find examples of what to look and listen for in child-led discussions, as well as potential misconceptions to watch out for.

An arrow bullet indicates an element of the slide that will be revealed on a click.

Where needed, answers are provided here or at the end of the Resource pack.

If a phase of the lesson provides an opportunity for assessment, this will be flagged up here.

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