Number Stacks

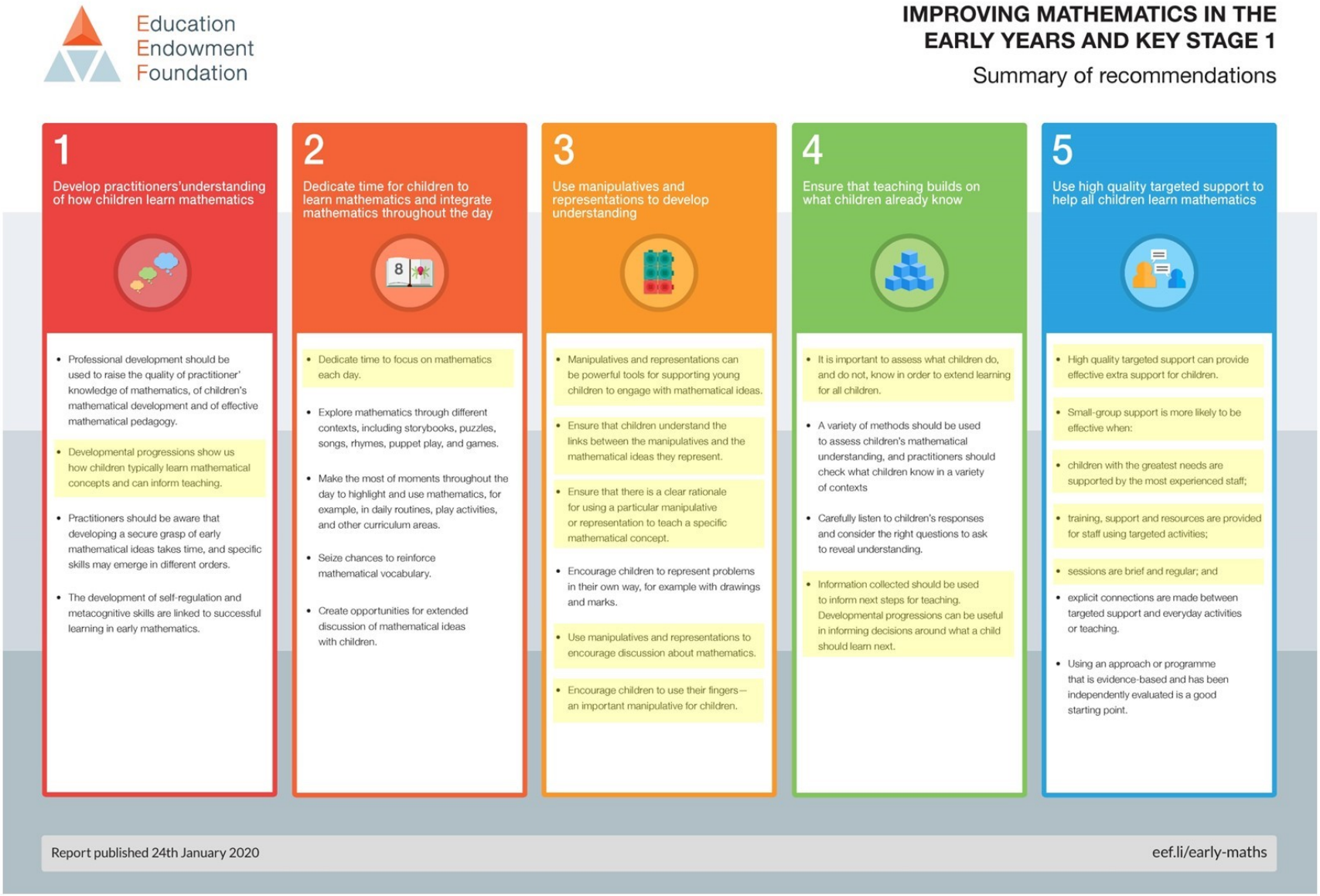
- Making sense of Numbers -

# Building Understanding of Primary Maths Concepts Through Consistent Use of Practical Resources

***With reference to the 2020 EEF Guidance Report:***

***'Improving Mathematics in the Early Years and KS1'***

As a primary maths intervention resource, Number Stacks aligns closely with many of the recommendations of the EEF Maths Guidance reports published in 2020.



# 1

## Develop practitioners'understanding of how children learn mathematics

- Professional development should be used to raise the quality of practitioner' knowledge of mathematics, of children's mathematical development and of effective mathematical pedagogy.
- Developmental progressions show us how children typically learn mathematical concepts and can inform teaching.
- Practitioners should be aware that developing a secure grasp of early mathematical ideas takes time, and specific skills may emerge in different orders.
- The development of self-regulation and metacognitive skills are linked to successful learning in early mathematics.

Number Stacks is based on a developmental progression of Key Skills, split into 5 different categories and linked to the English National Curriculum. It is essential that a child has a secure understanding of each skill before moving on to the next. You can view the Key Skills progression here:

https://www.numberstacks.co.uk/wp-content/uploads/2022/01/Key-skills-pathways.pdf

**Key Skills: Number & Place Value**

| | | |
|---|---|---|
| 1 | Read and write numbers to 10 in numerals | YR |
| 2 | Read and write numbers 11 to 20 in numerals | YR |
| 3 | Count backwards within 20 from any given number | YR |
| 4 | Identify 1 more or 1 less than a given number | YR |
| 5 | Order and compare numbers up to 20 using language 'more' and 'fewer' | YR |
| 6 | Count in multiples of 10 up to 100 | Y1 |
| 7 | Count backwards in multiples of 10 within 100 | Y1 |
| 8 | Read and write numbers to 100 in numerals, recognising the place value of each digit | Y1 |
| 9 | Count backwards within 100 from any given number | Y1 |
| 10 | Identify 1or 10 more or less than a given number | Y2 |
| 11 | Compare and order numbers from 0-100 using <> and = signs | Y2 |
| 12 | Read and write 3-digit numbers in numerals, recognising the place value of each digit | Y3 |
| 13 | Find 10 or 100 more or less than a given number | Y3 |
| 14 | Read and write 4-digit numbers in numerals, recognising the place value of each digit | Y3 |
| 15 | Round any number to the nearest 10, 100 or 1000 | Y4 |
| 16 | Read and write numbers to at least 1 million | Y5 |
| 17 | Compare and order numbers up to 1 million | Y5 |
| 18 | Round any number to a given degree of accuracy | Y6 |

**Key Skills: Addition & Subtraction**

| | | |
|---|---|---|
| 1 | Recognise number bonds to 10 | Y1 |
| 2 | Recognise number bonds for numbers within 10 | Y1 |
| 3 | Add single digit numbers | Y1 |
| 4 | Subtract single digit numbers | Y1 |
| 5 | Subtract single digit numbers from numbers up to 20 | Y1 |
| 6 | Add a two-digit number and 1s | Y2 |
| 7 | Add a two-digit number and 10s | Y2 |
| 8 | Add a pair of two-digit numbers | Y2 |
| 9 | Subtract a two-digit number and 1s | Y2 |
| 10 | Subtract a two-digit number and 10s | Y2 |
| 11 | Subtract a pair of two-digit numbers | Y2 |
| 12 | Use the inverse relationship to solve missing number problems | Y2 |
| 13 | Add numbers mentally, including: a three-digit number and 1s, 10s or 100s | Y3 |
| 14 | Subtract numbers mentally, including: a three-digit number and 1s, 10s or 100s | Y3 |
| 15 | Add numbers with 3 or more digits using a formal written method | Y3 |
| 16 | Subtract numbers with 3 or more digits using a formal written method | Y3 |

**Key Skills: Multiplication & Division**

| | | |
|---|---|---|
| 1 | Double numbers up to 10 | Y1 |
| 2 | Halve numbers up to 20 | Y1 |
| 3 | Calculate and write mathematical statements using the (X) and (=) signs, using tables they know | Y2 |
| 4 | Calculate and write mathematical statements using the (÷) and (=) signs, using tables they know | Y2 |
| 5 | Calculate mentally 2-digit times 1-digit numbers | Y3 |
| 6 | Divide numbers going beyond 12 times the number using the tables that they know | Y3 |
| 7 | Multiply two-digit and three-digit numbers by a one-digit number using formal written layout | Y4 |
| 8 | Use known multiplication facts to calculate division with remainders | Y4 |
| 9 | Identify multiples and factors of a number, and use the vocabulary of common factors and prime numbers | Y5 |
| 10 | Multiply numbers of up to 4 digits by a two-digit number using a formal written method | Y5 |
| 11 | Divide numbers of up to 4 digits by a one-digit number using a formal method | Y5 |
| 12 | Divide numbers of up to 4 digits by a two-digit number using a formal method | Y6 |

**Key Skills: Fractions**

| | | |
|---|---|---|
| 1 | Recognise and find half or a quarter of an object, shape or quantity | Y1 |
| 2 | Recognise, name and find 1/3, ¼, 2/4 and ¾ of a shape, set of objects or quantity. | Y2 |
| 3 | Find and write fractions of amounts including unit and non-unit fractions with small denominators | Y3 |
| 4 | Add and subtract fractions with the same denominator | Y4 |
| 5 | Recognise and find equivalent fractions | Y4 |
| 6 | Recognise mixed numbers and improper fractions and convert from one to the other | Y5 |
| 7 | Use common factors to compare and order fractions | Y5 |
| 8 | Add and subtract fractions with denominators that are multiples of the same number | Y5 |
| 9 | Use common factors to simplify fractions | Y6 |
| 10 | Multiply a proper fraction by a whole number | Y6 |
| 11 | Multiply pairs of proper fractions | Y6 |
| 12 | Divide fractions including fractions by whole numbers, whole numbers by fractions and pairs of fractions. | Y6 |

**Key Skills: Decimals & Percentages**

| | | |
|---|---|---|
| 1 | Recognise that decimals come from splitting ones into smaller parts and count up or down in tenths | Y3 |
| 2 | Add numbers with one decimal place | Y3 |
| 3 | Subtract numbers with one decimal place | Y3 |
| 4 | Round decimals with one decimal place to the nearest whole number. | Y4 |
| 5 | Recognise and count up or down in hundredths | Y4 |
| 6 | Add numbers with two decimal places | Y4 |
| 7 | Subtract numbers with two decimal places | Y4 |
| 8 | Recognise the decimal equivalents of ¼ ½ and ¾ | Y4 |
| 9 | Multiply and divide whole numbers and decimals by 10, 100 and 1000 | Y5 |
| 10 | Recognise the % symbol and know the equivalence between common fractions, decimals and percentages | Y5 |
| 11 | Find percentages of amounts | Y6 |

# 3

## Use manipulatives and representations to develop understanding

- Manipulatives and representations can be powerful tools for supporting young children to engage with mathematical ideas.
- Ensure that children understand the links between the manipulatives and the mathematical ideas they represent.
- Ensure that there is a clear rationale for using a particular manipulative or representation to teach a specific mathematical concept.
- Encourage children to represent problems in their own way, for example with drawings and marks.
- Use manipulatives and representations to encourage discussion about mathematics.
- Encourage children to use their fingers—an important manipulative for children.

Number Stacks uses stackable place value counters to help explain Key Skills from EYFS to Year 6. The consistent choice of manipulative makes it easier for children to make connections between concepts and helps build confidence.

All equipment needed is included in 'Grab & Go' resource kits, which mean no time is wasted hunting things down before each session. You can find out more about our resource kits here:

https://www.numberstacks.co.uk/resource-kit

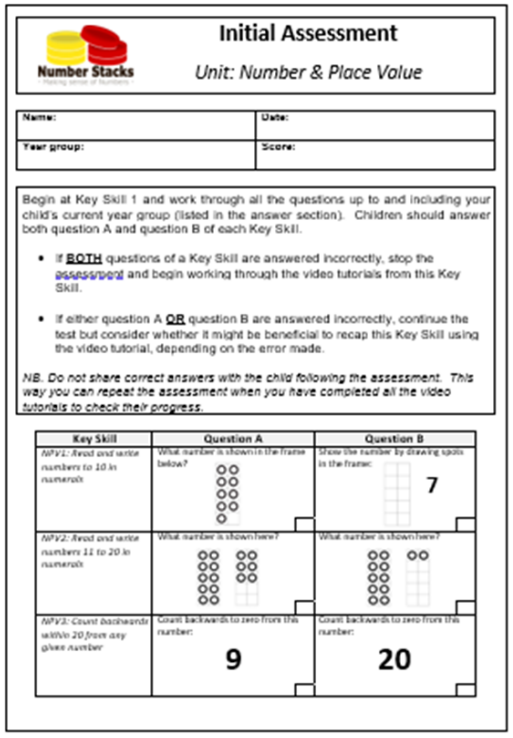
# 4

## Ensure that teaching builds on what children already know

- It is important to assess what children do, and do not, know in order to extend learning for all children.
- A variety of methods should be used to assess children's mathematical understanding, and practitioners should check what children know in a variety of contexts
- Carefully listen to children's responses and consider the right questions to ask to reveal understanding.
- Information collected should be used to inform next steps for teaching. Developmental progressions can be useful in informing decisions around what a child should learn next.

Initial assessments (one for each Key Skill category) are used to identify gaps in understanding and where each child needs support. As the assessments are linked to the Key Skills Progression, it makes it easy to track progress and highlight next-steps. Each Key Skill also has its own 'Fluency-Activity' which can be used to assess understanding and confidence of each skill once completed. You can view a sample of an initial assessment here:

https://www.numberstacks.co.uk/initial-assessments-2



Number Stacks

**Initial Assessment**

*Unit: Number & Place Value*

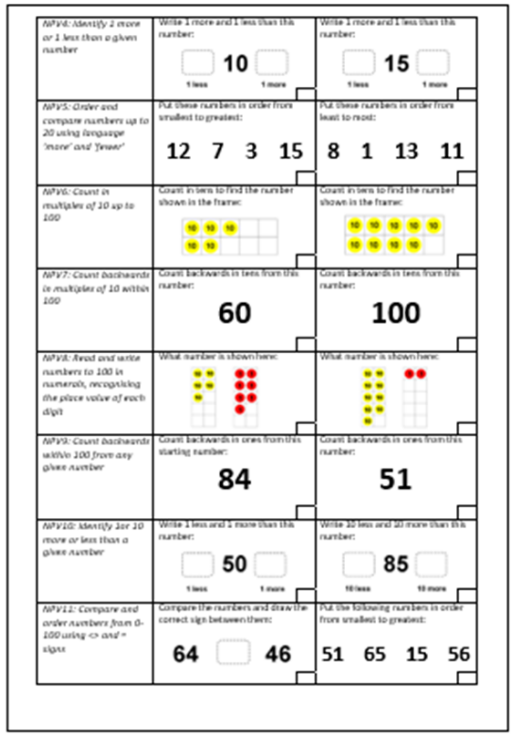
| Name: | Date: |
|---|---|
| Year group: | Score: |

Begin at Key Skill 1 and work through all the questions up to and including your child's current year group (listed in the answer section). Children should answer both question A and question B of each Key Skill.

- If **BOTH** questions of a Key Skill are answered incorrectly, stop the assessment and begin working through the video tutorials from this Key Skill.
- If either question A **OR** question B are answered incorrectly, continue the test but consider whether it might be beneficial to recap this Key Skill using the video tutorial, depending on the error made.

*NB. Do not share correct answers with the child following the assessment. This way you can repeat the assessment when you have completed all the video tutorials to check their progress.*

| Key Skill | Question A | Question B |
|---|---|---|
| *NPV1: Read and write numbers to 10 in numerals* | What number is shown in the frame below? | Show the number by drawing spots in the frame: 7 |
| *NPV2: Read and write numbers 11 to 20 in numerals* | What number is shown here? | What number is shown here? |
| *NPV3: Count backwards within 20 from any given number* | Count backwards to zero from this number: 9 | Count backwards to zero from this number: 20 |



| | | |
|---|---|---|
| *NPV4: Identify 1 more or 1 less than a given number* | Write 1 more and 1 less than this number: 1 less 10 1 more | Write 1 more and 1 less than this number: 1 less 15 1 more |
| *NPV5: Order and compare numbers up to 20 using language 'more' and 'fewer'* | Put these numbers in order from smallest to greatest: 12 7 3 15 | Put these numbers in order from least to most: 8 1 13 11 |
| *NPV6: Count in multiples of 10 up to 100* | Count in tens to find the number shown in the frame: | Count in tens to find the number shown in the frame: |
| *NPV7: Count backwards in multiples of 10 within 100* | Count backwards in tens from this number: 60 | Count backwards in tens from this number: 100 |
| *NPV8: Read and write numbers to 100 in numerals, recognising the place value of each digit* | What number is shown here: | What number is shown here: |
| *NPV9: Count backwards within 100 from any given number* | Count backwards in ones from this starting number: 84 | Count backwards in ones from this number: 51 |
| *NPV10: Identify 1or 10 more or less than a given number* | Write 1 less and 1 more than this number: 50 | Write 10 less and 10 more than this number: 85 |
| *NPV11: Compare and order numbers from 0-100 using <> and = signs* | Compare the numbers and draw the correct sign between them: 64 46 | Put the following numbers in order from smallest to greatest: 51 65 15 56 |

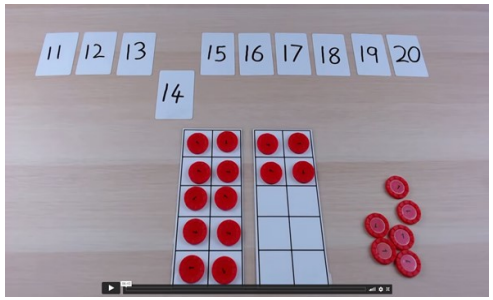
# 5

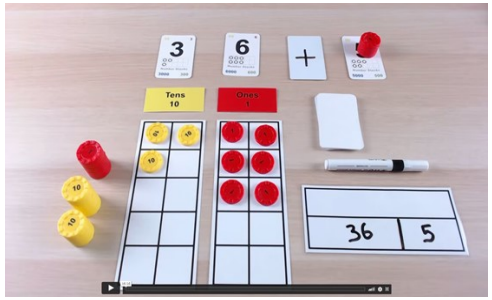
## Use high quality targeted support to help all children learn mathematics

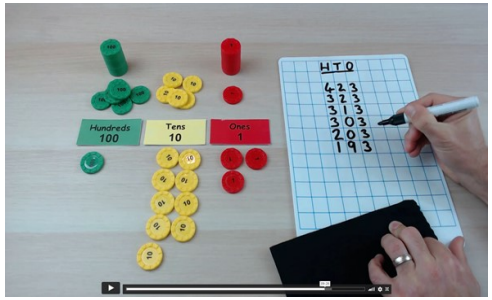
- High quality targeted support can provide effective extra support for children.
- Small-group support is more likely to be effective when:
- children with the greatest needs are supported by the most experienced staff;
- training, support and resources are provided for staff using targeted activities;
- sessions are brief and regular; and
- explicit connections are made between targeted support and everyday activities or teaching.
- Using an approach or programme that is evidence-based and has been independently evaluated is a good starting point.

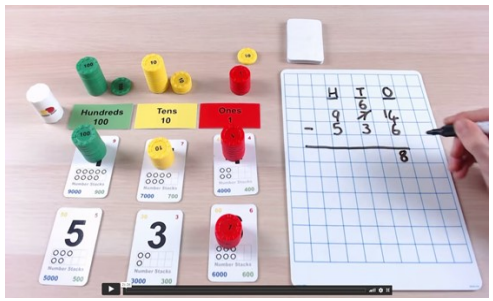
All teaching in Number Stacks is delivered through video tutorials that are designed to be watched by a child (or small group) and supporting adult together. Activities are explained and demonstrated by James (a primary teacher with 16 years experience) before the video is paused for the child to practise what they have watched. A typical section of a video is a few minutes long so a session would usually last about 15-20 mins and should take place daily if possible, but a minimum of 3 times per week.

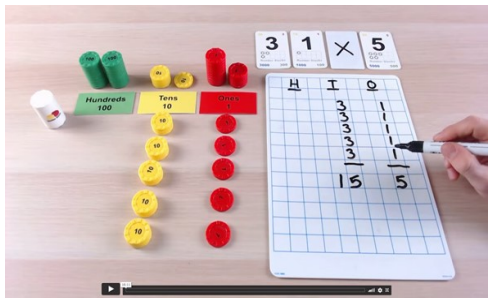
https://www.numberstacks.co.uk/video-tutorials




# NUMBER STACKS CASE STUDY

## *Pleasant Street Primary School, Liverpool*

Pleasant Street Primary have been using Number Stacks as a maths intervention to help children who were working below age related expectations (ARE). The data below covers a period from October 2020 to July 2021. Over this period, 56 pupils accessed the intervention of which 70% spoke English as an additional language (EAL) and 34% were on the SEN register. Staff used the Initial Assessments to establish a starting point for each child and then worked through the Number Stacks Key Skills, starting with the Number & Place Value category. Children had to demonstrate a secure understanding on the fluency tasks before progressing on to the next Key Skill, and only moved on to the next category of Key Skills when they had reached ARE in the current category. Frequency of sessions varied between classes with the children furthest behind having at least 3 sessions a week and those only working slightly below ARE, only one or two. The statistics below are taken from Pleasant Street's Intervention Tracking Data.

### KS1 (27 Pupils)

- 100% made progress from their starting points
- 63% Caught up with ARE in Number & Place Value
- 41% Caught up with ARE in all categories and no longer needed to access the intervention
- Pupils progressed by an average of 9 Key Skills

### KS2 (29 Pupils)

- 100% made progress from their starting points
- 83% Caught up with ARE in Number & Place Value
- 55% Caught up with ARE in two or more categories
- 93% Progressed by at least 10 Key Skills
- Pupils progressed by an average of 14 Key Skills

*'Number Stacks has been a fantastic intervention. It has worked well as it has helped close the gaps, especially with basic skills. The resources used are good to support the children as it is a visual element to support them.' (Y1 Teacher)*

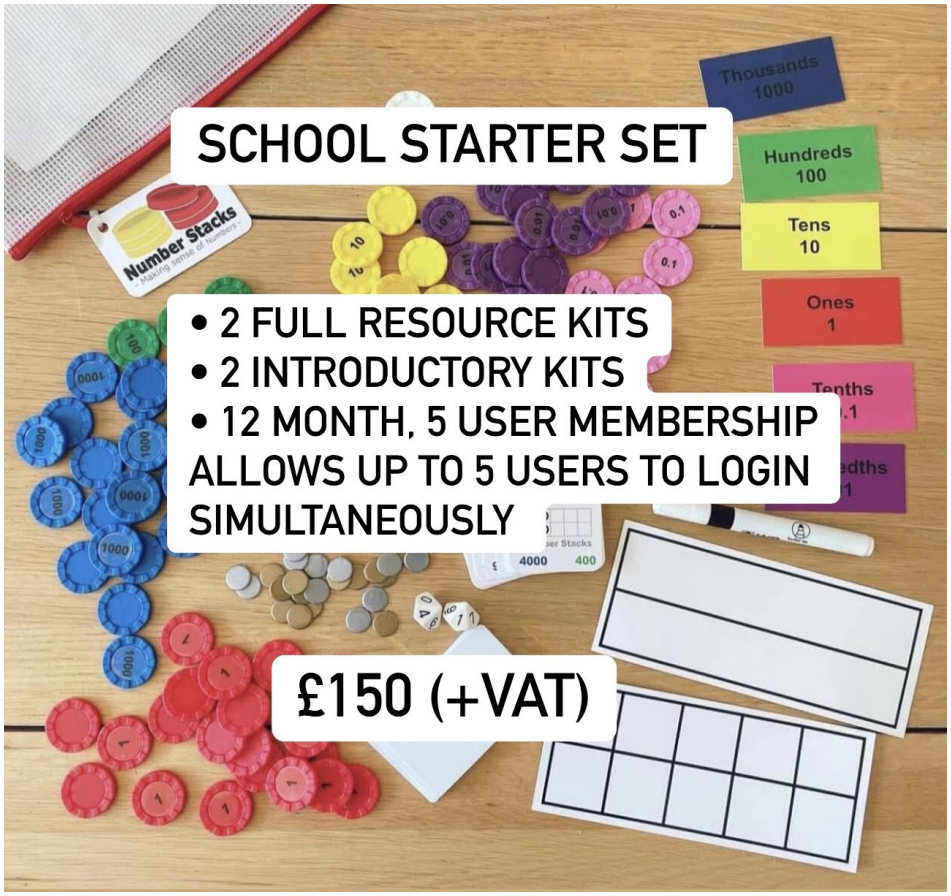
*'The children have really enjoyed the sessions and I think it has had an impact on their confidence in Maths. They have used their strategies in Maths lessons.' (Y2 Teacher)*

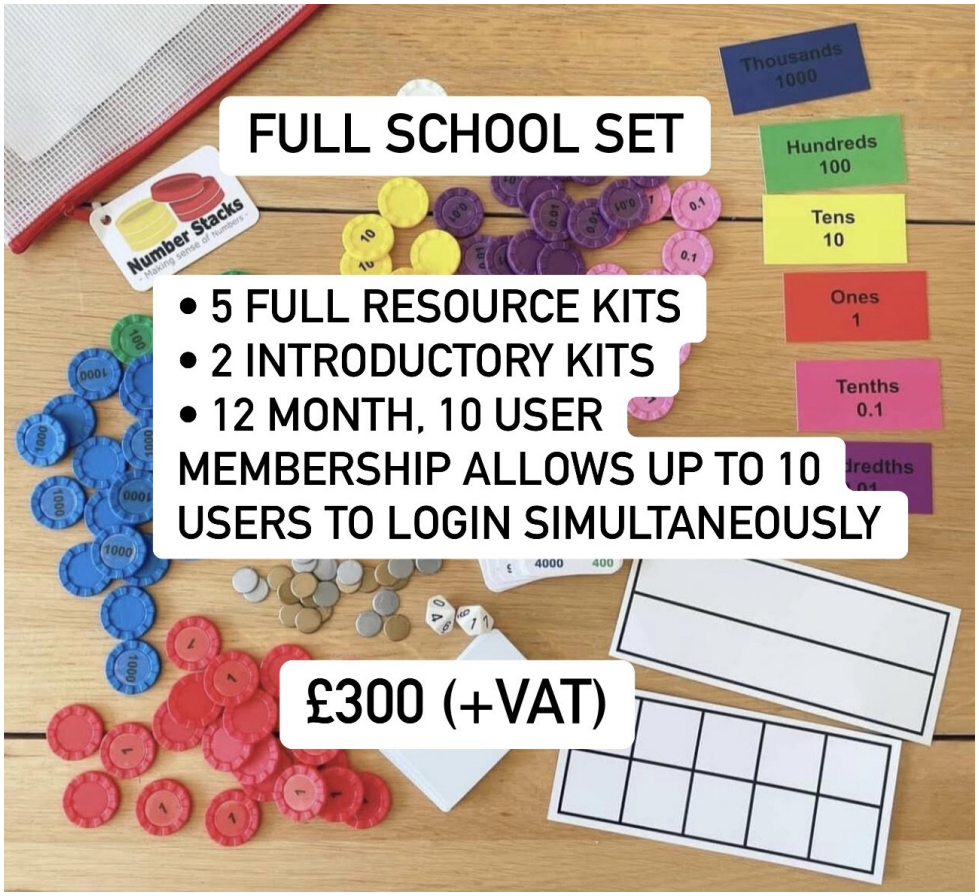
*'Number stacks has had a positive effect this year as children have responded well to the short lessons…The children have become more confident attempting questions in class and have improved their test results.' (Y4 Teacher)*

*'I like Number Stacks. It makes Maths easy because we have counters. It helps me with my maths because I remember all the things I have done in Number Stacks when we do Maths in class.' (Y4 Pupil)*

*'Number Stacks has been an easy intervention to complete. The resources are ready and the 'grab and go' nature of the intervention means that it is fuss free and there is no planning or resourcing needed. It has had a massive impact on pupil confidence and progress this year. The children enjoy the practical element of the sessions and we are noticing that they are using skills and strategies in Maths lessons.' (Intervention Manager)*

# www.numberstacks.co.uk/free-trial




# www.numberstacks.co.uk/schools

# Useful Links:

**EEF Guidance – Improving Maths in the Early Years & KS1:**

https://educationendowmentfoundation.org.uk/education-evidence/guidance-reports/early-maths

**Number Stacks Key Skills Progression:**

https://www.numberstacks.co.uk/wp-content/uploads/2019/02/Key-skills-pathways-edited-and-reduced-V4.pdf

**Number Stacks Free Trial (including initial assessments):**

https://www.numberstacks.co.uk/free-trial/

**Number Stacks School Packages & Case Studies:**

https://www.numberstacks.co.uk/schools/

**Number Stacks YouTube videos:**

https://www.youtube.com/channel/UCEDLenKjUvunqZRyzINZ_Qw/videos