Hampshire County Council

Improvement and Advisory Service

SUMMER 2024

Hantsmaths

In this issue:

Contents

Editorial

Welcome to the summer edition of *Hantsmaths*. We hope the term is going well and children are starting to enjoy experiences outside as the sun begins to shine.

As you may be aware, Andrew Jeffrey joined us as our key speaker for this year's primary mathematics conference that is part of our core provision programme. Andrew delivered a thought provoking and inspirational session that focused on mathematical reasoning. He spoke about reasoning being the skill that helps us to select the right tool to problem solve. Andrew shared with us a range of activities that could be used with all year groups across the primary phase, and we cannot wait to see how our mathematics leaders have taken some of his ideas and implemented them across the school. If you missed our conference this year, we have taken some time in this edition to review Andrew's key ideas and reflect upon his messages. Thank you, Andrew, for such an inspiring session.

I would like to take this opportunity to thank Jade Robinson from Alver Valley Schools and Hannah Martin from Sarisbury Church of England Junior School for their fantastic articles that they have shared with us. Jade has focused on developing problem solving at Alver Valley Schools and shares with us how she has supported teachers from nursery to Year 5 to plan for problem solving opportunities. The pupils' feedback is particularly fascinating with a child even comparing themselves to *Albert Einstein because they were full of ideas!*

Pathway to progress is our new intervention programme that we have developed, and we are pleased to say that you can now purchase the programme for Years 1, 2, and 6. We have had a lot of positive feedback from schools that are using the intervention and Hannah shares with us the impact this has had with pupils working in Year 6. The Year 4 programme is the next pathway to progress that we hope to have available very soon. Keep your eyes peeled!

We are also reminded within this edition of the importance of children seeing mathematics in everyday contexts and how games can be a powerful strategy to engage and secure the fundamentals of mathematics. Playing games enables pupils to further develop their metacognitive skills by thinking carefully about strategies and then spending the time to measure their own success.

I hope that you enjoy this edition of *Hantmaths* and I would like to take this opportunity to wish all schools a happy and successful summer term.

Kate Spencer

Primary Lead Inspector/Adviser for Mathematics, HIAS

Email: kathryn.spencer@hants.gov.uk.

Reasoning in every lesson – a review of this year's mathematics conference

Andrew Jeffrey, www.andrewjeffrey.co.uk/product-category/reasoning/ .

In primary mathematics education, nurturing reasoning skills establishes the groundwork for lifelong mathematical fluency and adept problem solving abilities.

We were lucky enough to have Andrew Jeffrey present at our conference this year, and he provided an opportunity for mathematics leaders to engage in dialogue centred around the fundamental question: How can we ensure that reasoning opportunities are incorporated into our lessons, regardless of what mathematics topic we are teaching?

Andrew shared simple yet impactful strategies that leaders and practitioners can readily implement in the classroom.

Fluency and reasoning are the twin engines of problem solving. Imagine you have been tasked with putting up a shelf: reasoning guides you in selecting the perfect tools, while fluency empowers you with the know-how to wield those tools effectively.

Similar then to a game of ping pong, pupils need to volley between them intermittently to reach the solution. Let's take this question Andrew shared as an example below.

As the teacher in this scenario, it is crucial for us to adapt our approach and questioning techniques when supporting struggling pupils. Questions such as *What do you understand about triangles?* and *How could that knowledge help you?* hold greater power in developing reasoning skills.

Reasoning – *I need to calculate the angle for x.*

Fluency – *I know angles in a triangle add up to 180°*

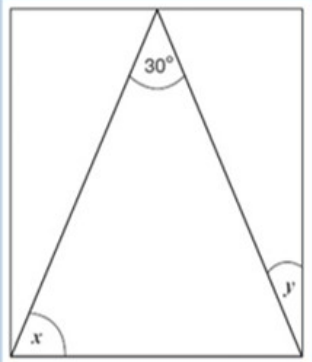
Reasoning – *I need to subtract 30 from 180 to find the total of the two bottom angles.*

Fluency – *180 ° – 30 ° = 150 °*

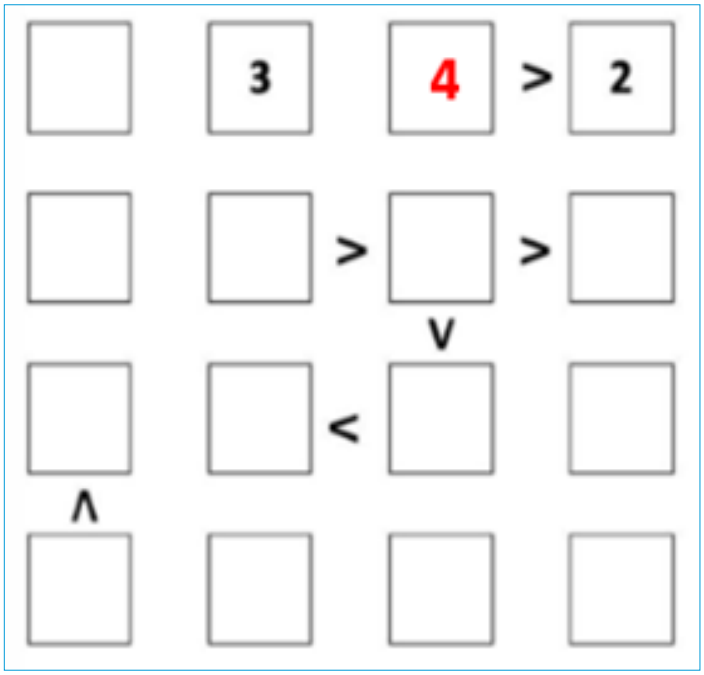
Reasoning – *This is an isosceles triangle, so the two bottom angles are equal.*

I will divide 150 ° by 2 to find angle x.

Fluency – *150 ° ÷ 2 = 75 °*



I particularly enjoyed Futoshiki, a board-based puzzle game, also known as Unequal. Similarly to Sudoku, the purpose of the game is to discover the digits hidden inside the board's cells. On each row and column each digit appears exactly once. As this example is 4x4, we can only use the digits 1, 2, 3 and 4. This task is a great opportunity to develop logical reasoning, with pupils reaching a solid conclusion through careful thinking. Inferences can be made based on the starting digits, leading to a supported conclusion.



For example, I know the red digit **must be** 4 because 1 is not greater than 2, and 3 has already been placed in the row.

This activity is a fantastic example of task design nurturing reasoning and problem solving abilities and creating challenge whilst keeping the fluency trivial.

Links to similar activities

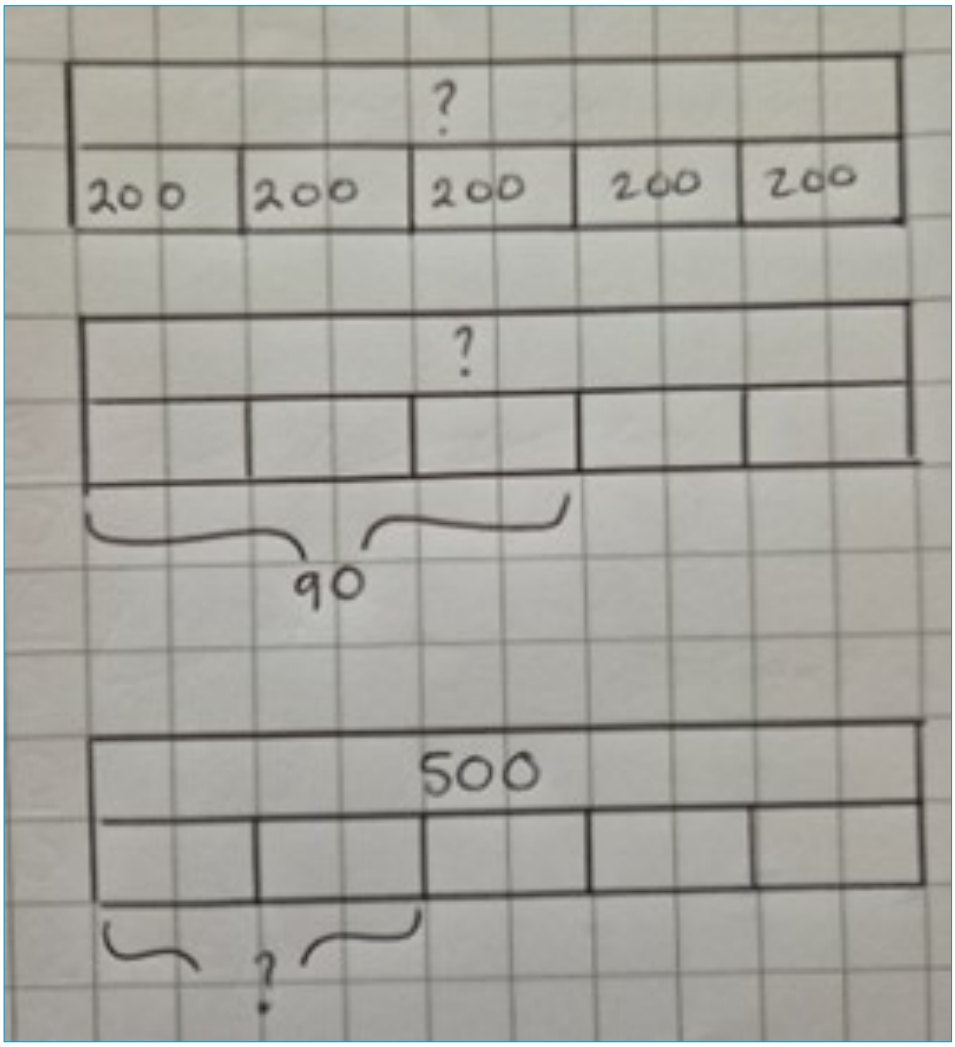
- Yohaku: a new type of number puzzle www.yohaku.ca/.
- KenKen puzzle official site: free math puzzles that make you smarter! www.kenkenpuzzle.com/.
- Building tables fluency – Andrew Jeffrey: https://andrewjeffrey.co.uk/?s=building+tables+fluency

Whilst highlighting the significance of pupils demonstrating their mathematical reasoning, Andrew presented techniques to enrich understanding through conceptual and visual means, facilitating abstract reasoning. Physically doing something prepares the brain to comprehend and internalise a range of abstract ideas.

Alongside the concrete models, it is also vital that as teachers, we encourage pupils not only to draw, sketch, and doodle, but also to see these drawings as every bit as important as the final answer to whatever they are working on. When learning to use the bar model, for example, pupils will all benefit from using linking cubes, square tiles or two-colour counters and the like, to create a picture to work from.

Let's take these 5 cubes as an example. Each cube represents a box, and each box has the same number of grains of rice.

- If one box had 200 grains of rice, how many grains of rice would there be altogether?
- If three boxes contained 90 grains of rice, how many grains of rice would there be in all five boxes?
- If five boxes contained 500 grains of rice altogether, how many grains of rice would there be in two of the boxes? (this is also equivalent to $\frac{2}{5}$ x 500).



It is important to insist on an answer of *"multiply 200 by 5"* and not accept an answer of *"1000"*, so that pupils can try to articulate what they are doing and therefore learn from each other.

I want to conclude this article by extending a heartfelt thank you to Andrew Jeffrey for his truly inspiring conference. I am eager to visit schools soon and witness firsthand the implementation of some of Andrew's practical ideas and suggestions.

Olivia Goodburn

Teaching and Learning Adviser for Mathematics, HIAS

Problem solving at Alver Valley Schools

As part of our school improvement plan (SIP) this year, we are focusing on problem solving in mathematics. Following discussions at core provision, it was clear that this is a wider focus for many schools across the county and probably across the country.

From our monitoring, we knew that as a school we were doing a lot of solving problems, but not giving children the opportunities to problem solve. Those scratch your head moments. Step back and let the children struggle moments. Becoming the facilitator, not the teacher moments.

During the autumn term, I worked with a member of each year group team to plan a unit of work following the Hampshire schemes, ensuring that we included the three main strands – fluency, reasoning, and problem solving.

When looking at the problem solving element, we looked at the different types of problems – working backwards, pattern spotting, logic problems, etc. We have now started plotting these onto a long-term overview with hyperlinks to suggested activities within the resources we already have in school. Over the year, we are aiming for children to have exposure to a range of different types of problem solving strategies and build on these as they progress through the school.

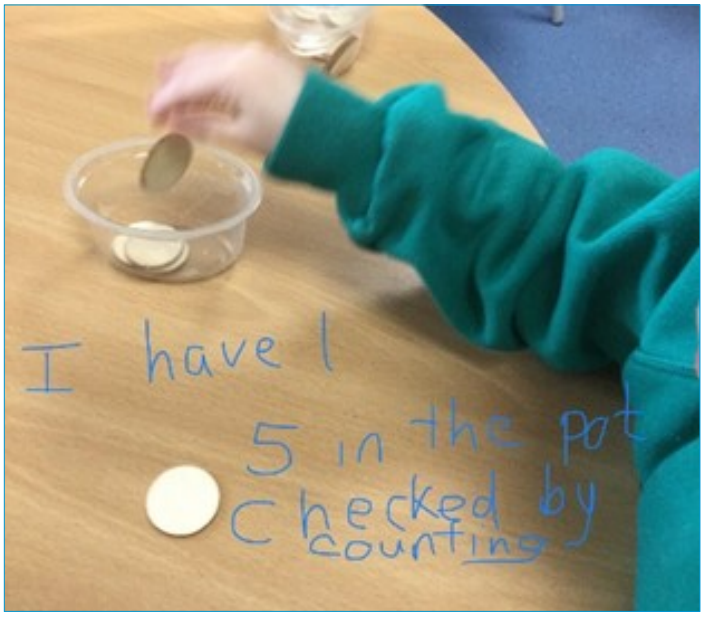
Year 2	Spring Term
Addition & Subtraction (measure) 2.5	Pattern spotting (Number bonds) Convince me card Y2 Card 15 Trial and improvement https://nrich.maths.org/188?utm_source=primary-map Number round up
Measurement (time and mass) 2.5	NCETM Y1 page 23 Mastery with greater depth (Logical reasoning) NCETM Y2 page 25 (Logical reasoning)
Fractions & Geometry 2.6	Year 2 Dip and Pick card 37 (visualising) I see reasoning KS1 - Page 80 (using diagrams and pictorial information)
NPV and Addition & Subtraction 2.7	1 more/ less 10 more/ less NCETM Mastery Y1 page 10 (Pattern spotting) I see reasoning KS1 - Page 38 (pattern spotting) I see reasoning KS1 - 134 (Using diagrams and pictorial information)
Calculate with money and Fraction 2.8	I see reasoning KS1 - Page 110 Challenging more able pupils in maths - Pages 17 and 31

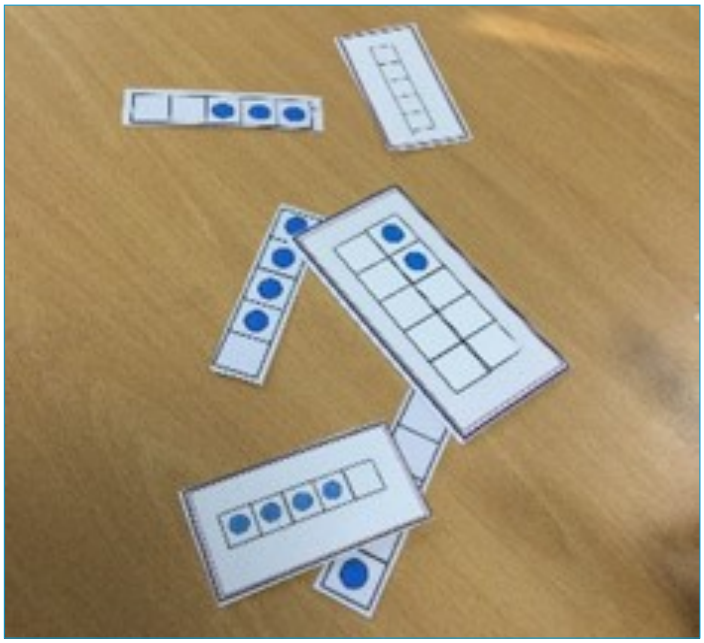
An example of our Year 2 overview for spring.

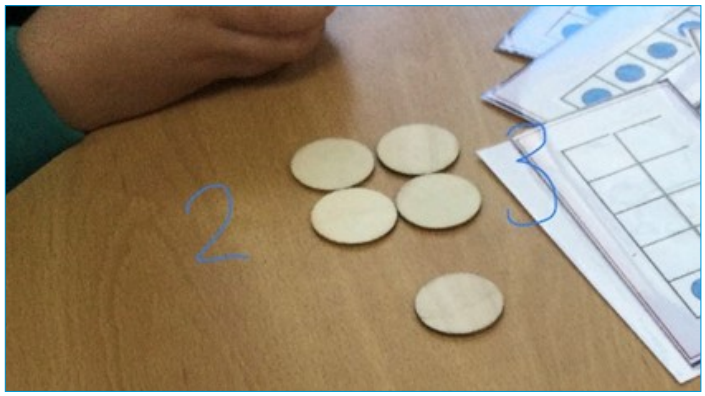
Problem solving in nursery

Nursery follows a lot of the ideas from Karen Wilding looking at subitising. The children worked in a small group with our Nursery Lead (who is a qualified teacher) looking at the five frames. The children picked a card and spoke about what they could see.

The teacher then held up two different cards and asked the children if they were the same or different and encouraged the children to explain. The children were given small pots with 5 wooden slices inside. They were asked to shake the pot and *roll* the wood onto the table. They then had to spot how many discs they had.





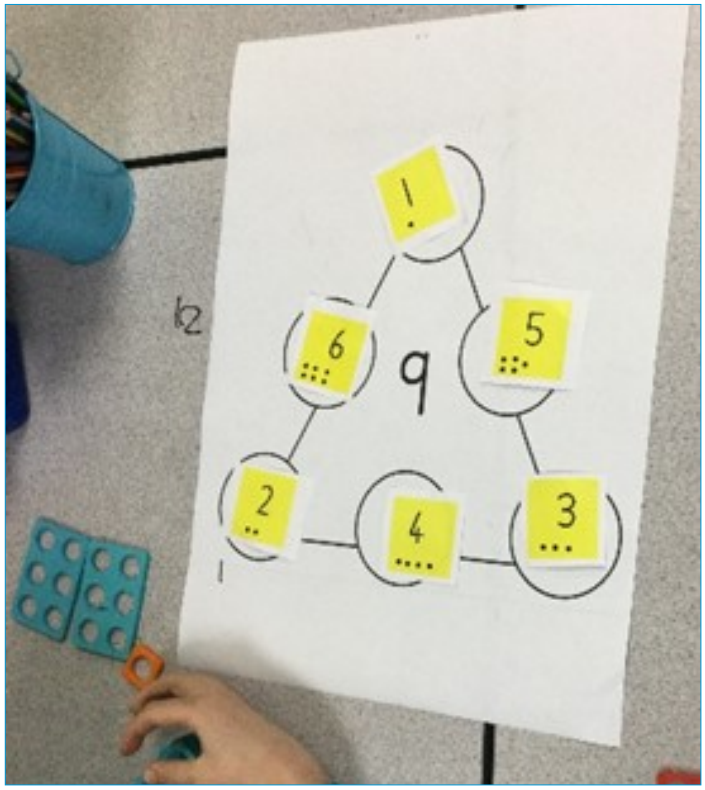


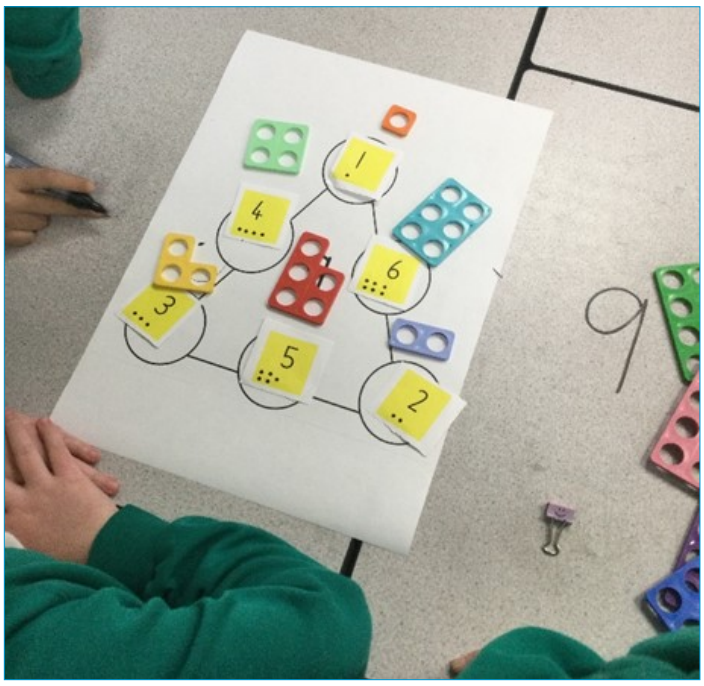
Year 2 problem solving

The children were given number cards 1-6. They were asked to place them anywhere on the triangle that they wanted. Some children had three numbers already placed before they started. Once the children had done this, the teacher said that they needed to add up the sides. She modelled one.

For adding up, some children independently got resources such as multilink and Numicon to support with their adding. Others chose to count the dots on their number cards.

The teacher then pulled them back together and set them the new challenge of ensuring that each side totalled 9.





"I liked trying to solve this problem because I got to be a calculator."

"The dots on the cards helped."

"At first we made 9 by adding 4 + 5 but that would have been too big when we added a third card."

"I know 9 is an odd number so we need to think about numbers that will make an odd number."

"I've noticed something, but I don't want to say my idea in case someone else has the same answer."

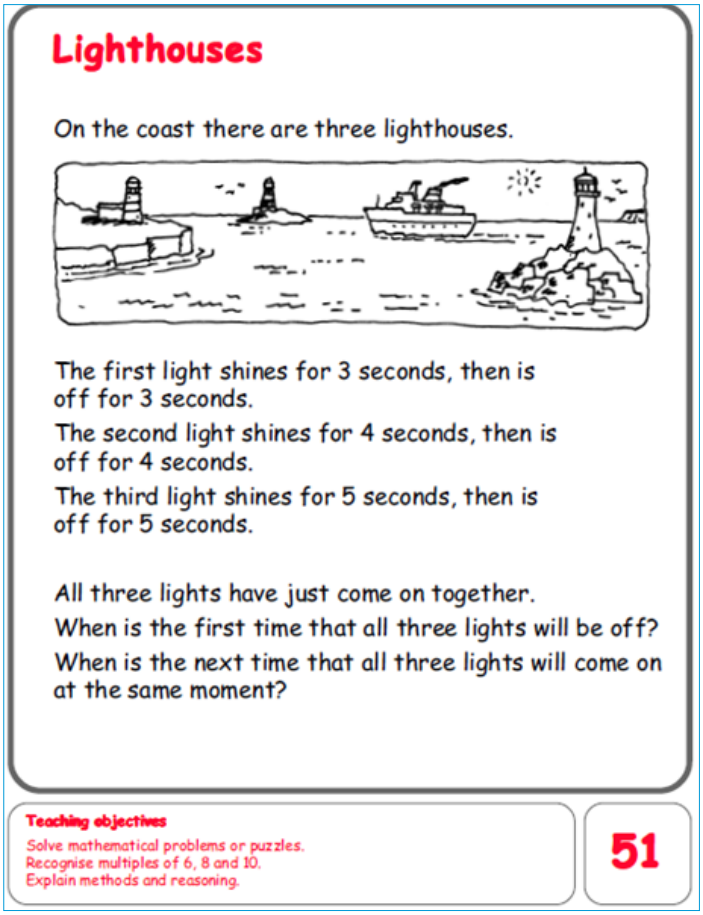
"I'm not sure if that is right. I'm going to check."

Once children had made the sides total 9, they were then given a different number to make.

Year 5 problem solving

Starting off

When I introduced the task to the children, I explained that we would be looking at problem solving and that this would be something slightly new to them that would test their resilience and challenge them. I gave the children the choice of whether they wanted to work as a table, pair or individually.



Lighthouses

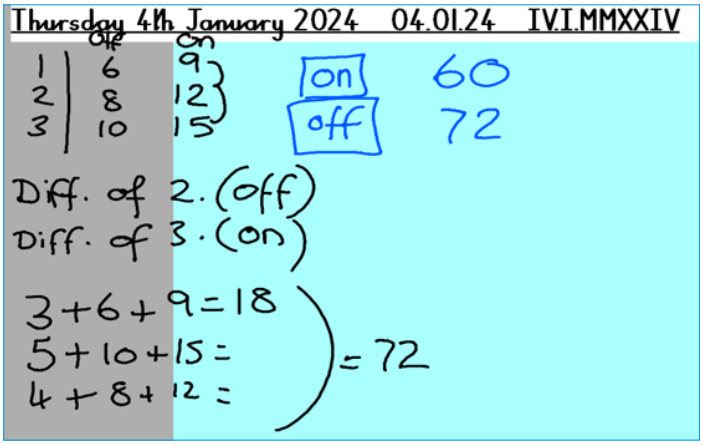
On the coast there are three lighthouses.

The first light shines for 3 seconds, then is off for 3 seconds.
The second light shines for 4 seconds, then is off for 4 seconds.
The third light shines for 5 seconds, then is off for 5 seconds.

All three lights have just come on together.
When is the first time that all three lights will be off?
When is the next time that all three lights will come on at the same moment?

Teaching objectives
Solve mathematical problems or puzzles.
Recognise multiples of 6, 8 and 10.
Explain methods and reasoning.

51

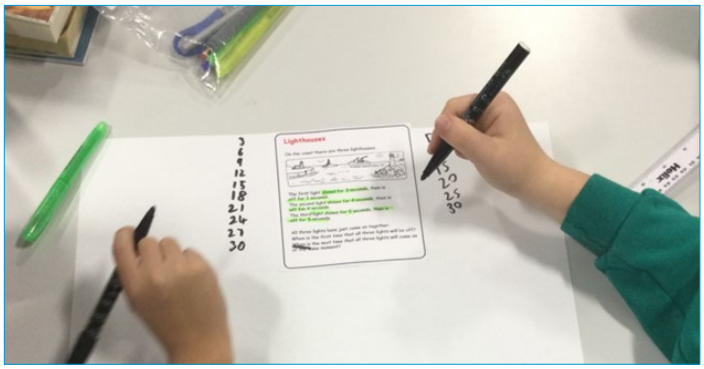


The children had 10 minutes to discuss and have a go at tackling the problem with no adult input other than reading the problem and modelling what the lighthouses did. During this time, many children were writing out calculations with the numbers they knew including the 4 operations. Some children sat with their heads in their hands and others started to draw pictures of lighthouses and annotate with the numbers.

Initial thoughts

After 10 minutes, we then shared any patterns that we had noticed at this point. We made links with our reasoning stems:

"I know that… the reason I did this was because… I think… I tested… the pattern is…"



I also gathered some feedback on their thoughts and feelings at this point in time.

"I'm just confused to be honest."

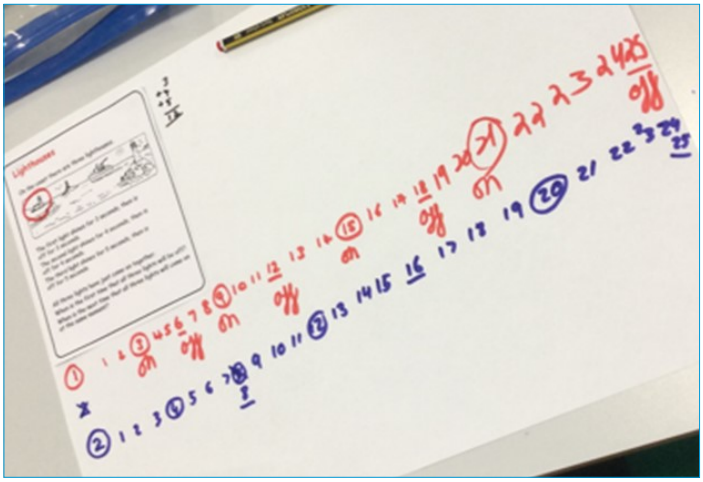
"It's ok, harder than I thought but it got easier."

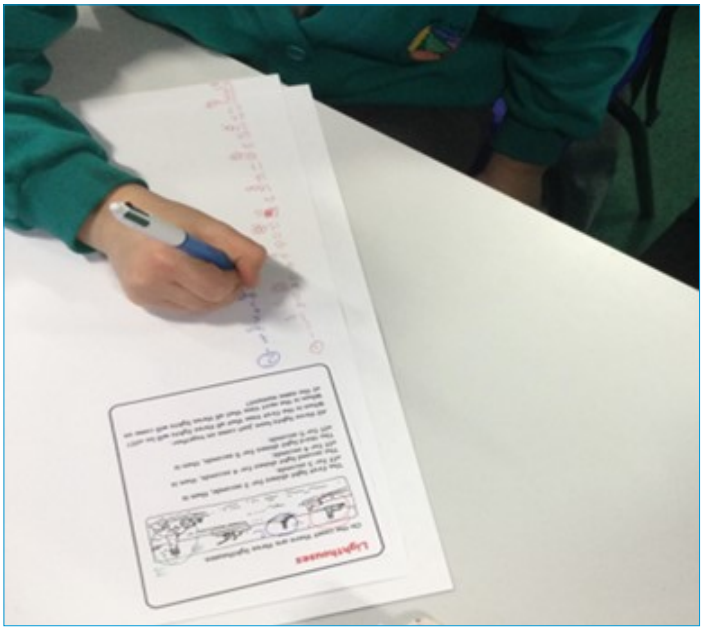
"Talking helped!"

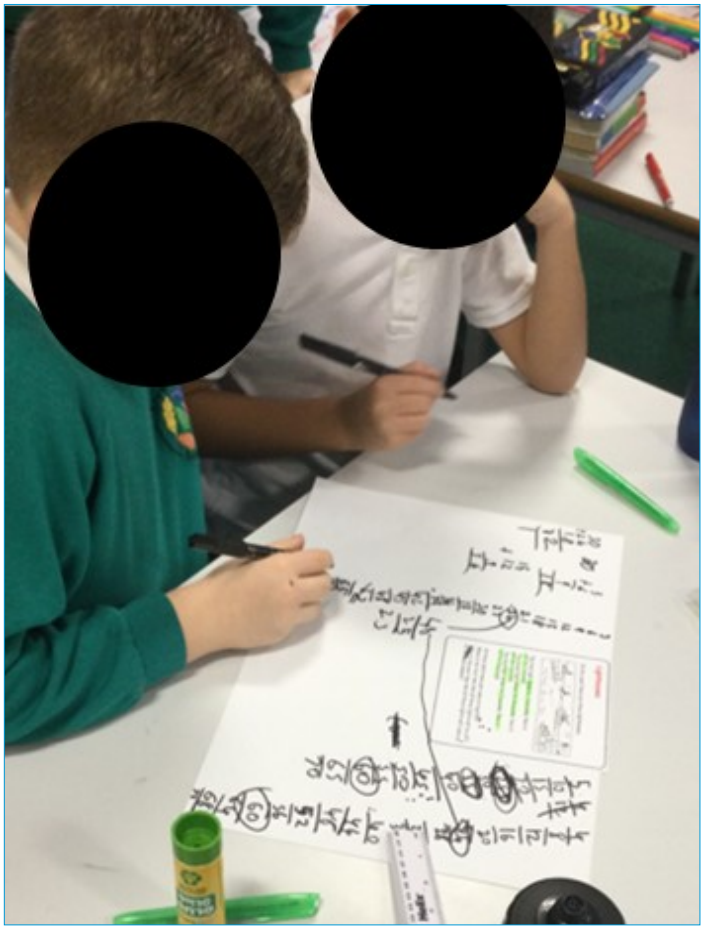
"Frustrated and confused."

Using the feedback of others

The children then had a further 10 minutes to use what other children had shared. All children were then on task at this point and there were lots of discussions going on. Children were going to look at what others had done, and most children changed to working as a table group if they had been working individually to share their findings.





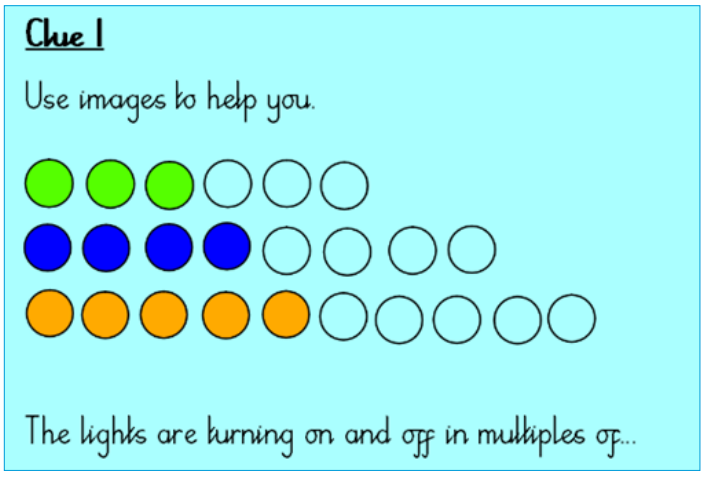


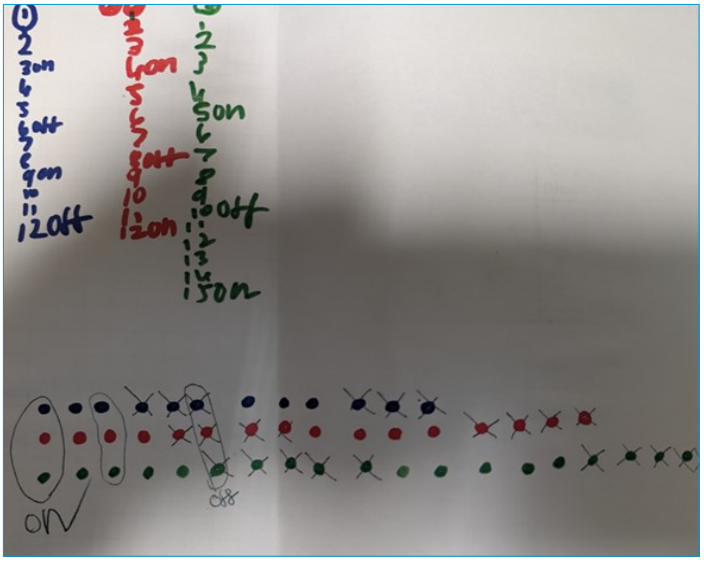
Clues

At this point, I offered the children a possible way that they could record their ideas to make sense of what was happening with the lights.

Some children were already spotting the multiples whilst others needed a clue.

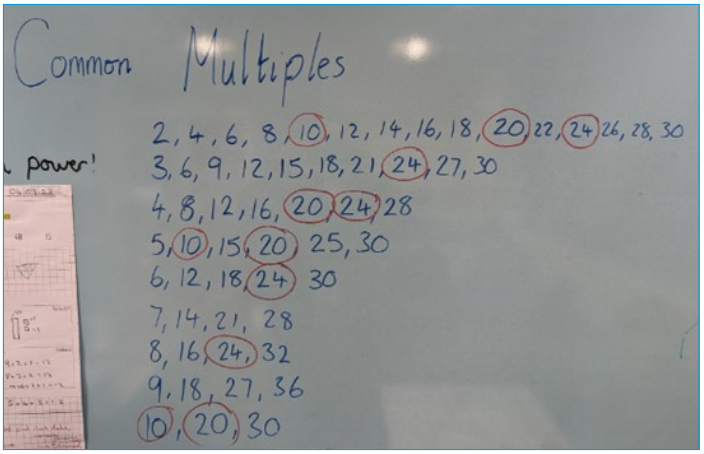
After being given a clue, this child took it further and started to cross off the *lights*.





Ending the session

At the end of the session, we shared what we had found out. Nobody had quite reached the answer, but they all understood a strategy to help them get to the answer and how it linked with multiples. We then looked at multiples and revisited the term *common multiples*. After adding this to our working wall, we discussed how for this problem, we needed to find common multiples for 6, 8 and 10.



After thoughts

After the session, we collated our ideas about the problem solving activity that we had done.

"I felt like Albert Einstein because I had a lot of ideas."

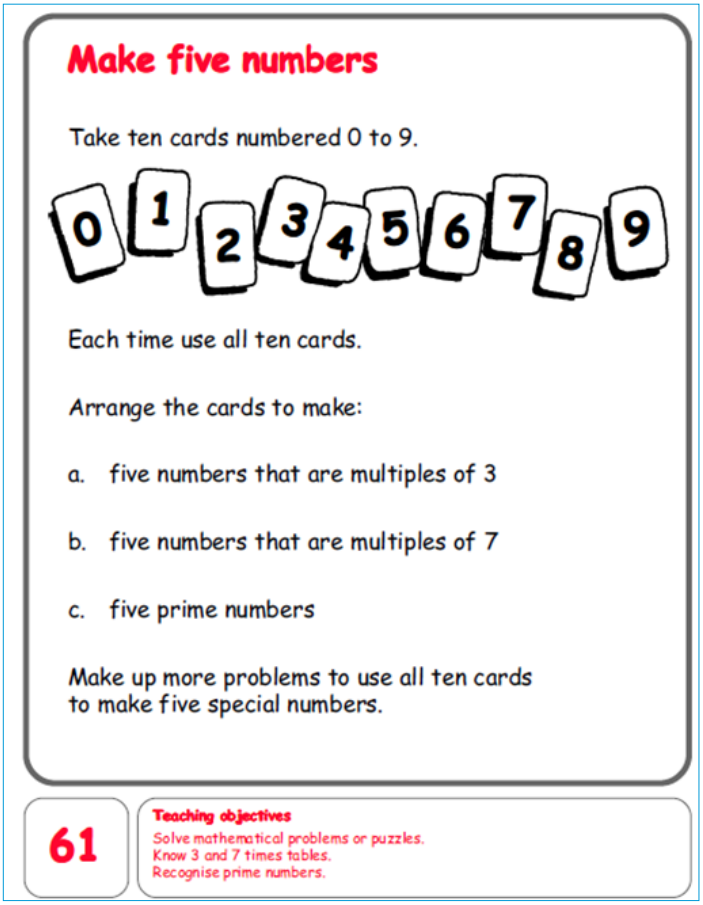
"I felt mad, annoyed and tired."

"I feel good because it was my first time trying this but I think we did pretty good."

"It was very tricky and I didn't understand at first."

"I felt confused and tired because it was hard work."

Session 2



Starting the lesson

This lesson followed on from the one the day before. We spoke about the problem solving skills that we had learnt and how mathematics is about looking for patterns and relationships.

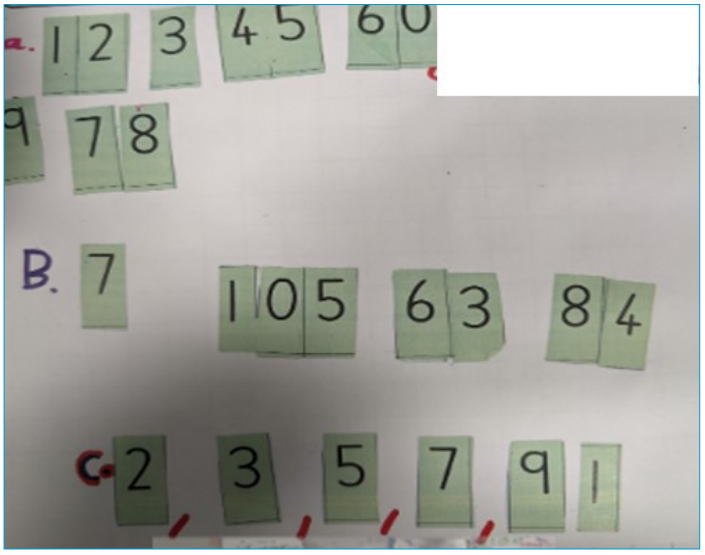
Each child had a set of cards 0-9 to start with and similarly to the previous lesson, they had the choice with whom they wished to work with.

I covered up questions b and c to start with. The children were very quick to find multiples of 3 and we discussed how we could work out a multiple of 3 if it was a bigger number by adding the digits together, eg 351 is a multiple of 3 because 3 + 5 + 1 = 9 and 9 is a multiple of 3.

Once the children had arranged the cards to find multiples of 3, I asked them to record these on their paper.

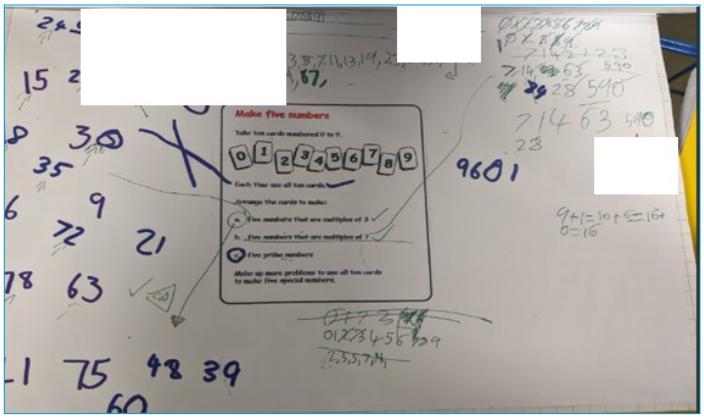
Returning to the problem

After 10 minutes, I drew the children back together and reminded them of the criteria of the problem. All the children were able to make multiples of 3, but many of them had forgotten that they had to use all the cards and only make 5 numbers. They were very excited to get going with this and there was a very different atmosphere during the lesson than the one before.



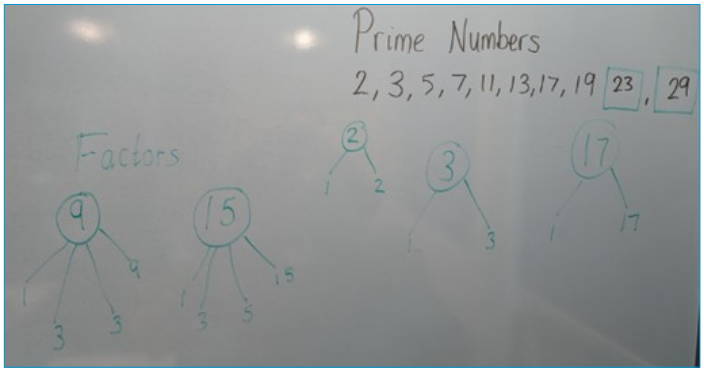
Next steps

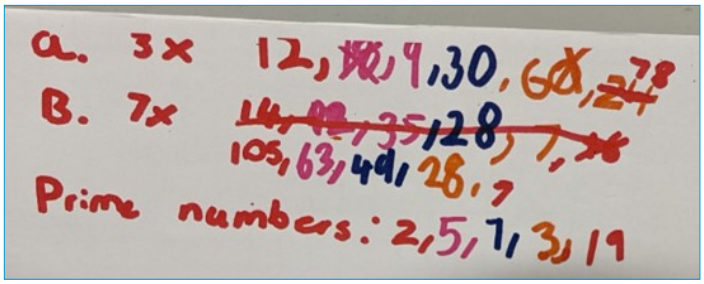
When moving onto problem b, the children found this much trickier. Most children were confident with 7 x tables and those who were not got their multiplication square for support, but they could not find 5 numbers using all the cards. After 15 minutes on this problem, I gave the children the number 105 as one of the answers. The majority of children were then able to find the other multiples of 7.



Prime numbers

The children remembered learning about prime numbers but nobody could remember what they were. We returned to the working wall and looked at the multiples work from yesterday, followed by some discussions about factors of numbers. I chose a couple of prime numbers to model the factors and this prompted some children about what a prime number was. We then wrote out the prime numbers to 20 and I challenged the children to work out the next two prime numbers.





Evaluation

At the end of the lesson, we discussed how both of the lessons were problem solving lessons, but we needed different skills to tackle them. I asked the children which problem solving lesson they preferred. Most children preferred the second lesson as it was more straight forward with the numbers, but some favoured the lighthouse problem.

"I found the lighthouse problem less confusing."

"I liked the challenge of the lighthouse."

"I preferred the numbers one [second problem] because it was less challenging."

"I liked both. The lighthouse was a challenge and the numbers one was fun."

Jade Robinson

Assistant Headteacher (Junior School), Alver Valley Schools

The value of mathematics games

Mathematics can be thought of as the basis for many things in our everyday lives, from counting and measuring to using patterns and relationships to make estimations and predictions about such things as speed, distance, and quantity. Mathematics helps us carry out a variety of important daily tasks such as cooking, travelling, managing our money, using technology, participating in sport, music and dancing, following a set of instructions, managing our time, and solving problems.

For some children, mathematics can be a challenge in school, and they are not yet fluent in the fundamentals to support further progress. Playing mathematics games with a teacher, another adult or a family member can encourage them to engage with basic numbers alongside problem solving and reasoning in a more inclusive environment. Increased fluency with numbers, through playing mathematics games, also prepares them for new learning in school.

Mathematics games provide a structure and a process for children to engage in collaborative problem solving in order to reach a goal. This might prove challenging for the child, but that is what makes game playing fun!

Well designed mathematics games are purposeful, and children experience regular success and enjoyment through challenge, collaboration, and participation. Through feeling successful, children are more likely to engage with other mathematics opportunities and tasks, leading to greater motivation and perseverance with their mathematics in school. This, in turn, can lead to a feeling of social and emotional well-being resulting in a positive impact on educational outcomes for the child.

"Games can be an engaging way to practise and extend skills. They can build on children's mathematics knowledge, generate repeated practice in a motivating context, and give children and adults an opportunity to discuss strategies and ideas.

There is some evidence that board games with linearly arranged, consecutively numbered, and equal-sized spaces may be particularly beneficial to numerical understanding, by providing opportunities for developing strategies such as 'counting on'."

Improving mathematics in the Early Years and Key Stage 1, Education Endowment Foundation (EEF)
www.educationendowmentfoundation.org.uk/education-evidence/guidance-reports/early-maths.

Mathematics games can develop key skills for life together with number fluency. They should be rewarding and fun. When engaging with numbers, and playing a game, children develop turn-taking and a sense of fairness and equity. They may experience a greater sense of belonging when they are in class due to their increased number knowledge and readiness to participate. Self-regulation and perseverance are developed when playing mathematics games, together with the skills of collaboration and reasoning.

In addition to this, mathematics games are an ideal vehicle for children to try new strategies and overcome difficulties, practising persistence and problem solving is an implicit part of game playing. They can see what works as a successful winning strategy and begin to evaluate why it works, so that they can play to win again. They can make repeated trials during a mathematics game without the pressure of *getting it right*. Mathematics games also support children to learn how to approach failure with a growth mindset as games provide safe opportunities to take risks.

Research from EEF into metacognition and self-regulation notes that these approaches carry a high educational value for a relatively low cost.

www.educationendowmentfoundation.org.uk/education-evidence/teaching-learning-toolkit/metacognition-and-self-regulation.

Mathematics games develop these key skills for life by encouraging children to think about and plan their own game strategies more explicitly, often developing specific strategies for planning, monitoring, and evaluating their successes and challenges.

Self-regulated learning can be broken into three essential components:

- cognition – the mental process involved in knowing, understanding, and learning
- metacognition – often defined as *learning to learn*
- motivation – willingness to engage our metacognitive and cognitive skills.

Engaging in and playing mathematics games with a teacher or other adult or family member enables children to develop self-regulation in an encouraging and *safe* environment. Through this interaction with others, children begin to know and understand how a game works, and how they can play that game to win, be successful or collaborate. The value of feeling successful and being able to access a meaningful task can increase children's willingness to participate at school, leading to greater number fluency and improved outcomes in mathematics, together with the development of practical and social skills for life.

There is some evidence to suggest that disadvantaged children are less likely to use metacognitive and self-regulatory strategies without being given explicit opportunities to experience, practise and develop these strategies. Through the use of purposeful well designed mathematics games, children are more likely to use these strategies independently and habitually, enabling them to manage their own learning and overcome challenges themselves in the future.

As teachers, we often have a well-loved set of games and challenges for our classes. Here are some ideas that often come up as favourites!

Countdown

The challenge is to use the numbers available and the four standard operations (addition, subtraction, multiplication, and division) to hit the target.

Start by choosing any six cards. The top row always contains the numbers 25, 50, 75 and 100, and the bottom row contains the numbers 1 to 10.

You can only use each card once in your solution.

www.nrich.maths.org/6499.

Nice or nasty

Find a partner and a 1-6 dice, or even a 0-9 dice if you have one.

Each of you draw a set of four boxes like this:

Take turns to roll the dice and decide which of your four boxes to fill. Do this four times each until all your boxes are full. Read the four digits as a whole number.

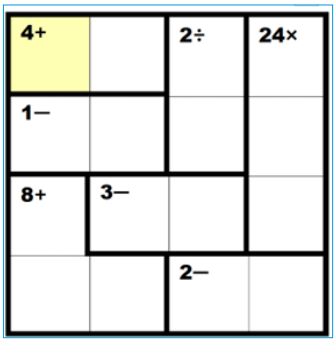
Whoever has the larger four-digit number wins.

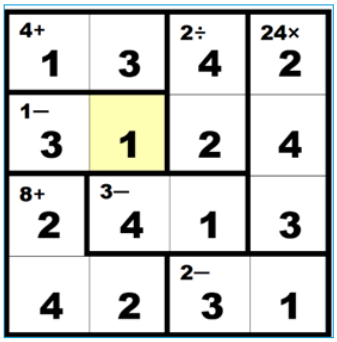
There are two possible scoring systems:

- a point for a win. The first person to reach 10 wins the game
- work out the difference between the two four digit numbers after each round. The winner keeps this score. First to 10,000 wins.

www.nrich.maths.org/6605.

KenKen®





Rules for playing KenKen®

The numbers you use in a KenKen puzzle depend on the size of the grid you choose.

A 3 x 3 grid (3 squares across, 3 squares down) means you use the numbers 1, 2, and 3.

In a 4 x 4 grid, use numbers 1 to 4.

A 5 x 5 grid requires you to use the numbers 1 to 5, and so on.

The numbers in each heavily outlined set of squares, called cages, must combine (in any order) to produce the target number in the top corner using the mathematic operation indicated (+, -, ×, ÷).

Here is how you play:

- use each number only once per row, and once per column
- cages with just one square should be filled in with the target number in the top corner
- a number can be repeated within a cage as long as it is not in the same row or column.

www.kenkenpuzzle.com/teachers/classroom.

Snakes and ladders and other traditional board games

(Counting, subitising from dice.)

24® game

Make24 with four numbers using any of the four operations.

www.24game.com/t-about-howtoplay.aspx.

Many games require little or no equipment other than what is already available in the classroom.

Which is your favourite game to encourage your class to think, collaborate, use game play and winning strategies, and calculate?

Jo Lees

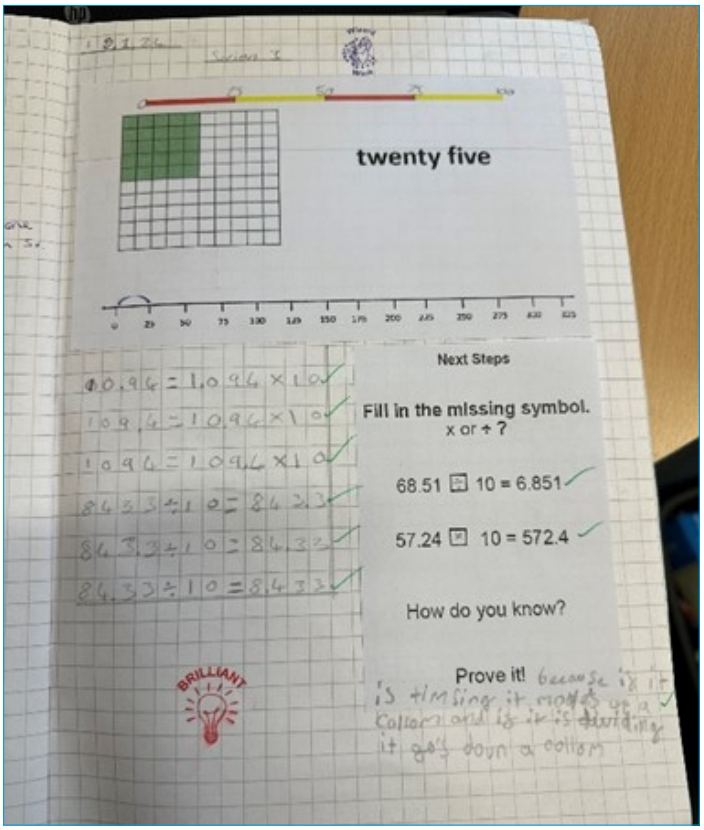
Secondary Lead Inspector/Adviser for Mathematics, HIAS

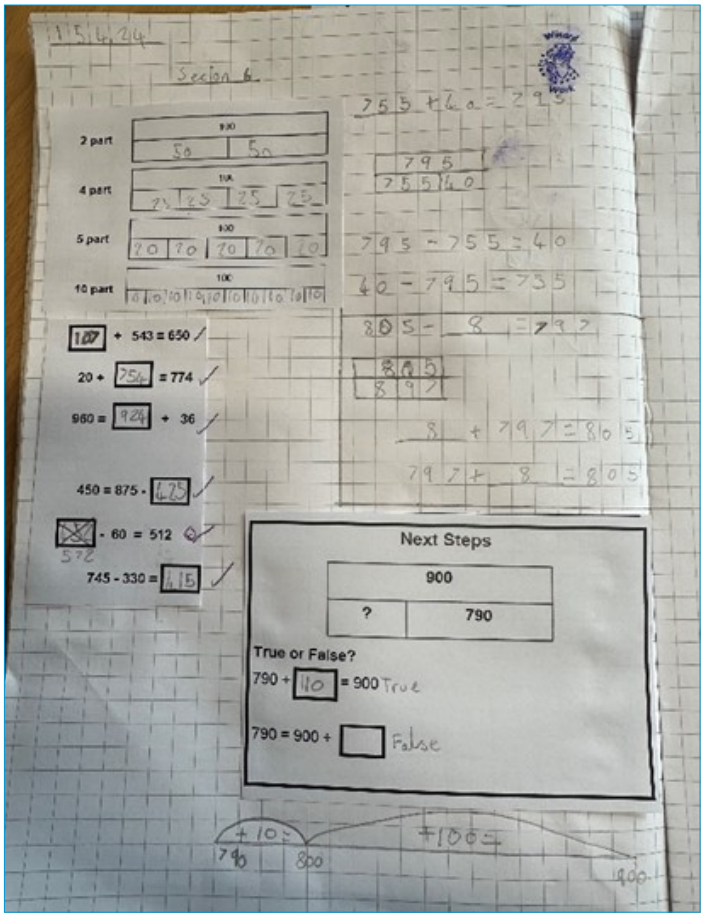
The impact of pathway to progress in Year 6

At Sarisbury Junior School we implemented the pathway to progress intervention in January 2024. We currently have 12 pupils participating in the intervention which we complete in groups of three. To ensure the appropriate children were selected for the intervention, we used the end of Year 5 data as well as a previous standard assessment tests (SATs) paper. All the pupils selected were working towards the Year 5 standard at the end of Year 5 or have shown a lack of confidence within the Year 6 content for mathematics.

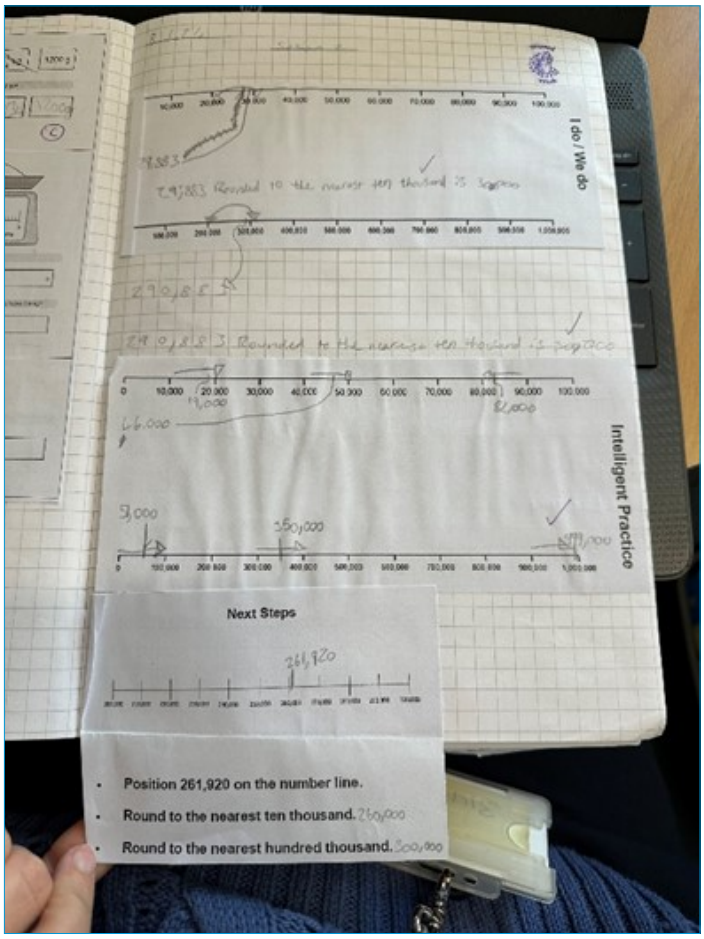
The teacher guide provides a comprehensive explanation of each session including misconceptions to be aware of and sentence stems, therefore I was easily able to share the pathway to progress training with one of the learning support assistants in Year 6 and she has been leading an intervention group with three pupils across the last half term. In my role as the Mathematics Lead, I have been delivering the intervention to the remaining nine pupils.

Following school closures due to lockdown, we saw a significant decline in pupils' confidence in mathematics. The sessions have enabled these pupils to feel successful in mathematics and changed their mindset about their capabilities within mathematics sessions. Some of the pupils who have been working on the intervention have also displayed a significant increase in their confidence and scores within practice SATs papers, particularly in the reasoning papers.





When discussing the impact of the intervention with three Year 6 pupils, Ella, Rosie and Layla, they shared that they have found the small groups highly beneficial – it has raised their confidence and they have been able to refer to the sessions back in the classroom, especially now they are revising ahead of their SATs. The intervention has been particularly advantageous for enhancing the pupils' reasoning skills with carefully crafted questions that explore pupils' knowledge and enable them to verbalise their understanding of different concepts. Rosie explained, *"The counting activities are helpful because when it comes to some questions in SATs you need to have these facts memorised – counting in 25s help me with my fractions and percentages understanding."*



As the Mathematics Lead, not only has delivering the intervention enabled me to impact on progress for our Year 6 cohort, it has also offered an insight into pupils' understanding of mathematics and their views. Through this pupil conferencing within the intervention, I have been able to evaluate areas of our mathematics curriculum.

For example, through the counting starters it has become clear that children are not counting aloud regularly enough in Years 5 and 6. This has highlighted a development area for my mathematics action plan this half term. The sessions have also been designed in a way to show the application of key skills.

Following the lesson on rounding using a number line shown here, Layla was able to use her knowledge of place value to read scales effectively. During her mathematics lesson, she was seen going back through her mathematics book to identify the intervention session and apply the skills to her work in class. Layla stated, *"The sessions have been very helpful because it has been great for spotting patterns and noticing things in mathematics. They have given time for extra guidance and more time to think over the tricky learning in class*."

Following the success I have seen from the pathways to progress intervention programme, particularly in building pupil confidence and improving attitudes to mathematics, we will be looking to implement the Year 2 programme in the autumn of Year 3 for pupils who were identified by our infant feeder school as working towards the standard for Year 2. During the next academic year, we will implement the programme earlier in the year for Year 6 pupils who were only just secure at the end of Year 5, before working with a similar group to this year in the spring term.

Hannah Martin

Assistant Headteacher and Mathematics Lead, Sarisbury Junior School

Resources in mathematics curriculum catalogue – available to subscribing schools

Our latest resources catalogue and clearance catalogue are available to view on the HIAS mathematics Moodle: https://maths.hias.hants.gov.uk/pluginfile.php/4807/coursecat/description/Maths%20Resources%20Catalogue%202024.pdf?time=1709741899935 and https://maths.hias.hants.gov.uk/pluginfile.php/4807/coursecat/description/Maths%20stock%20clearance%20catalogue%20-%20Feb%202024.pdf.

Cuisenaire rods – mini set (CWR001)

The inventor of the Cuisenaire rods, Georges Cuisenaire, introduced children to a link of play and learning, the relationships on which mathematics is based. This set is ideal for one child to work with, size (212mm x 150mm), made from hygienic and robust plastic.

Large coin assorted set (LC048)

Each set of 48 assorted demonstration coins help children with coin recognition. Pack consists of: 10 x 1p, 5 x 2p, 10 x 5p, 10 x 10p, 5 x 20p, 4 x 50p, 2 x £1, 2 x £2.

Large money notes (LMN001)

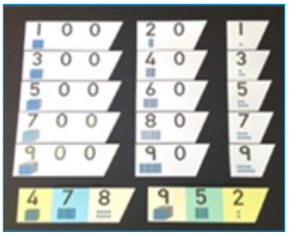
A set of paper money laminated on card. Supplied with 28 self-adhesive magnets. For role play and help understanding of money. The pack consists of: 1 x £50, 2 x £20, 5 x £10, 6 x £5.

Price reduced – refer to clearance catalogue February 2024

Large 1-100 number grid (LG005)

Laminated, dry wipe number grid with blank squares on reverse. 64cm x 59cm.

Place value cards (PVDN001)



These place value/Dienes support children to understand the value of digits within numbers and how they are written. Each card has an image of dienes to reinforce the value of the partitioned number.

Place value cards (PV001)

Each pack contains 5 sets of laminated cards, each set a different colour. Demonstrates that a digit of the same value varies according to its position in a number.

Place value extension cards (1,000) (PV005)

Each pack contains 5 sets of laminated cards, each set a different colour. To be used in conjunction with PV001 enabling 9,999 to be shown.

Place value extension cards (10,000) (PV007)

Each pack contains 5 sets of laminated cards with each set a different colour. To be used in conjunction with PV001 enabling 99,999 to be shown.

Place value extension cards (100,000) (PV009)

Each pack contains 5 sets of laminated cards, each set a different colour. To be used in conjunction with PV001 enabling 999,999 to be shown.

Pupil decimal place value cards (DPV001)

Each pack contains 5 sets of laminated cards, supplied in 5 different colours. These demonstrate number examples:

0.000-0.009;
0.00-0.09;
0.0-0.9;
0-9.

For more information about Mathematics Advisory Centre resources or services, visit the HIAS mathematics Moodle:

https://maths.hias.hants.gov.uk/course/index.php?categoryid=126.

Alternatively you can contact us by:

Email: maths.centre@hants.gov.uk

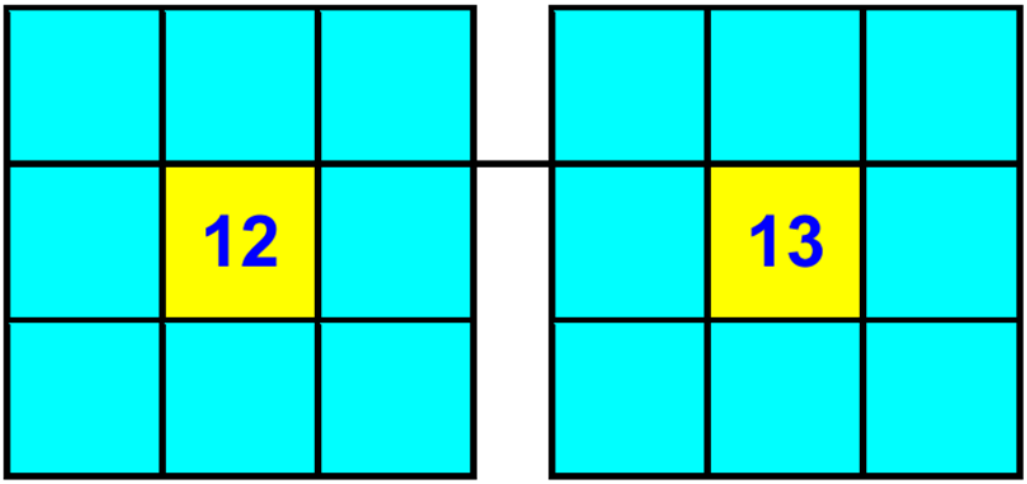
Phone: 01962 843893.

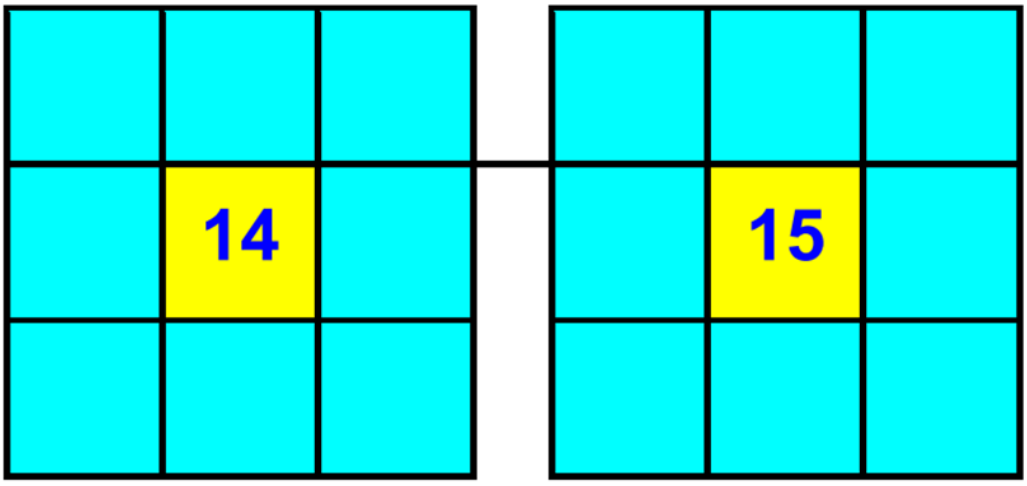
Primary puzzle

Puzzle time

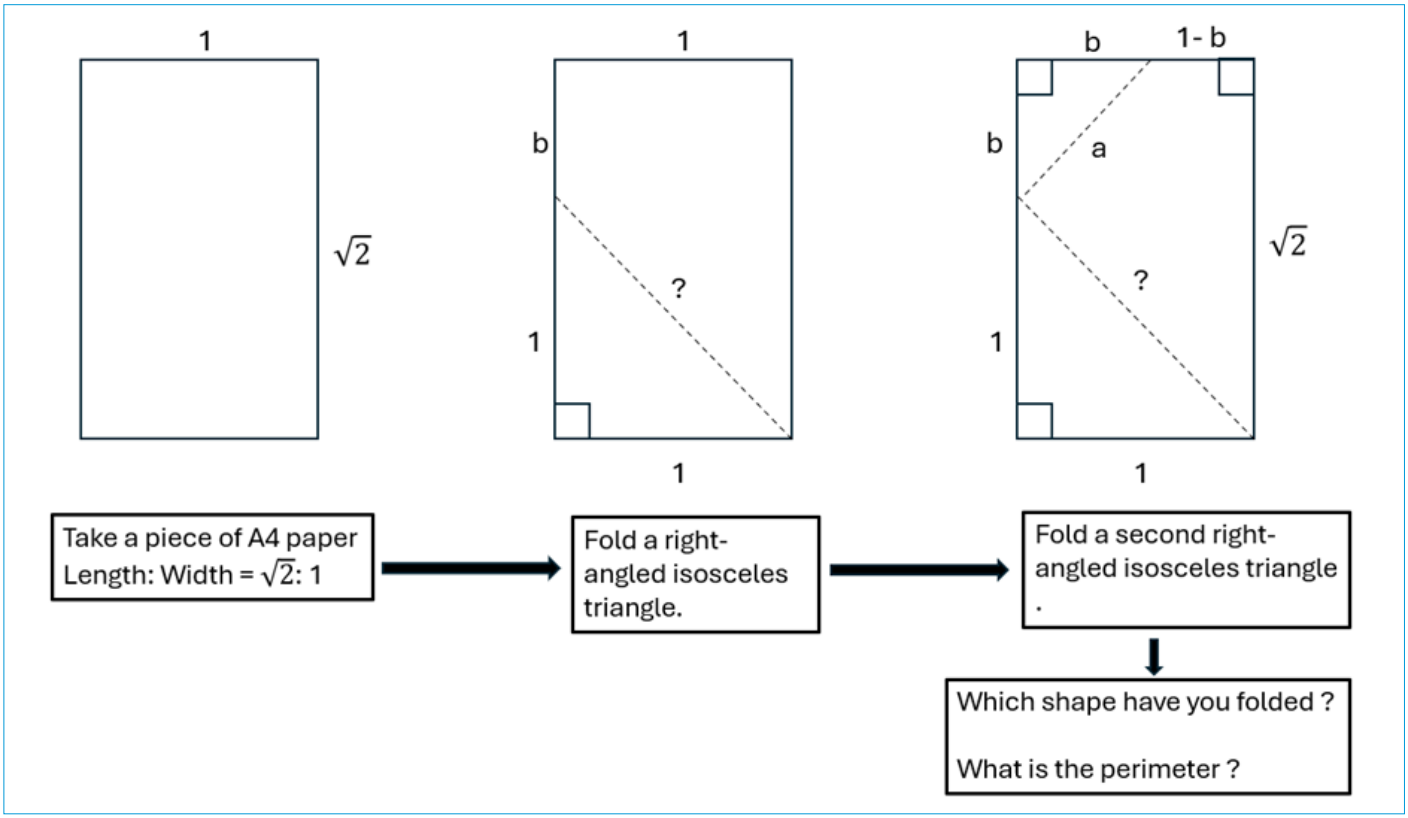
12 to 15

Can you put the numbers 1 to 8 in each of the squares so that each side adds up to the middle number?





Secondary puzzle



Primary puzzle – solution from autumn 2023

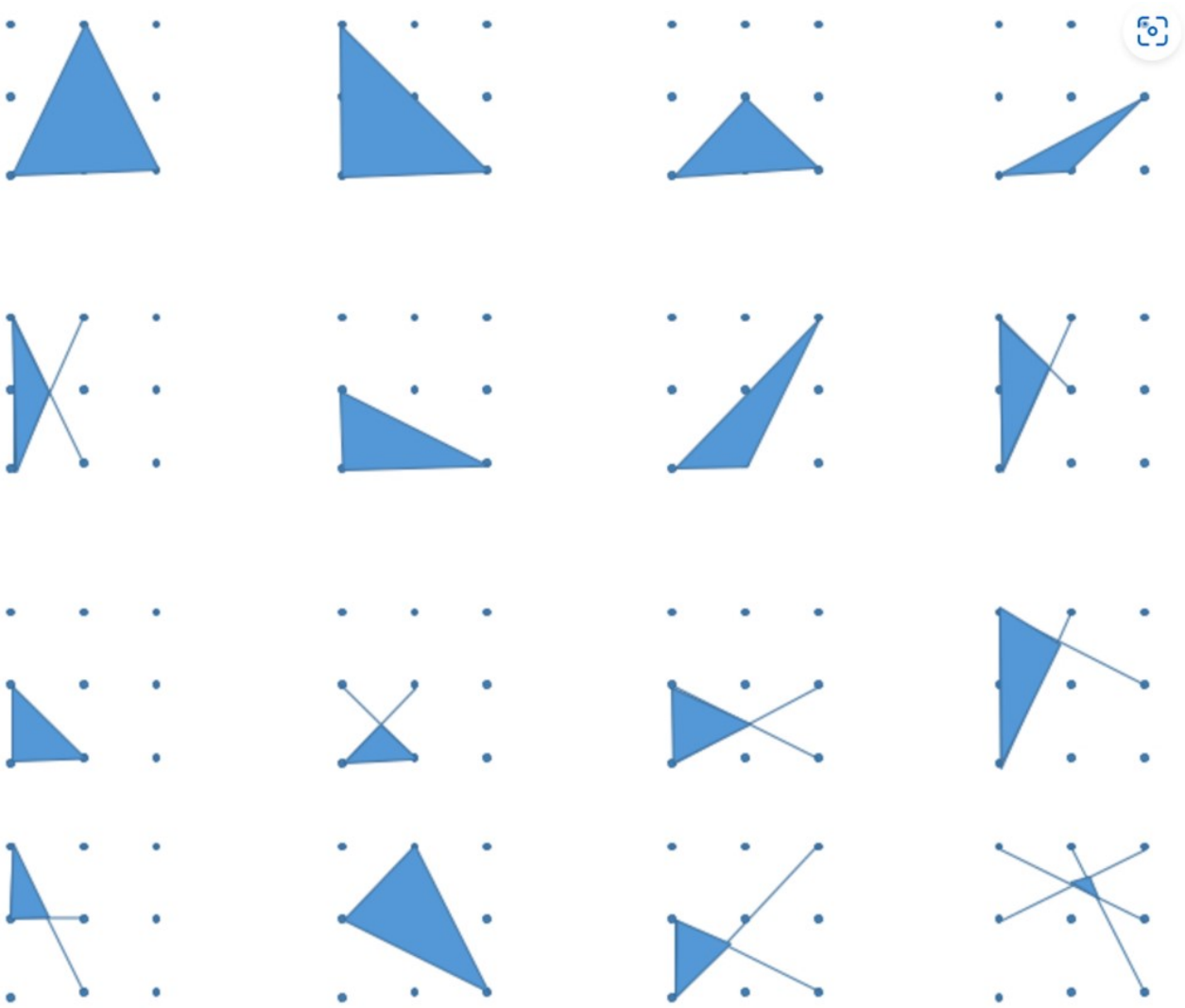
Tri.'s

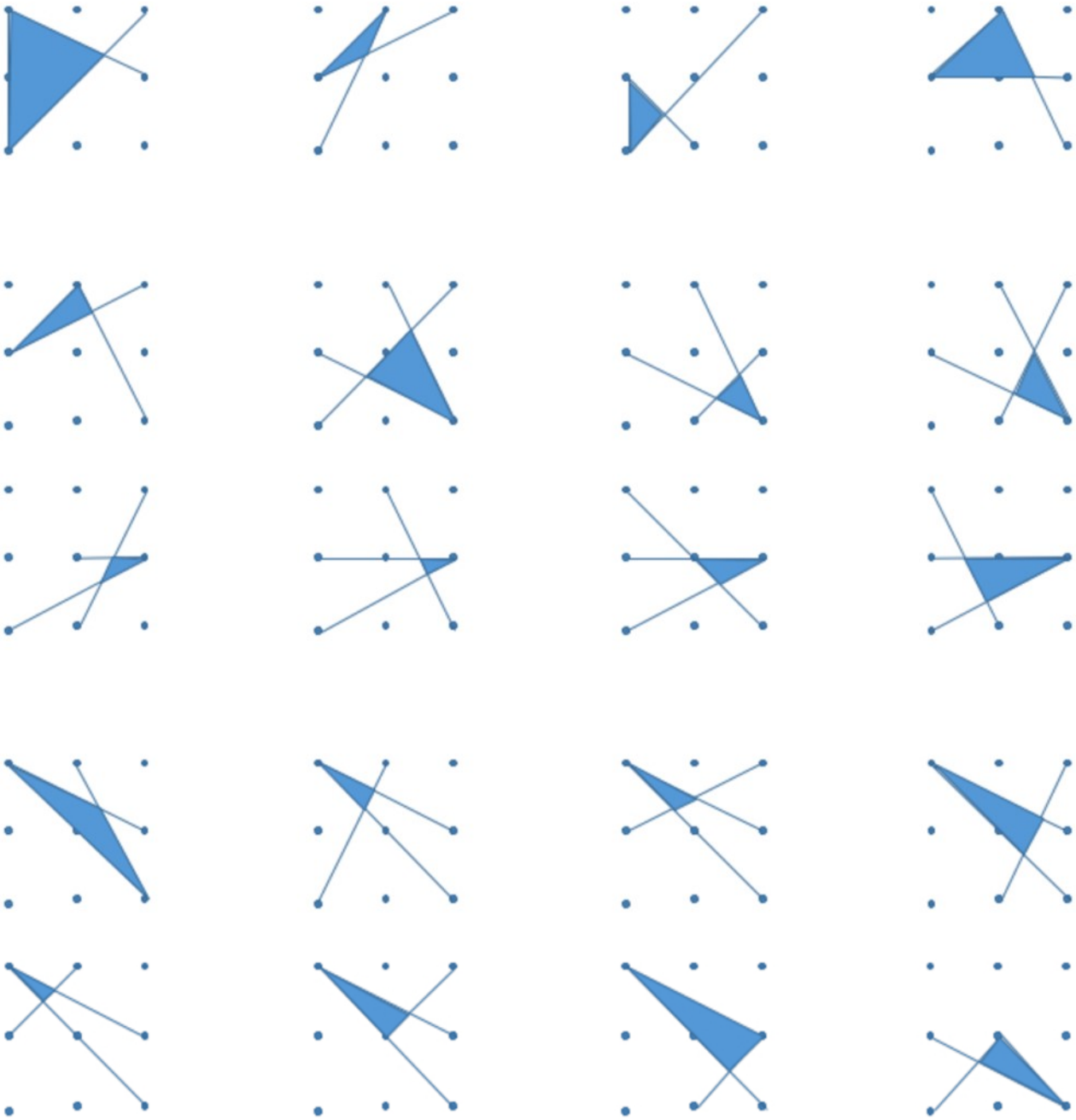
Age 7 to 11

Challenge level ★

There are lots of answers to this, depending on what questions you choose to ask. Here is what a teacher from Tudor Grange Academy Solihull wrote:

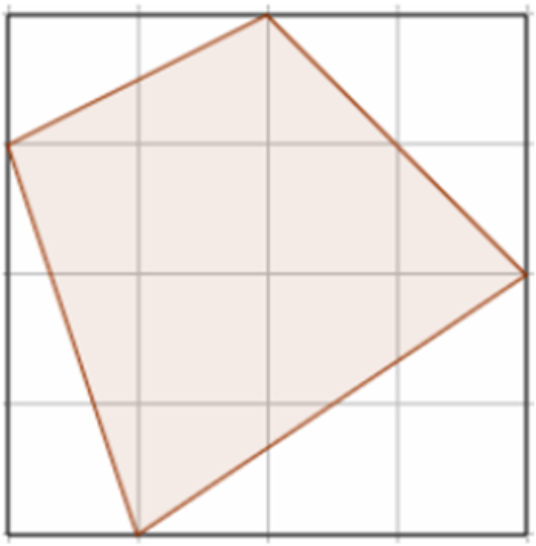
"Attached is my copy of as many answers to the Tri's task as possible. I used it with a Year 8 class to get them to practise measuring angles, and to get them doing more problem solving and thinking laterally as part of my angles scheme of work. I got them to compete to see who could find the most different solutions, then got them thinking about whether the triangles were scalene, isosceles, right-angled, thinking about why none of them were equilateral, which of them were right angled, and discussing why using a protractor to measure the angles can be much less accurate than using mathematical methods to calculate the exact angles."





https://nrich.maths.org/39

Secondary puzzle – solution from autumn 2023

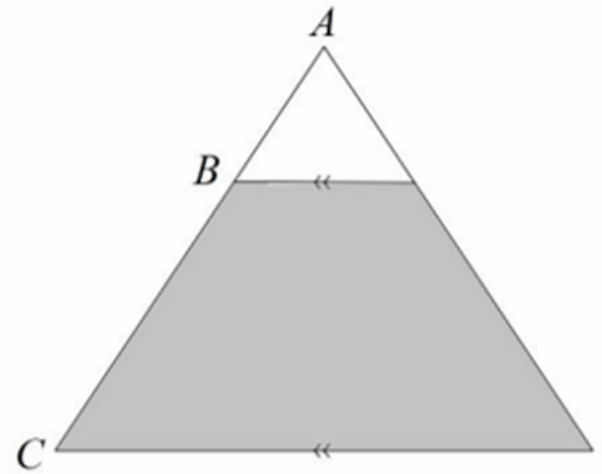


What proportion of this square is shaded ?

$16 - 1 - 2 - 3 - \frac{3}{2} = \frac{17}{32}$

Area of square – 4 triangles

An isosceles triangle is shown in the diagram below



$\frac{1}{9}$

The ratio of AB : BC is 1 : 2
What fraction of the triangle is not shaded?

www.m4ths.com

342.pdf (m4ths.com)

Courses 2023/24

Details of our upcoming mathematics courses and networks are provided below. Visit our mathematics courses Moodle page or scan the QR code for our full catalogue of mathematics professional learning opportunities.

How to book

All training can be booked via the Learning Zone. To search for a specific course, type the keywords provided in the *Find Learning* box, then click *See Classes* for details of available dates and times.

Learning Zone guidance

Visit our Learning Zone Moodle information page for Guidance on accessing the Learning Zone and managing bookings.

https://hias-moodle.mylearningapp.com/mod/page/view.php?id=481.

Need help?

To speak to a member of the HTLC bookings team, please contact:

Email: htlc.courses@hants.gov.uk.

Primary

Primary mathematics: effective teaching of times tables 2024

The aim of this course is to explore and develop ideas, pedagogies, and associated subject knowledge to promote and enhance the teaching of times tables in the classroom. Teachers will engage in mathematics from the primary curriculum and explore mental strategies in order to support pupils' conceptual understanding to mental fluency.

4 July and 26 September 2024

Math Tables 2024

Sub £210 / SLA £135 / Full £252

Secondary

Summer 2 secondary mathematics network 23-24

The primary aims of the subject network meetings are to:

- ensure a clear understanding of the national picture and its application in local and school contexts
- support effective subject leadership as appropriate to each school's individual context
- develop skills, expertise, and capacity within school subject leaders and their teams through quality strategic CPD and the sharing of good practice
- deepen understanding of subject specific pedagogy and knowledge that underpins good progress and attainment for all pupils
- facilitate school to school networking and develop strength across the system.

2 July 2024

Summer 2 Mathematics

Sub £75 / SLA £40 / Full £90

Contact details

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Mathematics Advisory Centre

Tel: 01962 843893

Email: maths.centre@hants.gov.uk

Website: www.hants.gov.uk/educationandlearning/hias

Moodle: http://maths.hias.hants.gov.uk/

Also from HIAS!

Publications: If you enjoyed reading this curriculum update why not take a look to see what other publications are produced by the Hampshire Inspection and Advisory Service. You will find a list of publications on our website at:

www.hants.gov.uk/educationandlearning/hias/curriculum-support.

Moodles: Have you visited the HIAS Moodles? The Moodle sites include top-quality resources, training and course materials – see: https://hias-moodle.mylearningapp.com/. Do not forget to sign up to our site news pages so we can keep you up to date with the latest news and training opportunities from the HIAS subject teams.

Moodle+ offers access to a wide range of high-quality resources for subject leads and teachers for all key stages in primary and secondary and is available by subscription. For more information email HIAS Publications: hias.publications@hants.gov.uk.