Hampshire Services
HIAS SCHOOL IMPROVEMENT

AUTUMN 2023

Hantsmaths

In this issue:

Hampshire County Council

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Contents

Editorial

Welcome to this autumn edition of *Hantsmaths*. I hope the new school year has started well for you all and that the articles we offer will provide you with inspiration and ideas for the terms to come.

As many of you will be aware, in July 2023 Ofsted published a new subject specific report: *Coordinating mathematical success*: www.gov.uk/government/publications/subject-report-series-maths/coordinating-mathematical-success-the-mathematics-subject-report. This report builds on the findings from the previous subject and research review and paints a broadly positive picture, headlining with a general message that mathematics education is improving in both primary and secondary. This is all down to the hard work and dedication of professionals in school and provides a much needed boost to our morale and thinking this early in the year. Of course, there are areas for development identified in the report, and we welcome the opportunity to support you on your own school improvement journey.

In addition to a brief summary of the main findings in the report, we share our usual range of articles. This time, we have put together a guide to our Moodle, which we know can be a bit of a maze at times! We also offer guidance on our resources and available courses, together with the primary and secondary puzzle pages to get you thinking mathematically.

We share the details of a couple of our more popular courses, including *new primary subject leaders*, a course designed to support those new to middle management and subject leadership. We also report on a recent course on problem-solving in primary mathematics, which I know many of you still feel is an area for development in your schools. Please contact us if these courses, or any others we offer, would be beneficial for you or colleagues in school and we will support you with booking on.

In our subject leader network meetings, we are currently sharing an exciting development that mirrors the HIAS science team's planning model. The five-step planning sequence for high-quality mathematics lessons, building on explicit knowledge intent, is designed to guide planning for the learning journey towards a successful outcome for all pupils through carefully sequenced prompts and stages. Please do check in with us or with your mathematics lead to find out more about this.

I hope you enjoy this edition of *Hantsmaths* and that you and your pupils continue to enjoy a successful and mathematically challenging school year.

Jo Lees

Secondary Lead Inspector/Adviser for Mathematics, HIAS

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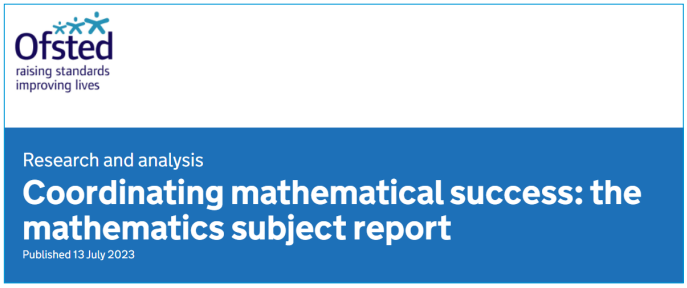
Mathematics education in schools is improving



In July 2023, Ofsted published a subject report looking at how mathematics is being taught in England's schools.

This article shares some of the key findings in primary and secondary. I encourage you to engage with the full report to support your thinking going forward. There are successes and challenges identified, of course. In particular, schools are thinking hard about more conceptual approaches to support automaticity and fluency, with problem-solving and reasoning at the heart of the best lessons. Formative assessment and checking for understanding are recognised as fundamental to high-quality teaching and learning alongside carefully considered summative tests where these will add value to teachers and pupils understanding of what is known and understood. We, in the HIAS mathematics team, feel that many of the observations and recommendations in this report will come as no surprise to our excellent practitioners in Hampshire, with a significant number of points already on our network meeting agenda.

This subject report evaluates the common strengths and weaknesses of mathematics in the schools inspected. The report builds on the *Ofsted mathematics research review* (www.gov.uk/government/publications/research-review-series-mathematics) which identified factors that can contribute to high-quality school mathematics curriculums, assessment, pedagogy and systems.

The report draws on evidence from subject visits to a sample of primary and secondary schools. All subject visits were carried out between September 2021 and November 2022.

The report found that the overall picture of mathematics education is now broadly more positive than it was 11 years ago when Ofsted last published a report on maths education: www.gov.uk/government/publications/mathematics-made-to-measure.

"This is the result of the commitment of school leaders and teachers. School leaders are focused on delivering a high-quality maths curriculum and they are giving teachers opportunities to develop their subject teaching knowledge. As a result, high-quality continuing professional development (CPD) for many maths teachers is a particular strength in England's schools. It enables teachers to teach with clarity and precision, helping pupils understand new concepts."

The report also notes areas where improvements could be made.

"In some secondary schools, pupils are not given opportunities to master foundational mathematical knowledge because teaching is over-focused on exam success. Some pupils are rushed through new content too quickly."

The report also highlights that challenges in recruiting and retaining specialist teachers are making it more difficult for schools to give a high-quality mathematics education.

His Majesty's Chief Inspector, Amanda Spielman, said:

"Mathematics is a core part of every school curriculum. It provides children with the tools they need to understand the world and lays the foundation for a range of disciplines and professions.

Despite sector-wide recruitment challenges, the picture for maths education in England has continued to improve. I hope that our recommendations are useful for subject leaders and teachers when constructing a challenging and engaging maths curriculum."

The report makes a variety of recommendations for how schools can ensure that all pupils become more proficient in mathematics, including:

- developing a curriculum that emphasises secure learning of mathematics knowledge and prepares pupils for transitions between key stages
- ensuring that teachers routinely check that pupils have secure understanding of foundational mathematics and address any gaps before moving to the next stage of learning
- making sure that teachers regularly connect new learning to what pupils have learned before and ensure that pupils consolidate new learning
- providing continuing professional development for teaching assistants, and other adults working with pupils, to help them understand the intended mathematics curriculum.

The main findings in primary

- In the last few years, a resounding, positive shift in mathematics education has taken place in primary schools. Curriculum is now at the heart of leaders' decisions and actions. Generic approaches, such as the expectation that all teaching should always be differentiated, have dissipated. We now see high-quality curriculums, collaborative support for teachers and a focus on mathematics teaching. Leaders intend that pupils *keep up, not catch up.* These approaches set out a better path to proficiency for pupils.
- Teachers help pupils to understand new concepts. Networks of support provide regular and highly useful training. This helps teachers to adopt new and improved ways of explaining and modelling concepts. Often, teachers use physical resources and pictorial representations to help pupils see underlying mathematical structures. They also teach and model new vocabulary, regularly check pupils' understanding and swiftly pick up misconceptions.
- There are some deficiencies in the quality and quantity of practice that pupils undertake. Even when teachers teach with clarity and precision, it is likely that these deficiencies undermine pupils' ability to remember important knowledge. For older pupils, these deficiencies affect their ability to attain procedural fluency (speed and accuracy).
- Pupils' gaps in knowledge tend to be centred around, but not limited to, addition facts in younger year groups. This was for some, but not all pupils. These early gaps in knowledge may not become apparent until a significant amount of time has elapsed. This is because it is possible, in the medium-term, for pupils to understand what is being taught and then keep up with extra classroom support and slower calculation. However, this is at the expense of later ability to access the curriculum.

- Accountability measures and wide spreads of attainment tend to influence leaders' decision making and resource allocation for Year 6 cohorts. Allocating additional resources to Year 6 leaves leaders with fewer resources to invest in pupils' earlier education. Further, a goal of true proficiency is superseded by *age related expectations* which roughly equates to 50% accuracy in end of key stage tests. As a result, many pupils are not as prepared for the rigours of secondary education as they could be.

The main findings in secondary

- Notable improvements have taken place in mathematics education in recent years. Widespread weaknesses identified at the time of Ofsted's last mathematics subject report, around deficiencies in curriculum guidance and weaknesses in ongoing professional development for staff, are now much less likely to be evident in schools. However, some weaknesses identified in that report persist and continue to limit pupils' learning of mathematics. The teaching of disparate skills to enable pupils to pass examinations but not equip them for the next stage of education, work and life, and weaknesses in the teaching of mathematical problem solving, remain areas of weakness across many schools. These weaknesses are disproportionately likely to be evident in schools that struggle to recruit and retain specialist mathematics teachers.
- Recruiting and retaining high-quality, specialist, mathematics teachers is a challenge for many schools. Leaders' curriculum decisions are increasingly influenced by the need to cope with these difficulties. Some schools that identify this problem do not take steps to develop the subject knowledge and subject specific pedagogical knowledge of less experienced and non-specialist teachers, hence usually providing a weaker mathematics education to their pupils.
- A high-quality of education leads to strong pupil outcomes, but this is not necessarily true in reverse. Strong exam outcomes do not, necessarily, indicate a high-quality mathematics education because, in some schools, pupils are taught a narrowed curriculum that allows them to be successful in exams without securing the mathematical knowledge they need to be successful later. These decisions are made because leaders and teachers are acutely aware of the impact of pupils achieving certain threshold grades in terms of post-16 opportunities, and implications for school accountability.
- Curriculum planning around the teaching of mathematical facts and methods is usually strong. Where it is weaker, however, it tends to take less account of what pupils have learned previously and what they will study later. In these schools, pupils often are taught a series of disconnected mathematical methods and *tricks* that apply only in specific circumstances.
- Long-term curriculum planning to develop pupils' ability to use the facts and methods they have been taught to solve familiar and unfamiliar problems, is uncommon. Curriculum decisions about problem solving are often left to individual class teachers. The quality of these decisions is variable. As a result, some pupils, particularly those who find learning mathematics more challenging and those taught by non-specialist teachers, are not effectively taught how to solve problems mathematically.
- Mathematics leaders, and teachers, consistently emphasise the importance of clarity and technical accuracy in written, and spoken mathematics. Where teachers model this accurately and explicitly, it is more likely to be present in pupils' communication.

- In most schools, exercises and activities are used by teachers, but in some schools, pupils are asked to undertake exercises and activities that are not carefully designed, or some pupils are moved on without having had sufficient practice to consolidate new learning.
- Pupils who are learning mathematics more slowly than their peers frequently receive a mathematics education that does not meet their needs. They are often rushed through the study of new content, in order to *complete the course*, without securely learning what they are studying. This frequently results in pupils repeating content, in Key Stage 4 that they have already studied, but not learned, in Key Stage 3 (and 2). Often the curriculum for these pupils is narrowed with little teaching of how the facts and methods learned can be used to solve problems mathematically. Many of these pupils develop a negative view of mathematics.
- Leaders' application of GCSE grade thresholds to internal assessments gives false assurance about pupils' learning. As a result of teachers and leaders accepting this level of achievement in internal assessments, some pupils are progressing through the mathematics curriculum with significant, and growing, gaps of knowledge.
- In the vast majority of secondary schools, department meeting time is allocated to improving the quality of provision in mathematics as opposed to undertaking administrative tasks. Many leaders and teachers note that this had been a significant and positive change over the recent years.

Some key take aways from the report

- The use of manipulatives, models, images and technical vocabulary is having a positive impact on pupil progress.
- Mastery pedagogies such as variation and questioning to deepen understanding are becoming more embedded in classroom practice.
- Teachers are utilising all aspects of *practice* more effectively, including rehearsal, retrieval and recall. The idea of revisiting ideas regularly and making rich connections being more beneficial than *blocked* approaches.
- Careful planning of learning journeys using *small steps* or progressive *I can statements* is more widely implemented and is enabling learners to secure the basics and achieve fluency more readily.

The report reviews and discusses these findings in some depth. It also identifies interesting examples of stronger and weaker practice, which I am sure we can all relate to at some level. It is, in many ways, a balanced and realistic view on mathematics education in our schools today. Lots to work on, but also lots to celebrate. The HIAS mathematics team look forward to working with you in school settings and in our subject leader network meetings to celebrate and build on the things we do well as well as address some of the points made in the report.

Jo Lees

Secondary Lead Inspector/Adviser for Mathematics, HIAS

The five-step planning sequence for high-quality mathematics lessons

The HIAS mathematics team have recently worked alongside the HIAS science team to review some of the key messages we provide to schools when planning a unit of work. The five-step planning sequence has been developed and designed to provide clear guidance to teachers on the steps that would be taken at the planning stage to support the development of high-quality mathematics lessons. During this article, I will share with you the five-step model and the thought process that will take place at each stage to support teachers in adapting lessons. Think carefully about questioning to inform assessment and consider the sequential order in which objectives will be taught to enable pupils to move successfully from the unknown to the known in a lesson and learning journey.

Stage 1

Establish **explicit knowledge intent** for the lesson/sequence of lessons.

What exactly do you want the pupils to know/ get better at by the end of the lesson/sequence of lessons?

Eg three different ways to show number bonds within 10.

Find missing angles on a straight line, knowing they sum to 180°.

Know or derive 3 times tables and associated division facts.

This should be shared with pupils and visible throughout the period of instruction.

Teachers will identify the explicit knowledge that pupils will learn within a unit of work. This explicit knowledge will generally be found in the curriculum model or scheme of work that a school uses. Ongoing assessment will also help teachers to identify the explicit knowledge for individual pupils.

Stage 2

From your explicit knowledge intent establish what **prior knowledge** needs to be checked before teaching new knowledge.

This should be in the form of precise, rapid questions (approximately four-five that easily identify gaps in knowledge from the previous lesson(s) or topics that connect to this one.

At this stage, teachers need to think carefully about the prior knowledge pupils will need to have to access the unit of work. Low stakes formative assessment tasks or quick quizzes can be a useful tool to inform planning and identify individual pupil starting points. The HIAS mathematics team have recently developed *entry tasks* for each unit of work that will support teachers in assessing the prior knowledge and these tasks are available now on Moodle+.

Stage 3

From your explicit knowledge intent establish the **instructional sequence** and **key facts**.

Instruction sequence: how will I model this? What will I draw/show? How will I link from the familiar to the unfamiliar? Will you be using the *I do, we do, you do* approach for equations and procedures?

Teachers will now think carefully about the explicit knowledge that they identified in step one and the order in which the objectives will be taught. It is important at this stage to understand how one concept or skill builds upon another and develop a learning journey based upon this. Teachers will establish outcomes including the key facts that pupils will retain. This will help teachers to identify what they will be modelling and the models and images they will use and build upon throughout the unit of work.

Stage 4

From your explicit knowledge intent plan your **knowledge check** questions.

- What formative assessment questions will you ask to check for understanding of each piece of explicit knowledge?
- What method will you use to establish success across the whole class? Eg mini whiteboards, cold calling, talk partners and stem sentence rephrasing.
- What success rate are you looking for?

How will I know if a pupil is on track and has understood the explicit knowledge? At the planning stage, teachers will think carefully about the strategies they will use to ensure that all pupils have gained a secure understanding of the concepts and skills taught within the unit of work. Teachers will consider the key questions to ask and the range of strategies they will use to gather the information. Planning the *knowledge check* questions will support teachers to adapt planning based upon assessment whilst delivering the sequence of work.

Stage 5

What **application of knowledge** opportunities are you providing?

- Carefully sourced SATs questions?
- Sequenced intelligent practice examples?
- Practical or real-life contextual problems?
- Opportunities for problem-solving and reasoning, not just *answer getting?*

A range of tasks can be selected at this stage to give pupils the opportunity to practise and apply the knowledge that they have gained throughout the unit of work. When planning, teachers should identify how all three aims of the National Curriculum will become part of the learning journey, enabling pupils to be taught the skills of reasoning and problem solving as well as fluency.

The five-step planning sequence for high-quality mathematics lessons can provide a structure for teachers at the planning stage to follow, allowing them to ensure they have thought carefully about the learning journey that they are about to teach, how it meets the needs of all pupils and how pupils will demonstrate they have gained the identified explicit knowledge. We also hope that this planning structure will help teachers to develop learning journeys that enable their pupils to thrive and make connections between mathematical skills and concepts.

Kate Spencer

Primary Lead Inspector/Adviser for Mathematics, HIAS

New primary mathematics managers course

We are delighted to offer a course to help new mathematics managers in primary schools.

Rebecca Vickers, Teaching and Learning Adviser, will lead three half-day sessions to explore key issues in leading and managing mathematics teaching and learning in the primary years. Delegates will develop their understanding of their role as a mathematics subject leader.

As part of the course, a bespoke individual virtual session of one hour will be booked with each participant to discuss their own professional needs and support them with their mathematics action plan.

The sessions will explore the following components:

- the features of effective learning and teaching in mathematics
- providing guidance, CPD and leadership for colleagues
- evaluating current practice in the mathematics leader's own school
- identifying the processes involved in implementing change.

Further details and booking information can be found in the courses section of this publication. Please also visit the Learning Zone for information on how to book:

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

Feedback from previous delegates

"As a newly appointed mathematics subject leader, I had the privilege of participating in the new mathematics manager course run by Rebecca Vickers (HIAS). This comprehensive programme has left an indelible mark on my teaching career, equipping me with the knowledge, skills, and strategies needed to lead and inspire change within my school's mathematics curriculum.

The course's content was well-designed, providing a holistic approach to leadership in primary school mathematics. Over the course of several weeks, I engaged in in-depth sessions that covered a wide range of topics, from curriculum development and assessment to teacher support, data analysis and Ofsted inspections. These modules were informative and practical, enabling me to immediately apply what I learned in my daily teaching and leadership responsibilities.

One of the course's standout features was a testimony from a fellow mathematics leader who shared her journey through two Ofsted inspections and mathematics deep dives in a challenging setting. It was incredibly reassuring to know that we all go through difficulties in our role as mathematics leaders and all the hard work, time and energy invested in raising standards would pay off.

Another highlight was the opportunity to collaborate with fellow educators and share best practices. Group discussions and book looks allowed us to exchange ideas and learn from one another. We could share our frustrations and celebrate the little, daily victories, which was fantastic.

Rebecca was knowledgeable and passionate about mathematics education. Her expertise shone through in her engaging presentations and her ability to answer our questions with clarity and depth. Her unwavering commitment to our growth as mathematics leaders was evident throughout the course.

In conclusion, the new mathematics managers course was a great experience that has enriched my teaching practice and leadership skills. It has provided me with the tools and confidence to drive positive change in my school. I highly recommend this course to any new maths subject leader who might feel overwhelmed with the enormity of the task ahead. This is the course for you! You will emerge a more confident, assured and skilled maths leader at the end of it."

Joanna Kniola, Mathematics Manager,
Stoke Park Infant School

"I recall the prospect of becoming a mathematics manager to be extremely daunting and I remember feeling clueless as to where to start. The new mathematics managers' course was extremely helpful in outlining my role as a leader and allowing me to prioritise my new responsibilities.

The HIAS mathematics team were fantastic in helping us identify areas in our school that needed to be developed, and supported us in doing so. Having the time and the safe place *to reflect on mathematics in my school, was incredibly reassuring and I found networking with other colleagues to be really useful.*

Another helpful part of the course was learning about the HIAS resources that could be used to support the development of my school's mathematics curriculum. The resources ensured curriculum coverage and gave opportunity to revisit every area of mathematics through its cyclical approach.

The course also helped me to develop an action plan that was achievable and once again allowed me to prioritise what I wanted to achieve each term. As a result of knowing this, I was able to deliver training to colleagues back at school where I could share my goals and promote mathematics. I felt able to share my vision with my colleagues who could help drive the subject forward.

The course also advises on subject monitoring and how to effectively monitor maths in the school. I felt this gave me a better insight into what was happening in each year group and therefore gave me the confidence to celebrate fantastic practice and make changes that could make our curriculum even better."

Grace Abraham, Mathematics Manager,
Calmore Infant School

"The new to mathematics managers course was incredibly helpful to me as I undertook this new role. I am not an overly confident person and taking on this position was a big step for me, one which I did not feel very qualified for despite being a class teacher for 10 years. However, this course (and Rebecca) was supportive and informative, explaining the role clearly and presenting it in small steps to digest after each session.

Speaking to people in the same situation was very beneficial, helping to build my confidence and realise that I was capable of fulfilling this role. I learnt a great deal from the three sessions including how to monitor, how to be effective and how to not panic during Ofsted!

The sessions were a perfect opportunity to ask questions I would not necessarily ask at core provision sessions. I learned how to become a more effective middle leader, ensuring I understood what is needed for the school, regarding policies, the school improvement plan and understanding data.

The primary self-assessment highlighted the key areas that would help understand the role more throughout the year and coming back to it each time highlighted the progress we had all made. Therefore, increasing our confidence.

This course was extremely valuable and gave me the tools I needed to feel able to succeed in moving forward."

Jacqui French, Mathematics Manager,
Fair Oak Infant School

"I have been a teacher for a few years but was new to the role of mathematics manager, that I share with someone else. From the first moment of the first session of the course, Rebecca put us at ease with the expectation that we were not expected to know everything and do everything straight away. The opportunity to talk to colleagues is invaluable and Rebecca supported us to talk through issues we were having and how to manage these within our own schools.

One of the most useful things was the support received in writing an action plan and then guiding us through how to implement this using small steps whilst also being reassured that we could not change and did not need to change everything straight away.

The sessions focussed on something different and relevant each time, from completing a self-evaluation on our subject, to support on how to carry out book scrutinies and learning walks, to Ofsted visits. All were incredibly useful and just gave me the confidence to believe in myself as a subject leader so much so, that part way through the year, I led a maths inset day, training colleagues and delivered CPD on current mathematical practice.

The one to one follow up sessions enabled me to personalise my time with Rebecca and think specifically about what I needed to do to be a good mathematics subject lead in my school.

Because of this course, I have written an action plan, developed a new mathematics planning format that plans out the mathematics learning journey for each unit, and most importantly has given me the inspiration, enthusiasm, confidence and motivation to drive mathematics in my school."

Ruth Appleby-Smith, Mathematics Manager,
Lockerley Primary School

The mathematics Moodle maze

Moodle+ is our annual subscription service, offering schools access to a range of exclusive quality primary and secondary resources. These resources are intended to stimulate ideas for use by teachers and to support subject leads in their role. As a mathematics team, we regularly upload new resources.

For more information about Moodle+ and to subscribe: www.maths.hias.hants.gov.uk/course/index.php?categoryid=85.

Primary

Hampshire schemes of learning – updated 2023

The HIAS mathematics scheme of learning overviews have been updated for 2023 to include the *I can learning journey* statements. The objectives are now carefully sequenced to support teachers with the order in which objectives can be taught. Within the plans, we have included links with other resources on Moodle+ that support the teaching of the unit.

Entry and exit tickets

One form of low stakes assessment is the use of *entry and exit tickets* at the start and the end of a unit of work. Entry tickets provide an opportunity for pupils to demonstrate what they already know and understand before a new topic is taught (perhaps from the previous year group or a previous unit of work). Exit tickets provide an opportunity for pupils to demonstrate what they now know that they did not know before, after the topic has been taught (taken from the current unit of work).

Interleaving, recall and retrieval

These low stakes tasks are designed to enable learners to engage in recall and retrieval by practising skills and recalling knowledge acquired in previous units of work. The tasks should reflect content that learners should already feel confident with and encourage them to self-assess areas for development and consolidation.

Paired example

The aim of the *paired example* is to support teacher modelling and builds in the opportunity for pupils to practise with a task that links to the method demonstrated in the example. The principle of this method of instruction is to allow pupils to observe a worked example, then discuss and interrogate the method with the teacher to check understanding.

Connect4Maths – primary

A resource to support the *HIAS scheme of learning for mathematics*; knowledge recall and retrieval; and skills practice.

This resource contains a set of connected low stake questions to support knowledge recall and retrieval.

Year 6 SATs preparation resources

Within this section you will find documents to support teaching in Year 6 focusing upon preparing pupils for the end of Key Stage 2.

SEND case study good practice guidance – mathematics

This document is a collection of SEND case studies which have been completed using a plan, do, review structure by mathematics managers and SENCos across Hampshire. The aim of this document is to provide schools with a bank of effective strategies, which have had a positive impact on pupils with SEND.

Primary number facts: matching cards to support recall and retrieval

Matching cards to support number facts recall and knowledge retrieval.

Primary mental fluency check and progression documents

The *mental fluency check* document and the *mental fluency progression* document should be read and used in conjunction with one another. It is designed to support teachers with Assessment for Learning (AfL) and focusing attention on their planning and formative assessment judgements.

Primary vocabulary cards

These cards provide ideas to support the development of precise mathematical vocabulary by considering what a mathematical word means and what it does not mean; it also encourages the use of diagrammatic models and images to support understanding.

Secondary

The professional offer for the secondary section of the Moodle+ mirrors the primary one. The HIAS scheme of learning is designed for Year 1 through to Year 9 and the format is consistent across all year groups.

Hampshire schemes of learning (secondary) updated 2023

Paired examples

Interleaving, recall and retrieval

Connect4Maths – primary

Entry and exit tickets

Vocabulary cards

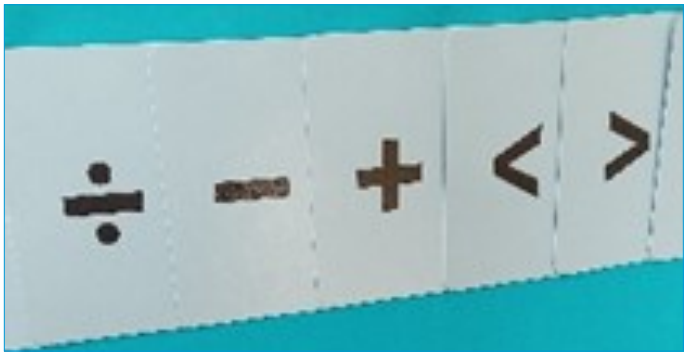
Resources in mathematics curriculum catalogue – available to subscribing schools

Our latest resources catalogue is on our website: https://tinyurl.com/yx988v4t.

Laminated digit cards (NC001, NC003, NC005, NC007)

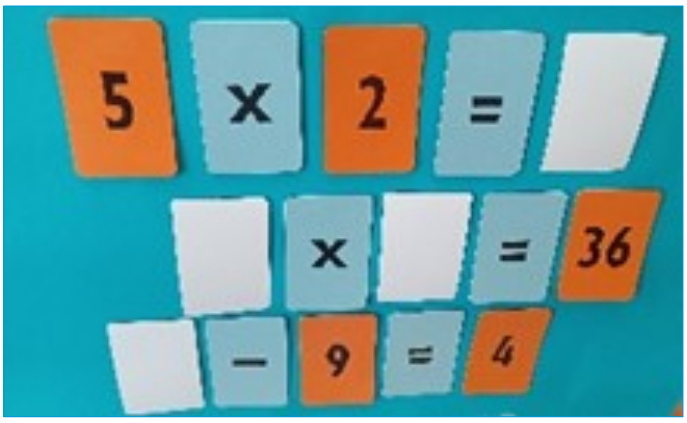
The digit cards include 0 to 10, 0 to 20 and 0 to 100 (in multiples of 10). These cards can be combined to demonstrate various maths exercises, number recognition, ordering, counting, matching games and various maths exercises.

Mathematical symbol cards (MS001)



Each set of 45 contains five of each of the mathematical symbols for addition, subtraction, division, multiplication, brackets, equals, greater than and less than.

Blank cards (BC001)

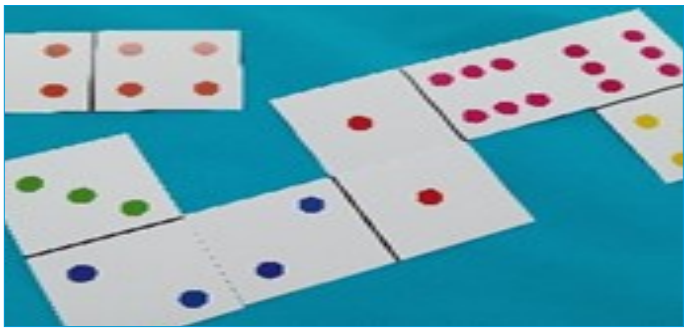


The pack contains 1,000 blank cards (playing card sized) for customising number games and other activities. Mix and match with NC001, NC003, NC005, NC007 and MS001.

Numbers and images – CPA (Key Stage 1) (NI001)

Mastering number using the CPA approach. This box contains all you need to practise making links between different essential representations of number from 1 to 10 in a motivating enjoyable way. Can be used in combination with number and spotted dice, domino cards, Cuisenaire rods, apples and fish for counting.

Colour spotted domino cards (DM003)

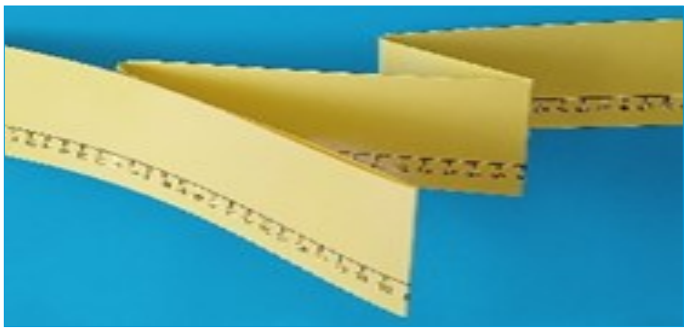


Traditional dominoes for use in whole class and individual mathematics lessons. Set of 28.

0-50 white desktop number line (NL049)

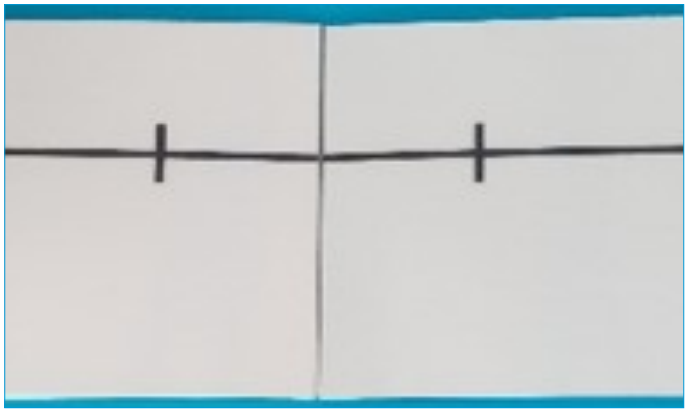
Demarcated in units of 1 with multiples of 10 highlighted in red, including space for recording calculations. Learning to visualise the difference between numbers helps to progress mental maths skills.

0-100 structured number line (NL039)



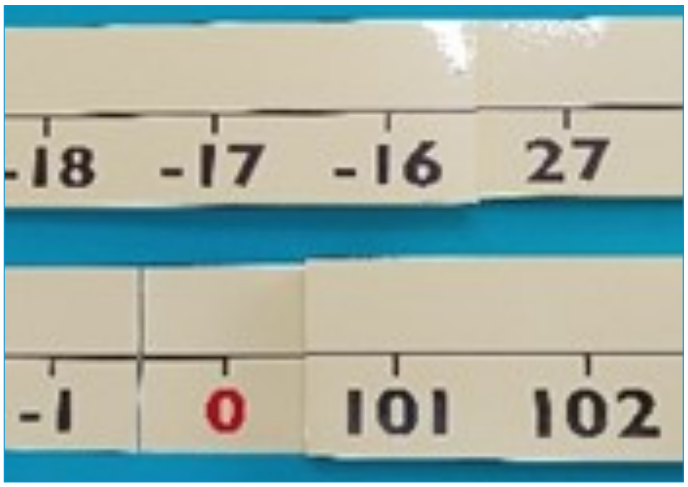
Demarcated in units of 1 with space above for recording calculations. This number line is suitable for teaching number, counting, addition and subtraction in Key Stage 1.

Blank number line (NL003)



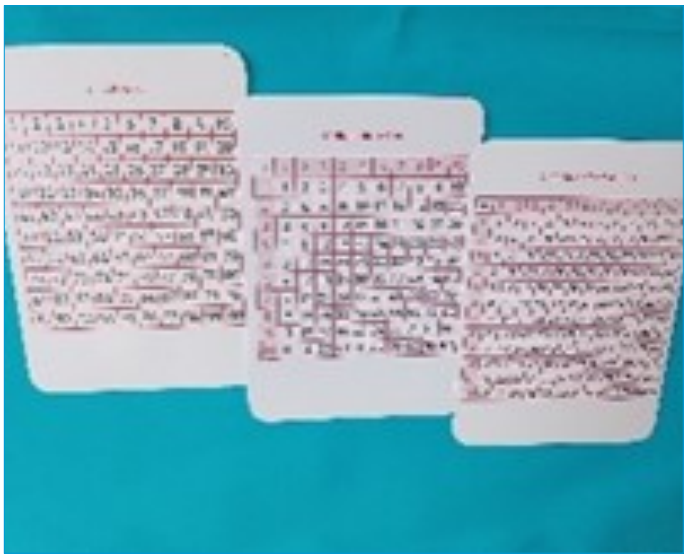
This laminated, dry wipe surface number line can be customised to demonstrate a wide variety of skills such as counting, addition, subtraction, decimal, fraction work and problem solving. A very versatile resource enabling whole class, small groups or individual tasks. (1 metre long).

Negative number lines -4 to 105 (NL001) and -20 to 30 (NL005)



These number lines introduce the concept of working with negative and positive numbers, for example counting backwards from zero. Ideal for addition and subtraction work, the concertina effect allows selection of specific numbers.

A5 number grids (A5001, A5002, A5003) (packs of 35)



The A5001 grid is a 1-100 numbered grid with a blank grid on the reverse side.

The A5002 grid is a multiplication square up to 10 x 10 with a blank grid on the reverse side.

The A5003 grid is a multiplication square up to 12 x 12 with a blank grid on the reverse side.

For more information about Mathematics Advisory Centre resources or services visit our website:

www.hants.gov.uk/educationandlearning/hias/curriculum-support/resource-centres/mathematics.

Alternatively you can contact us by:

Email: maths.centre@hants.gov.uk

Tel: 01962 843893.

Primary puzzle corner

Tri.'s

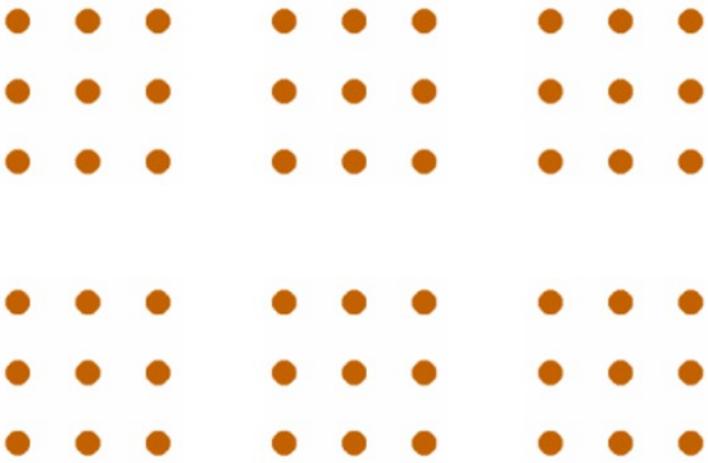
Age 7 to 11

Challenge level ★

Many schools that I have worked in, which is quite a lot, have used nail boards with elastic bands to do some work on shape. Sometimes they have some plastic ones which do the same job and are less painful when you lean on them. Well this challenge is to use an idea that started with using nail boards like these but has changed into using 9 dots arranged in a square to be like a small 3 by 3 nail board.

If you use three lines, (like you may have had three elastic bands for a nail board) see what triangles you can make just using these nine dots. The lines **must** go from dot to dot, (like an elastic band has to go from nail to nail).

The recording of these can get very confused so I suggest that you draw each new triangle on a new set of 9 dots.



Well now, what about the smallest one?

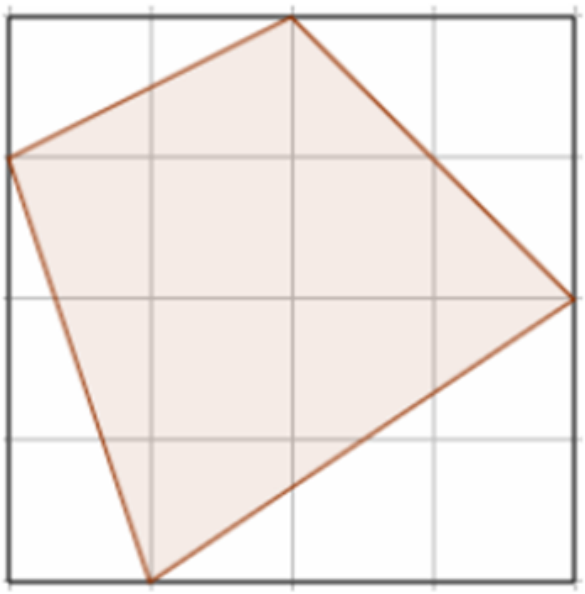
Have you used any kind of system to get all the ones that are the same shape but put in different places?

How many of each triangle have you found?

Finally, the usual question for you to ask, *"I wonder what would happen if ...?"*

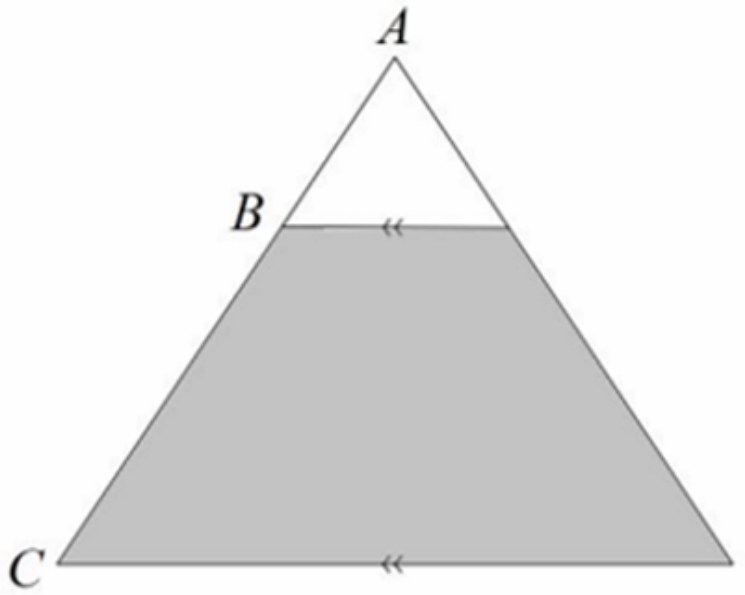
https://nrich.maths.org/39.

Secondary puzzle corner



What proportion of this square is shaded ?

An isosceles triangle is shown in the diagram below



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

www.m4ths.com

342.pdf (m4ths.com)

Primary puzzle corner – solution from summer 2023

Measures (length, mass and capacity)

Year 1:

The oak tree is 7 metres tall and the pine tree is 11 metres tall.

Which tree is tallest? Pine tree

How much taller is it? 4 metres

Year 2:

One bag holds 5kg of rice.

How many bags are needed for 23kg of rice? 5 bags

Year 3:

50 grams of peanuts are needed to make four peanut cookies.

How many grams of peanuts are needed to make 8 peanut cookies?

100g of peanuts

Year 4:

Amy is really thirsty.

She finds two drinks in the shop.

A bottle of fruitade is 2/5 of a litre and a bottle of Quencher is 330ml.

Which bottle would give her the most drink? Fruitade (2/5 of 1000ml is 400ml)

Year 5:

One tin of paint covers an area of 5 metres squared.

Zoe wants to paint a rectangular wall that measures 14 metres by 2.3 metres.

How many tins of paint will she need?

7 tins of paint

Year 6:

A jug holds 1.5 litres of water.

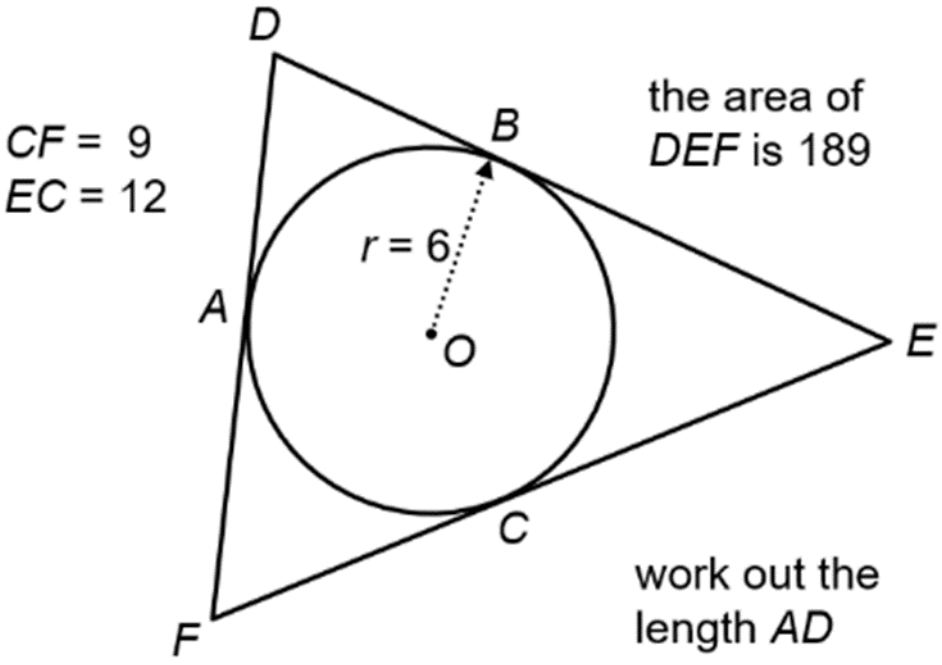
Rob drinks 0.75 litres, Sam drinks 330ml and Tim drinks ¼ of a litre.

How much water is left in the jug?

170ml

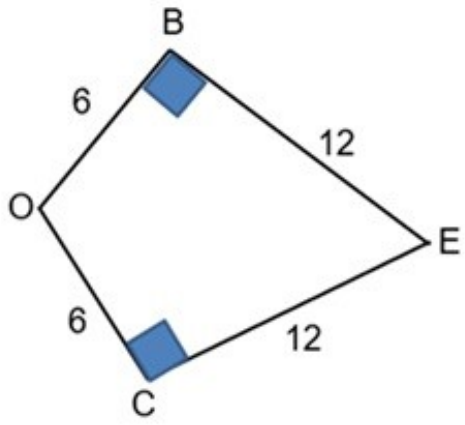
Secondary puzzle corner – solution from summer 2023

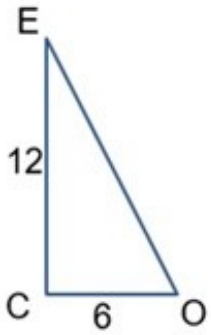
Tangents to the circle



Based on problems from the CBSE exams (India) Year 10

www.donsteward.blogspot.com/2018/02/tangents-to-circles.html.

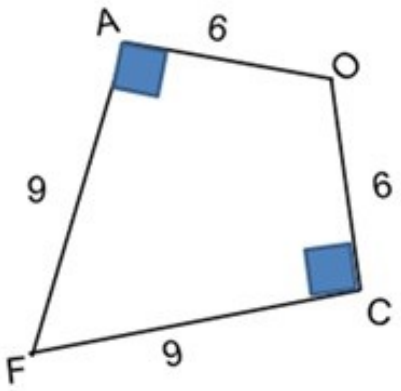




Area of kite OBEC = 2 x area of triangle OEC

OEC = ½ bh = ½ 6 x 12 = 36

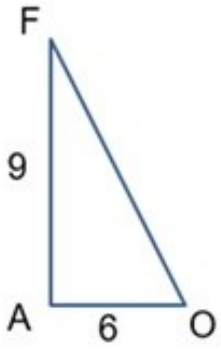
So Area OBEC = 72



Area of kite OAFC = 2 x area of triangle OAF

OAF = ½ bh = ½ 6 x 9 = 27

So Area OAFC = 54



Area of kites OAFC and OBEC = 54 + 72 = **126**

Area of triangle DEF = **189**

So area of kite OADB = 189-126 = **63**

Take right angled triangle ODB

Area ODB = half of 63 = 31.5

½ bh = 31.5
½ x 6 x h = 31.5
6h = 63
H = 63/6 = **10.5 = AD**

AD = 10.5

Check and verify

Use right angled triangles and tanθ = opposite / adjacent

Establish that:
angle FED = 53.13….º
angle EFD = 67.38….º
angle FDE = 59.489….º

(Check 180 – 53.13 – 67.38 = 59.489)

Alternative routes ?

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

Pathway to progress – a mathematics intervention programme for Year 2 pupils

A half-day training session on *pathway to progress – a mathematics intervention programme for Year 2 pupils*. This is designed to give pupils the foundations and skills to enable them to make accelerated progress and secure age-related expectations at the end of Key Stage 1.

- The programme works alongside the HIAS schemes of learning and would also complement a blocked unit approach.
- It can be used alongside diagnostic mathematics tasks or classroom AfL to plug gaps and maximise progress in mathematics. This will allow pupils to keep up with peers and age-related learning back in class.
- To keep the momentum of learning, it should be delivered at least three times a week, either one-to-one or in small groups of no more than three pupils.

3 November 2023

Pathway Year 2

Sub £120 / SLA £85 / Full £144

Primary mathematics: new mathematics managers

Over three face-to-face half-day sessions this course will explore key issues in leading and managing mathematics teaching and learning in the primary years. Delegates will develop their understanding of their role as mathematics subject leader.

As part of the course a bespoke individual session of one hour will be booked during the autumn term with each participant to discuss their own professional needs and support them with their mathematics action plan.

7 November 2023, 1 February and 15 March 2024

Mathematics Manager

Sub £445 / SLA £245 / Full £534

Pathway to progress – a mathematics intervention programme for Year 6 pupils

A half-day training session on *pathway to progress – a mathematics intervention programme for Year 6 pupils.* This is designed to give pupils the foundations and skills to enable them to make accelerated progress and secure age-related expectations at the end of Key Stage 2.

- The programme works alongside the HIAS schemes of learning and would also complement a blocked unit approach.
- It can be used alongside diagnostic mathematics tasks or classroom AfL to plug gaps and maximise progress in mathematics. This will allow pupils to keep up with peers and age-related learning back in class.
- To keep the momentum of learning, it should be delivered at least three times a week, either one-to-one or in small groups of no more than three pupils.

10 November 2023

Pathway Year 6

Sub £120 / SLA £85 / Full £144

Primary mathematics: working at greater depth in mathematics

The course aims to develop teachers' ability to vary tasks to meet the needs of greater depth pupils within their class. Teachers will explore strategies, task design and questioning to enable pupils to deepen their knowledge and understanding.

Learning outcomes:

- teachers will analyse pupil's efficiency with mental strategies when solving arithmetic questions to inform future number fact fluency planning needs
- teachers will understand how to vary tasks to develop a deeper knowledge and understanding when reasoning and problem solving
- teachers will understand what makes a good task and develop questioning to ensure pupils have opportunity to justify and prove their thinking
- teachers will assess pupil work and make judgements regarding next steps. Teachers will then vary tasks according to assessment for learning.

23 November 2023 and 22 February 2024

Mathematics Greater 23

Sub £190 / SLA £125 / Full £228

SEND planning tool: using the pre-Year 1 to Year 3 mathematics planning tools (*Webinar*)

The course will explore the effective use of the pre-Year 1 to Year 3 SEND planning tools in mathematics. The documents have been written to outline the knowledge, concepts and strategies needed to progress from the Early Years Foundation Stage to the Year 3 curriculum. The planning tool is specifically for pupils with SEN.

The course will consider:

- effective pedagogy in mathematics
- diagnostic assessment
- developing pupil independence.

Delegates will have time to reflect on the needs of a child they are teaching and create a bespoke plan for the child.

30 November 2023 and 8 January 2024

SEND Planning Tool

Sub £140 / SLA £100 / Full £168

Secondary

Secondary mathematics network – autumn 2

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.

28 November 2023

Autumn 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.