Heads of Maths Network Meeting
January 11th 2022
(in place of Autumn 2 meeting)

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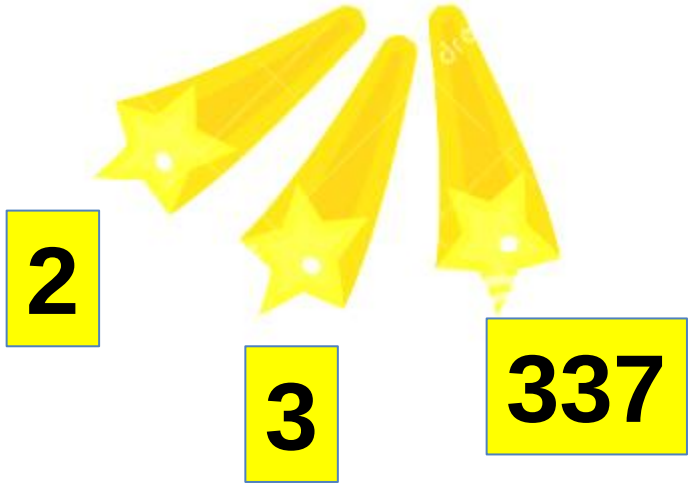
Happy New Year

2022



Meeting will start at 1315

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Jo.Lees@hants.gov.uk

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Hampshire HoDs: Date schedule
All meetings start at 1315 with approximate finish of 1600

Date	
Thursday 07-10-21	**Holiday Inn Eastleigh**
Tuesday ~~30-11-21~~ 11-01-22	**MSTeams**
Wednesday 02-02-22	**MS Teams**
Wednesday 23-03-22	**Holiday Inn Eastleigh**
Thursday 05-05-22	**Holiday Inn Eastleigh**
Tuesday 05-07-22	**MSTeams**

Remember to register your car reg when you go in !

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Materials for Hampshire HoDs Meetings

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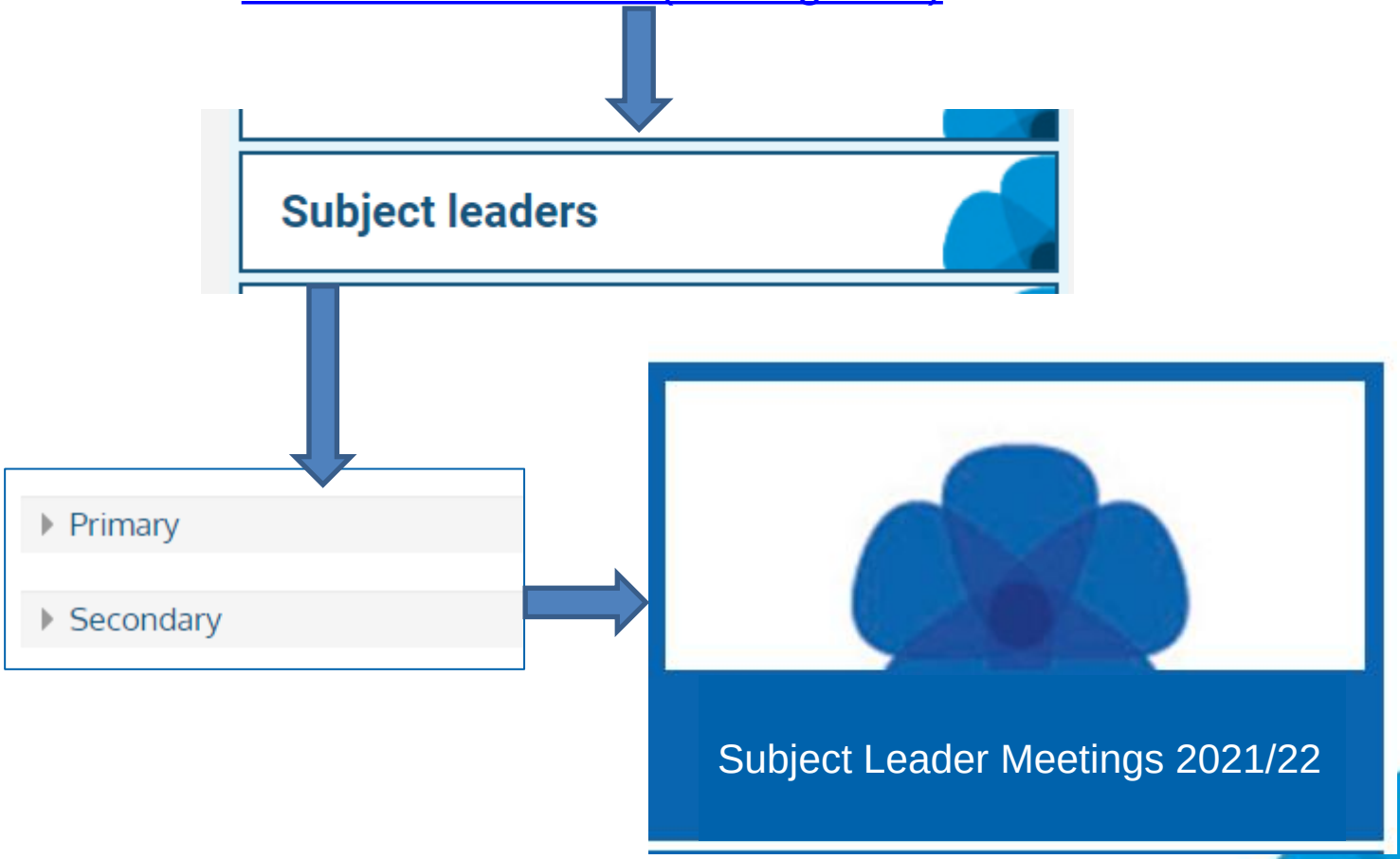
HIAS Maths Moodle (hants.gov.uk)



HH2122

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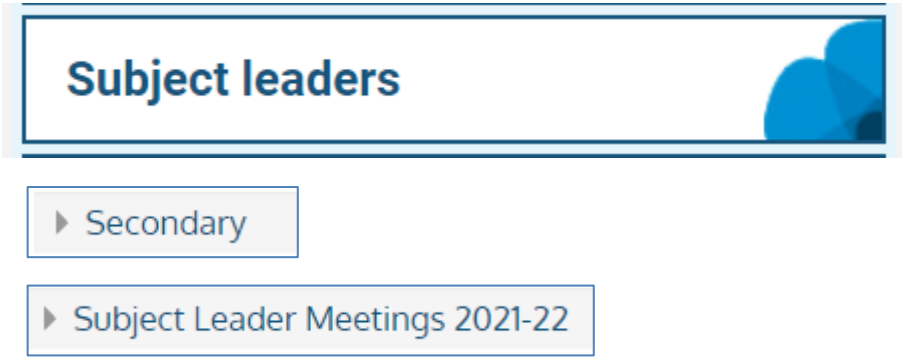
Examination Boards' Presentations

Available to view in your subject leaders folder on the HIAS maths moodle (password HH2122)



Agenda

- Subject enjoyment: Some maths to get us started
- Curriculum: Developing vocabulary in KS3 and KS4
- Teaching and learning: Metacognition and self-regulation - a look at the first recommendation in the EEF report
  Metacognition and Self-regulated Learning | EEF (educationendowmentfoundation.org.uk)
- Leadership: Ofsted Deep Dive in maths - some preparation thoughts - be prepared to share what you are doing in your departments or any experiences you have already had
- Assessment: GCSE arrangements and resources available - be prepared to share good ideas for revision, curriculum coverage, interventions, gap analysis etc
- AOB

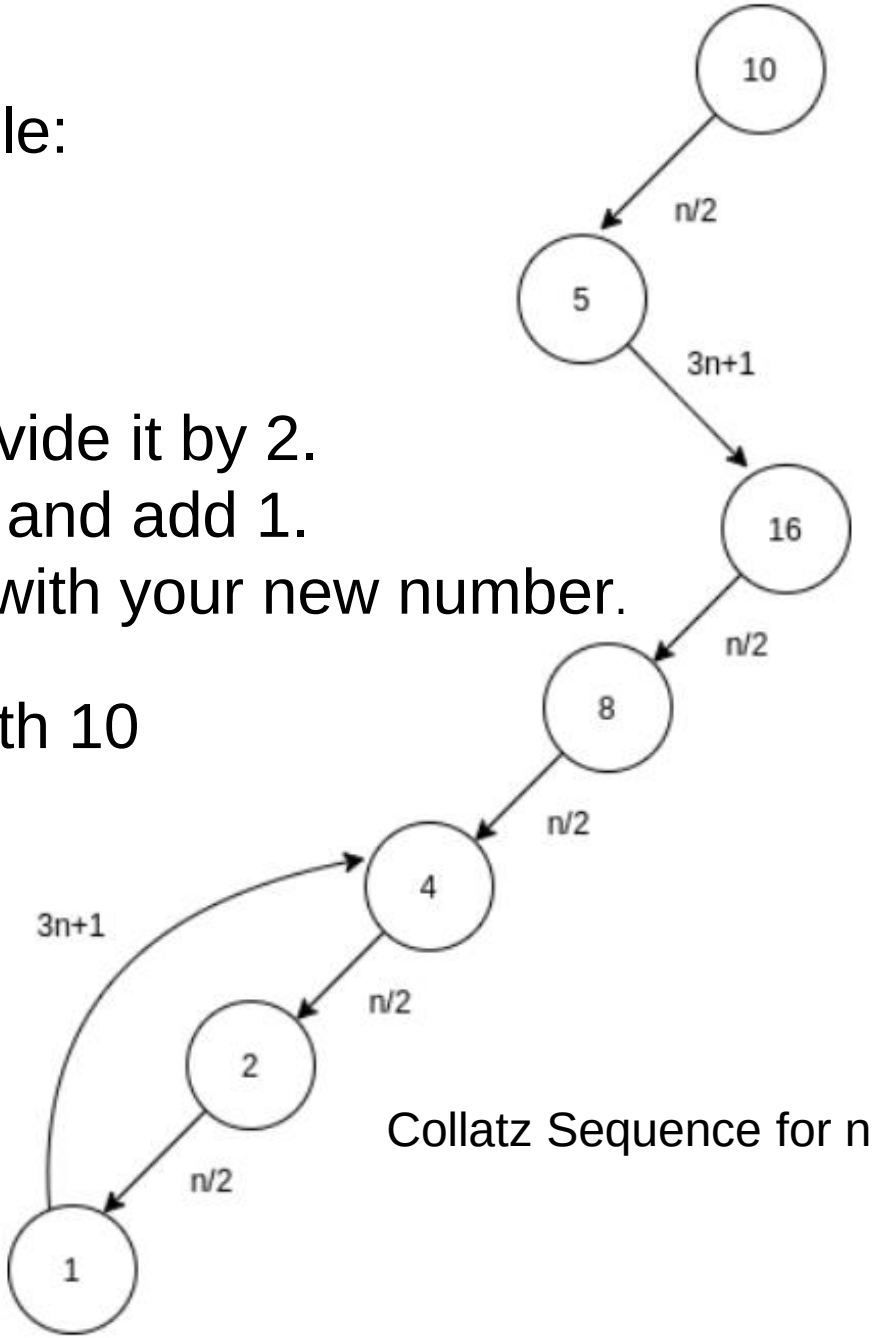
An interesting number puzzle:

Pick any positive integer.

- If that number is even, divide it by 2.
- If it's odd, multiply it by 3 and add 1.
- Now repeat the process with your new number.

In this example, I started with 10

$$f(n) = \begin{cases} n/2 & \text{if } n \equiv 0 \pmod 2 \\ 3n+1 & \text{if } n \equiv 1 \pmod 2. \end{cases}$$



Collatz Sequence for n = 10

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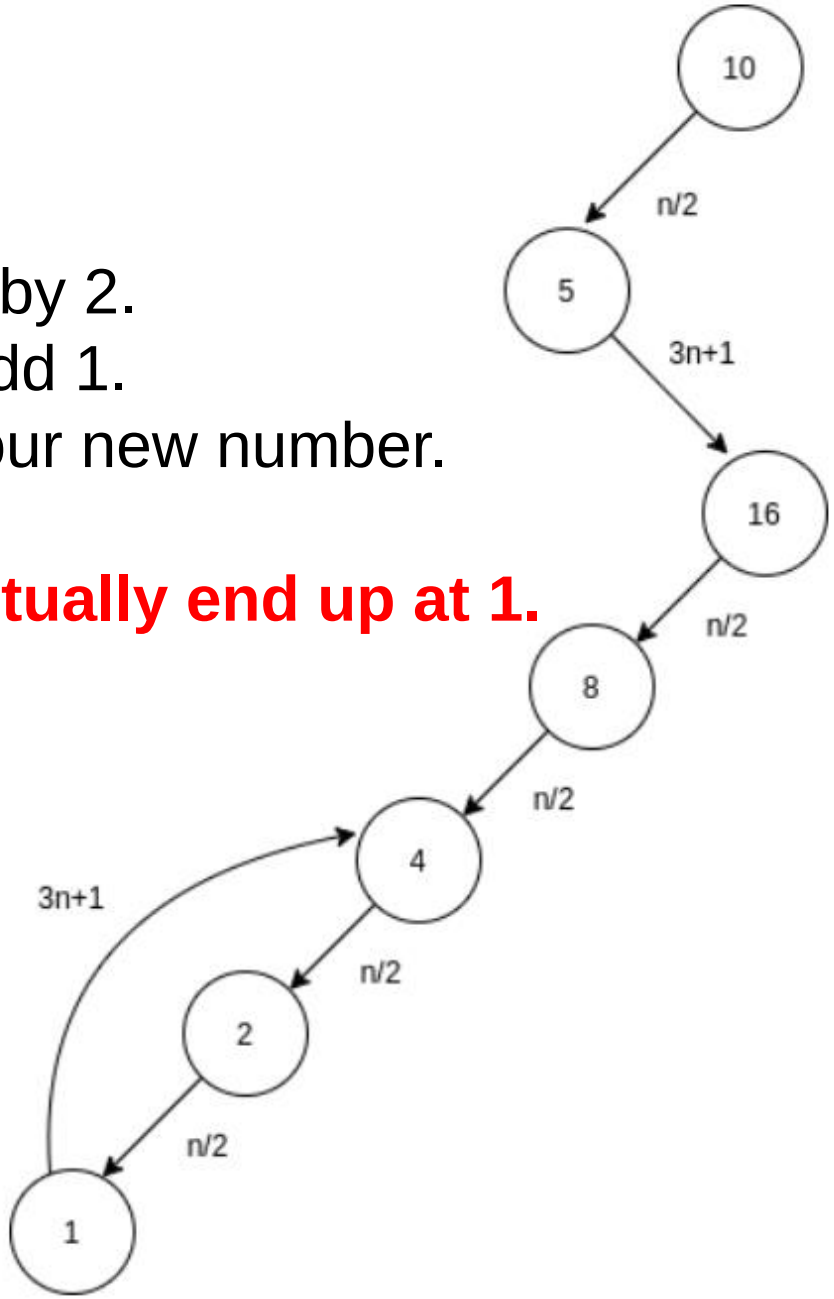
Collatz Conjecture

Pick any positive integer.
If that number is even, divide it by 2.
If it's odd, multiply it by 3 and add 1.
Now repeat the process with your new number.

If you keep going, you'll eventually end up at 1. Every time.



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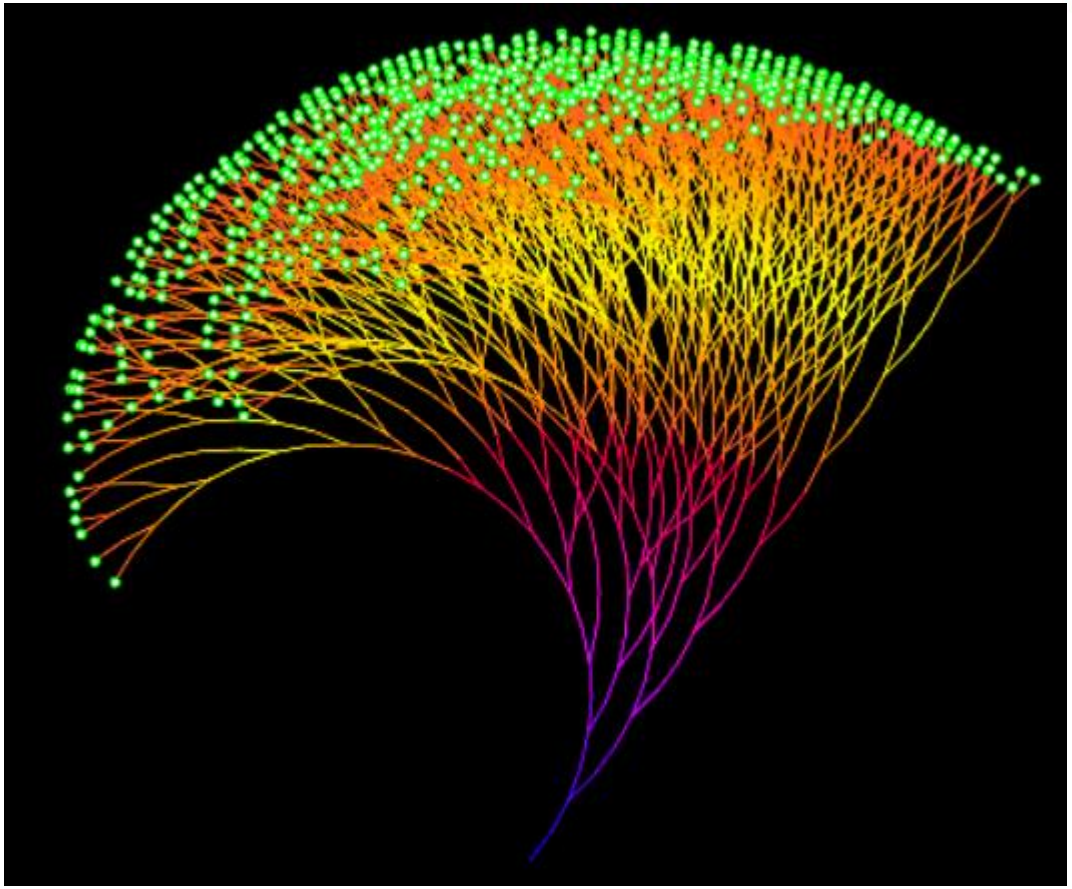


If you are thinking that the above picture is a coral seaweed or any fancy neural network of a brand-new species, it is not. It is actually a beautiful representation of a sequence of numbers that are generated from the **Collatz Conjecture**, also known by multiple names like **Thwaites Conjecture, Kakutani's problem, Ulam conjecture, Hasse's algorithm, Syracuse problem,** or simply the **3n+1 conjecture.**

Mammoth hours of mathematicians down the drain over the years…

To date, mathematicians have used the brute force approach till 2^{68}, which comes out to be around 300 quintillion (295,147,905,179,352,825,856 to be precise) numbers and have found all of them to obey the Collatz Conjecture!

However, as long as you cannot pen down a proof for *any* positive integer ,n, to cover all numbers to infinity, you cannot translate this conjecture to a theorem!

Various attempts have been made to prove this conjecture via graphical plots, but everyone seems to have satisfied conditions for “almost” true, but not “absolutely” true.

Something for any year group and any set to explore and ponder …….
Challenge : Find a counter-example ☺

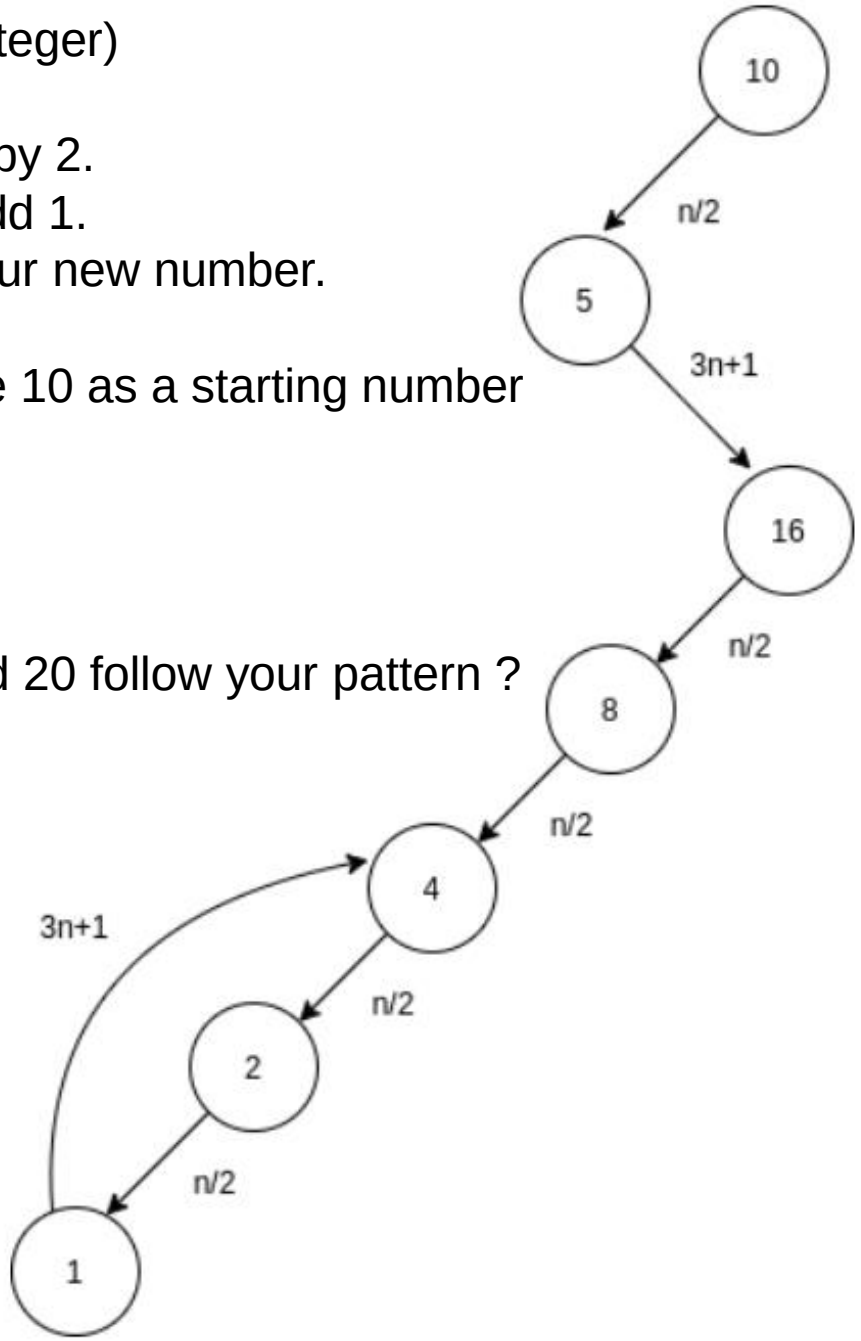
Year 7

Pick any positive whole number (integer)

- If that number is even, divide it by 2.
- If it's odd, multiply it by 3 and add 1.
- Now repeat the process with your new number.

Here is an example where I choose 10 as a starting number

What do you notice?
What do you wonder?
Have you found a pattern?
How many numbers between 1 and 20 follow your pattern ?



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Year 11

Pick any positive integer

- If that number is even, divide it by 2.
- If it's odd, multiply it by 3 and add 1.
- Now repeat the process with your new number.

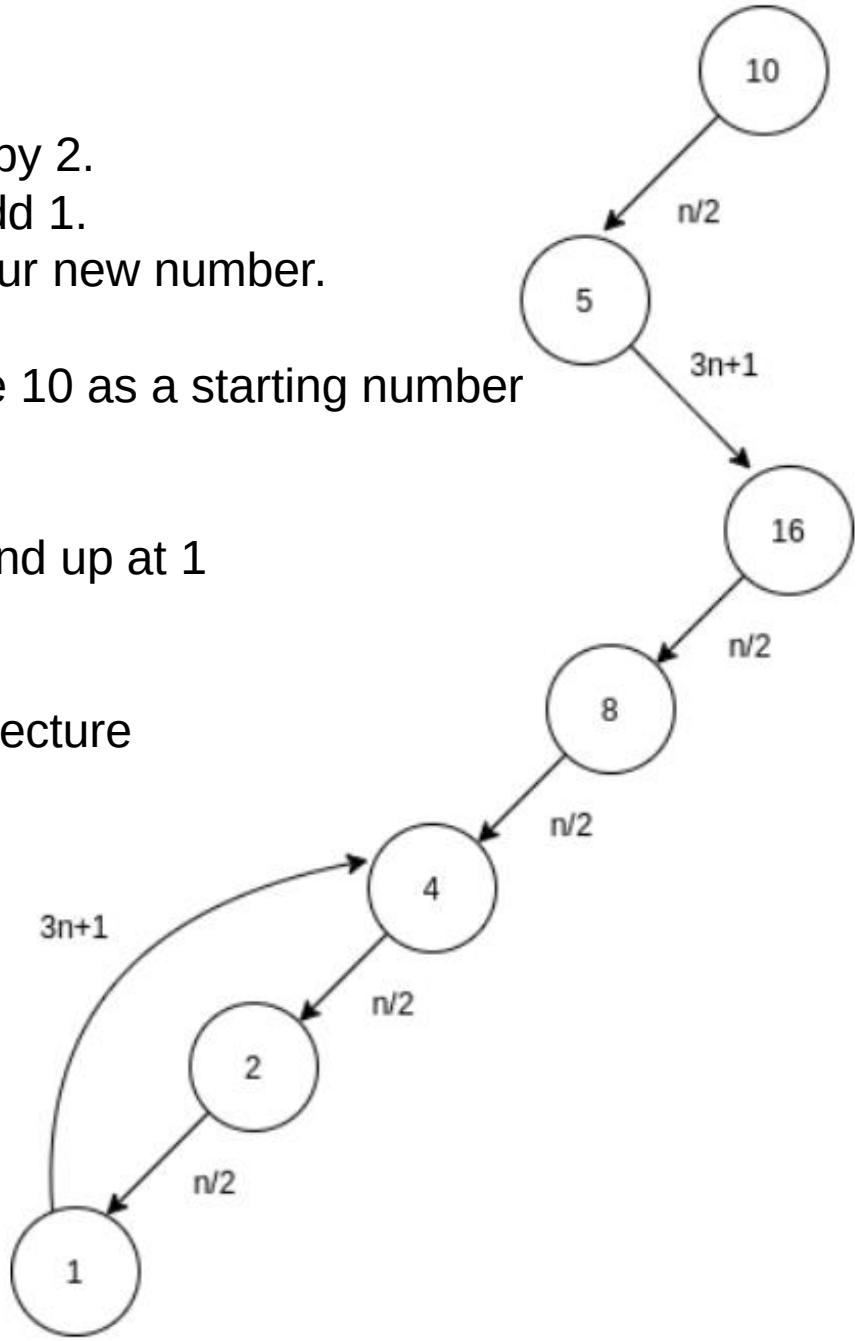
Here is an example where I choose 10 as a starting number

Conjecture:

Every positive integer will always end up at 1

Challenge:

Find a counter example to this conjecture



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The Collatz conjecture is the subject of a video from YouTube channel Numberphile.

It is the perfect example of a simple problem that even the greatest mathematical minds in the world haven't been able to solve.

UNCRACKABLE? The Collatz Conjecture - Numberphile - YouTube

Mathematical Literacy

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Why does precise mathematical vocabulary matter ?

- You have to understand what the question is asking if you want to get it right.
- Often, everyday words have a different (or parallel) meaning in a mathematical context (such as ‘difference’ , ‘true’ and ‘product’)
- Subject specific vocabulary is not usually part of an English course, so we need to teach it somewhere, particularly for students with EAL.
- Encourages and allows for mathematical discussions, talk for learning, communication between mathematicians

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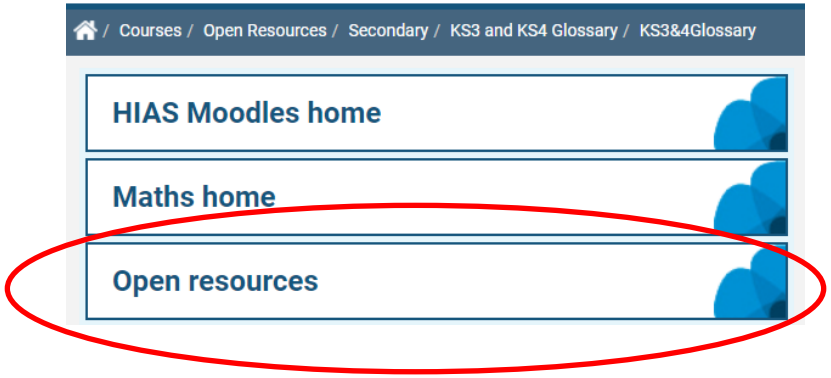
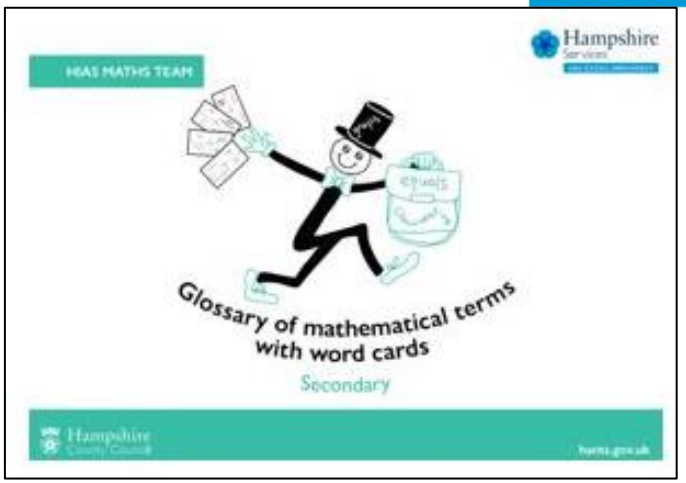
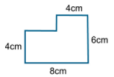




Word	Domain	Year	Meaning	Example
circumference	geometry- properties of shapes	6	The distance around a circle (its perimeter).	
common factor	multiplication and division	5	A number which is a factor of two or more other numbers.	3 is a **common factor** of the numbers 9 and 30.
common multiple	multiplication and division	6	An integer which is a multiple of two or more other integers.	24 is a **common multiple** of 2,3,4,6,8 and 12.
complement (of a number)	addition and subtraction fractions, decimals, and percentages.	5	Pairs of numbers that sum to another number (number bonds).	67 + 33 = 100 67 and 33 are **complements** in 100.
composite number	multiplication and division	5	A whole number that is the product of other whole numbers, excluding 1. This means that 1 and prime numbers are not composite. A composite number has more than two factors.	2 x 6 = 12 and 3 x 4 = 12 12 is a **composite number.**
composite shape	geometry- properties of shapes	5	A shape formed by combining two or more shapes.	

Contents

[Online Training - Course: KS3 and KS4 Glossary (hants.gov.uk)]

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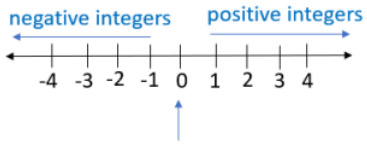
Word	Example
integer	**-15 , 7 , 43** **are all integers**
Picture, model, or diagram	**Non-Example**
Integer Number Line  Zero is neither positive nor negative	**0.5 , -6.2 , 81.9** **are not integers**

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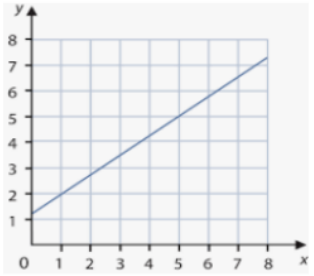
Word	
dividend	
Picture, model, or diagram	

Word	Example
Picture, model, or diagram	Non-Example



$y = x + 1$

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How else do you promote or teach mathematical vocabulary?

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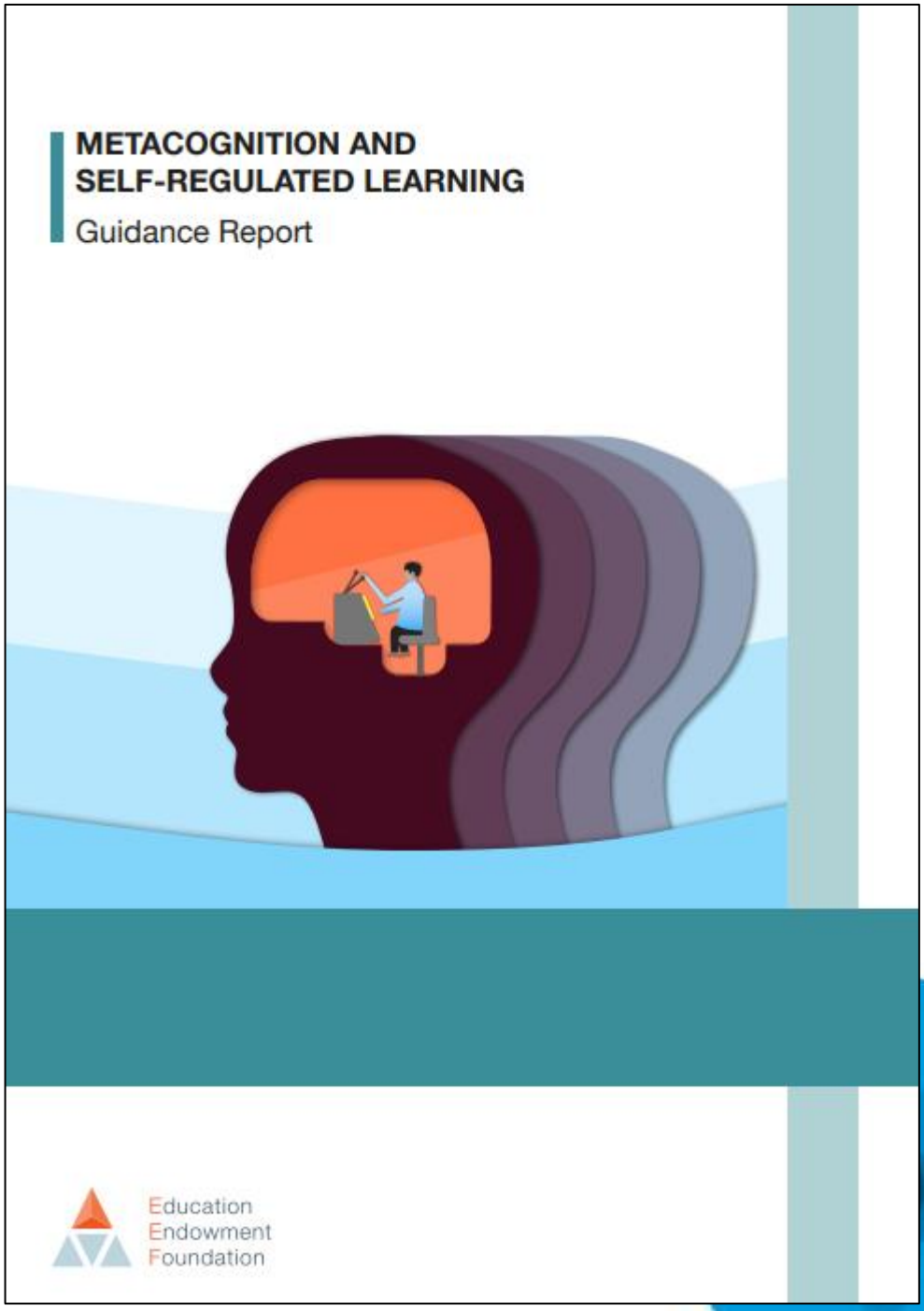
[EEF_Metacognition_and_self-regulated_learning.pdf (educationendowmentfoundation.org.uk)]



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Recommendation 1	Teachers should acquire the professional understanding and skills to develop their pupils' metacognitive knowledge
Recommendation 2	Explicitly teach pupils metacognitive strategies, including how to plan, monitor, and evaluate their learning
Recommendation 3	Model your own thinking to help pupils develop their metacognitive and cognitive skills
Recommendation 4	Set an appropriate level of challenge to develop pupils' self-regulation and metacognition
Recommendation 5	Promote and develop metacognitive talk in the classroom
Recommendation 6	Explicitly teach pupils how to organise, and effectively manage, their learning independently
Recommendation 7	Schools should support teachers to develop their knowledge of these approaches and expect them to be applied appropriately

1

Teachers should acquire the professional understanding and skills to develop their pupils' metacognitive knowledge

- Self-regulated learners are aware of their strengths and weaknesses, and can motivate themselves to engage in, and improve, their learning
- Developing pupils' metacognitive knowledge of how they learn – their knowledge of **themselves as a learner**, of strategies, and of **tasks** – is an effective way of improving pupil outcomes
- Teachers should support pupils to **plan, monitor** and **evaluate** their learning

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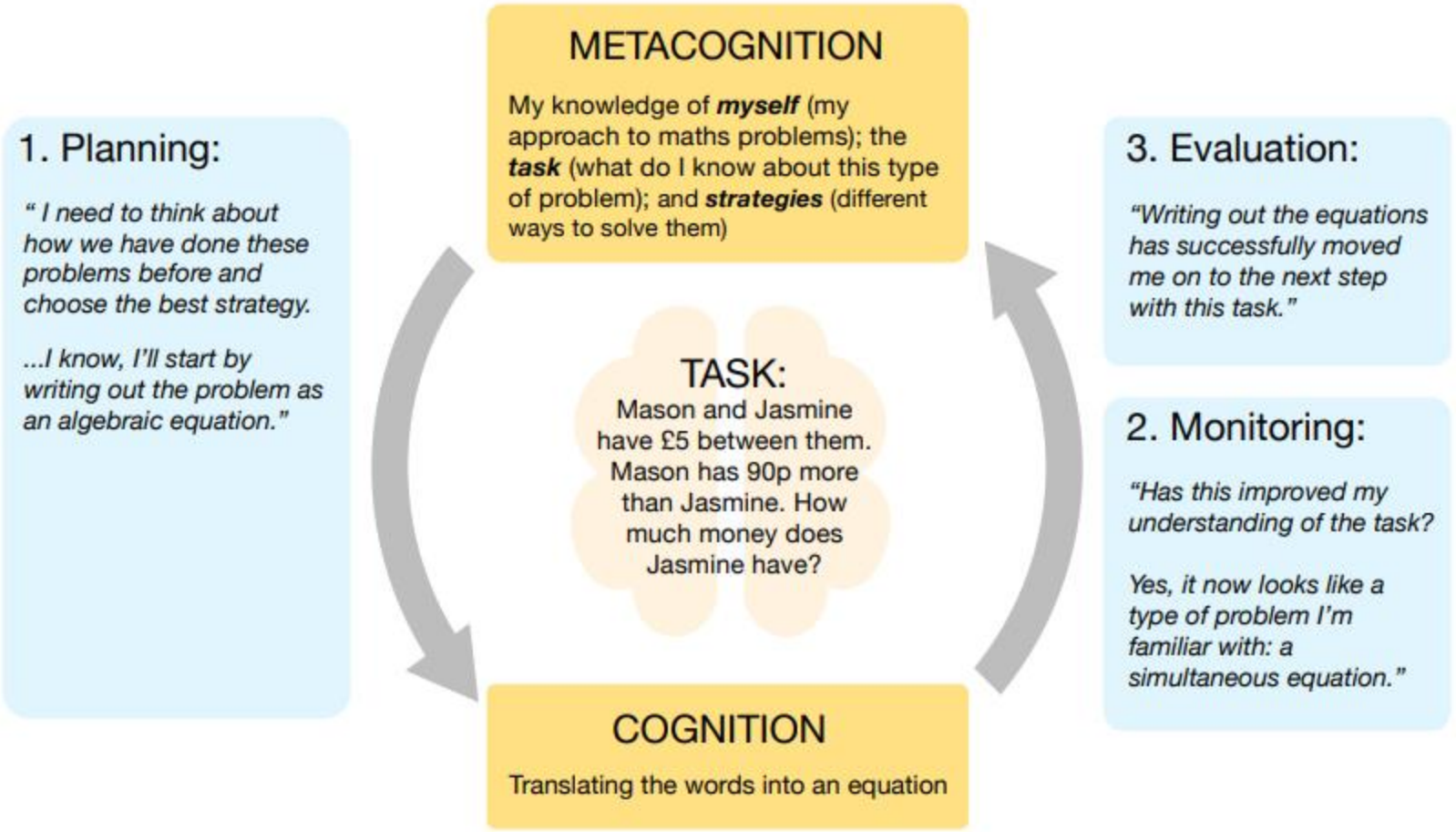
The ways learners monitor and purposefully direct their learning



The mental process involved in knowing, understanding and learning

The learner starts with *some* knowledge of the task
-word problems in maths are often solved by expressing them as equations
The learner also starts with strategies
-how to turn sentences into an equation **(Planning)**

Cognition

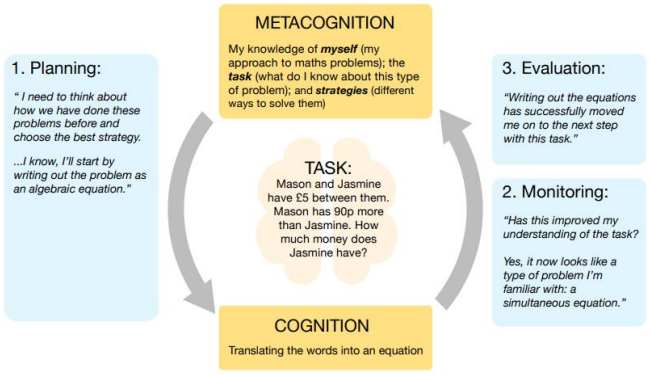
Their knowledge of the task then develops as it emerges from being a word problem into a simultaneous equation. **(Monitoring)**

They can then continue through this cycle if they have the strategies for solving simultaneous equations.

They can then evaluate overall success by substituting answers into the word problem and checking they are correct. (**Evaluation)**

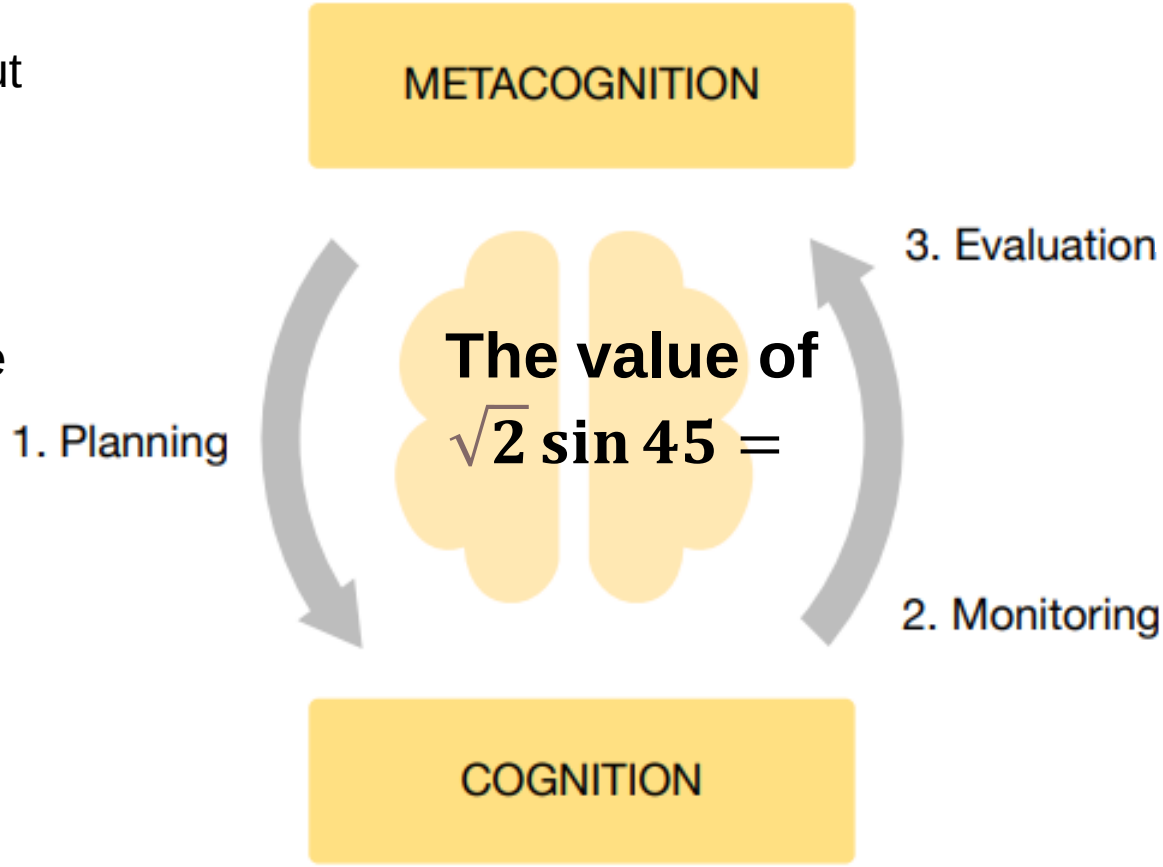
If this was wrong, they can attempt other strategies and once more update their metacognitive knowledge.

Metacognition



The ways learners monitor and purposefully direct their learning

Think about problems I have seen like this before and choose the best strategy



Have I found the correct value?
How can I check?
I am correct, what is next ?
I am incorrect, think again

Has this improved my understanding of the task ?
Yes, I have a good strategy to proceed
No, I need to think again

The mental process involved in knowing, understanding and learning

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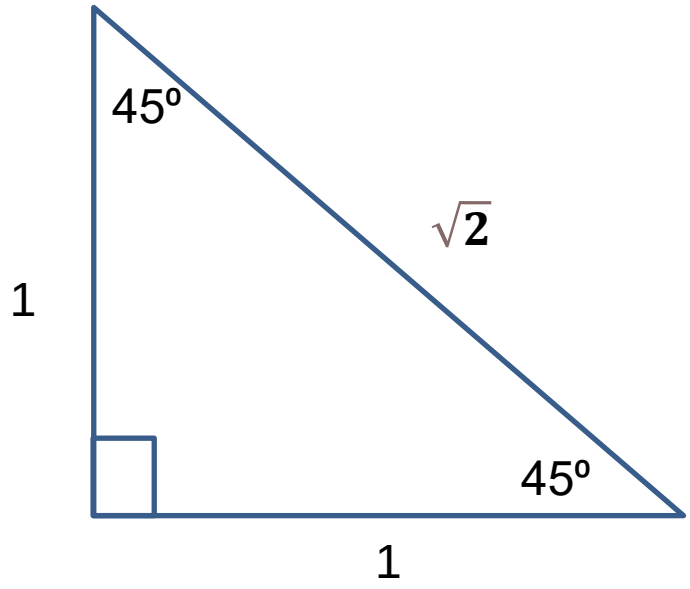
The value of

$$\sqrt{2}\sin 45 = 1$$

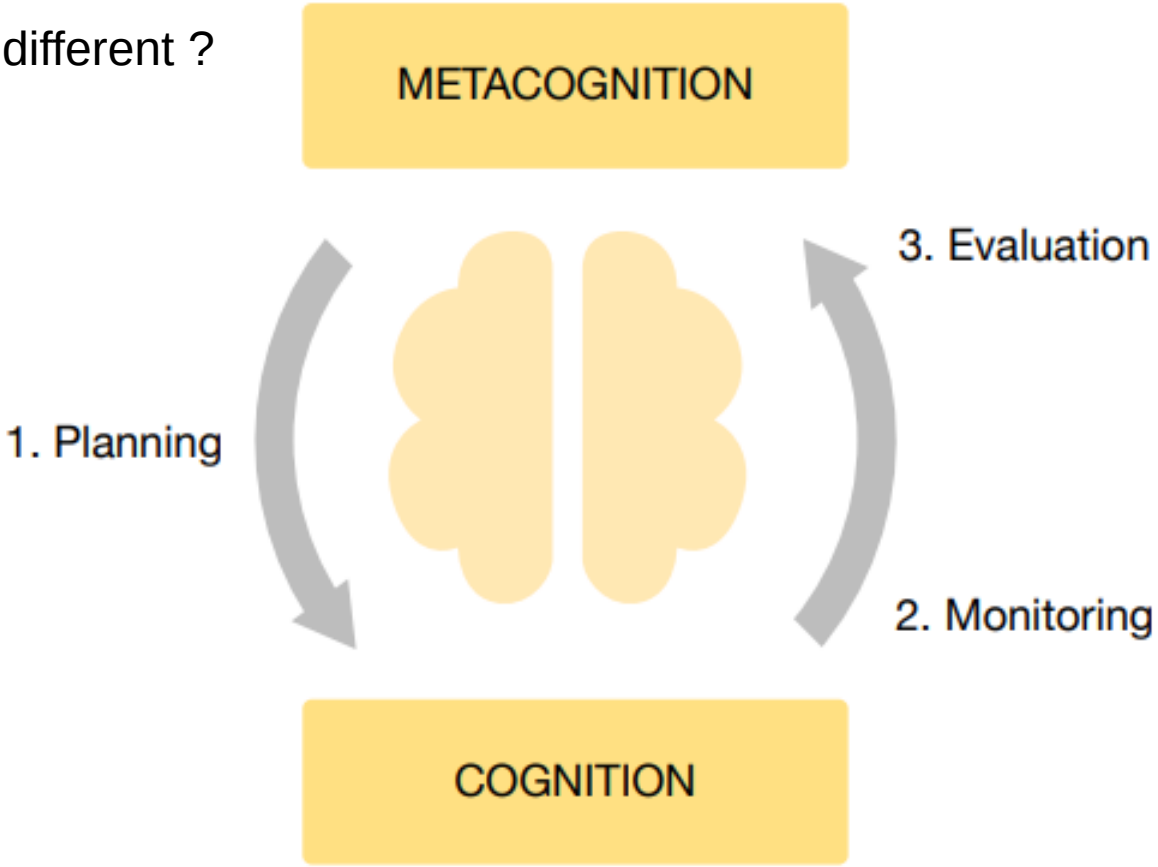
Sin 45 = opp. / hyp. = 1 / $\sqrt{2}$



Task:
Select or create a task and go through this process

- as a teacher
- as a learner

Same experience or different ?



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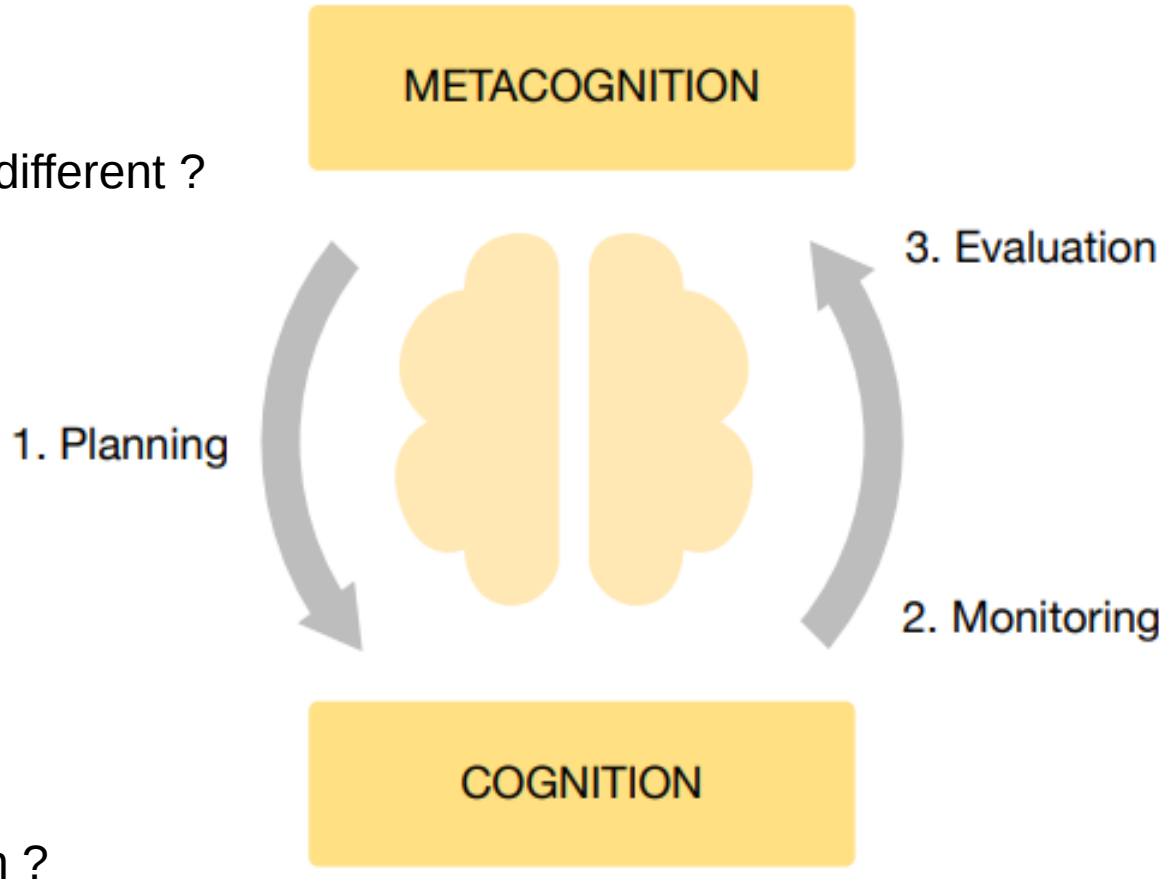

How did you get on ?
What do you need / want to develop with the department in this area?

Preparing for an Ofsted ‘Deep Dive’ in maths

Are you clear about what is meant by ‘Intent, Implementation, Impact’ ?

Check the Education and Inspection Framework (EIF)

Quality of education

Inspectors will make a judgement on the quality of education by evaluating the extent to which:

Intent

•leaders take on or construct a curriculum that is ambitious and designed to give all learners, particularly the most disadvantaged and those with special educational needs and/or disabilities (SEND) or high needs, the knowledge and cultural capital they need to succeed in life

•the provider’s curriculum is coherently planned and sequenced towards cumulatively sufficient knowledge and skills for future learning and employment

•the provider has the same academic, technical or vocational ambitions for almost all learners. Where this is not practical – for example, for some learners with high levels of SEND – its curriculum is designed to be ambitious and to meet their needs

•learners study the full curriculum. Providers ensure this by teaching a full range of subjects for as long as possible, ‘specialising’ only when necessary

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Implementation

•teachers have good knowledge of the subject(s) and courses they teach. Leaders provide effective support, including for those teaching outside their main areas of expertise

•teachers present subject matter clearly, promoting appropriate discussion about the subject matter they are teaching. They check learners' understanding systematically, identify misconceptions accurately and provide clear, direct feedback. In doing so, they respond and adapt their teaching as necessary, without unnecessarily elaborate or differentiated approaches

•over the course of study, teaching is designed to help learners to remember in the long term the content they have been taught and to integrate new knowledge into larger concepts

•teachers and leaders use assessment well, for example to help learners embed and use knowledge fluently or to check understanding and inform teaching. Leaders understand the limitations of assessment and do not use it in a way that creates unnecessary burdens for staff or learners

•teachers create an environment that allows the learner to focus on learning. The resources and materials that teachers select – in a way that does not create unnecessary workload for staff – reflect the provider's ambitious intentions for the course of study and clearly support the intent of a coherently planned curriculum, sequenced towards cumulatively sufficient knowledge and skills for future learning and employment

•a rigorous approach to the teaching of reading develops learners' confidence and enjoyment in reading. At the early stages of learning to read, reading materials are closely matched to learners' phonics knowledge

Impact

•learners develop detailed knowledge and skills across the curriculum and, as a result, achieve well. Where relevant, this is reflected in results from national tests and examinations that meet government expectations, or in the qualifications obtained

•learners are ready for the next stage of education, employment or training. Where relevant, they gain qualifications that allow them to go on to destinations that meet their interests, aspirations and the intention of their course of study. They read widely and often, with fluency and comprehension.

What is an Ofsted deep dive?

- An Ofsted deep dive is an in-depth examination of a national curriculum subject by an Ofsted inspection team. It is part of the Ofsted inspectors' remit to monitor the 3 Is – Intent, Implementation and Impact – of the curriculum.

- From Ofsted's guidance and the experiences of those who've gone through one already, we know that an Ofsted deep dive involves lesson observations, book looks and discussions with HoDs, teachers and pupils

- According to the new EIF, the intent behind a deep dive is to "establish a coherent base on quality of education"; so multiple deep dives from Ofsted will give inspectors a connected sample of lessons with which to establish a clearer idea of the overall teaching quality of the school.

Some ‘typical’ features of a 2 day deep dive in maths:
(each one will be bespoke to the school of course)

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Day 1:

P1: Interview with the HoD

P2: Learning walk with HoD
maybe 2 x KS3 and 2 x KS4 (lessons identified during P1 interview)

P3: 30 mins pupil interview (with pupil’s books)
30 mins corridor drop-ins (2 classes identified in P1 interview)

P4: 30 mins meeting with HoD to discuss initial thoughts
30 mins corridor drop-ins (3 classes identified in P1 interview)

P5: no inspectors in the maths department

P6: 30 mins teacher meet (possibly not TLR holders)
30 mins work scrutiny with HoD and then summary of findings

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Day 2

End of lessons watched (final minutes inspector on corridor)

CPD meeting, small group of staff selected: Questions might include

- What is your schools CPD cycle?
- What does coaching look like?
- How do you use CPD to improve your own practice?
- How does CPD work in your department?
- What do mentees feel about being coached?

HoDs interview

- What is your intent?
- How does your curriculum work?
- What do you mean about interleaving?
- How does interleaving work? Examples?
- How does year 9 prepare for GCSE whilst not being KS4?
- What does QA look like in the department?
  (How do you check that the things you want to be implemented, are being implemented?)
- How do you ensure the curriculum is working?
- How are you teaching and ensuring fluency?
- How do you teach problem solving?
- What support do you give for SEN? At a department/class/individual level?
- What is an area for improvement in Maths?
- What is the percentage of LAP students in your school?
- How do you promote an enjoyment for Maths?
- How do you use CPD to support class teachers?

Learning Walk

- What did you think of that lesson ?
- Is that a typical lesson in this department ?

Teachers' questions

- How is reasoning embedded in KS3 as well as Year 11 and how are you improving this?
- Thinking about the lessons visited today, how does this build on what they have done before and what they are doing next?
- What does a lesson with a SEND student look like and how are these students supported in your lessons?
- Safeguarding- e.g. If you had a concern about your head teacher, who would you report this to?

Pupils' questions

Pupils will have their books so that they can use them to discuss answers.

Inspector may choose one pupil and ask the HOD to choose another

- Do you like maths lessons?
- What is your favourite aspect of maths lessons?
- How do your maths lessons work?
- How do your lessons build on stuff you have learnt previously?

Pupils may also be asked some specific maths-based questions, for example, an Inspector might write or draw questions and ask all pupils some calculation or terminology questions such as identifying what a subset is Venn diagrams.

Work scrutiny questions

HoD might be asked to bring 4 other books, alongside books selected during pupil questions

- What does a standard work scrutiny look like in your department?
- Are you happy to see these books?
- Comparing two students in different groups-why has this student got less green pen in their book that this student?
- How is this student challenged more than this student?
- How do Y8 books differ from Y9?
- What is the expectation on copying/ printing examples with diagrams?
- Show me in Y11 books the end goal you want for all students to achieve?
- How do you support SEN needs in terms of books?

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What do you and your department need to do next ?

Do you have an Intent, Implementation and Impact statement that is co-constructed with SLT and with your department so that everyone knows and understands the **‘why, how and so what’** in maths ?

How confident are you of the responses from colleagues and pupils ?

How do you feel about a work scrutiny tomorrow ? Are you ready ?

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GCSE arrangements and updates

Data

https://analytics.ofqual.gov.uk/apps/GCSE/County/

Grade summary for GCSE Mathematics 2019 and 2021										
	Grade 9		Grade 7+		Grade 5+		Grade 4+		Grade 1+	
	2019	2021	2019	2021	2019	2021	2019	2021	2019	2021
England	3.7%	9.0%	20.4%	25.9%	50.1%	59.1%	71.4%	77.9%	98.2%	99.0%
Hampshire	3.8%	6.1%	20.7%	26.8%	51.8%	60.2%	74.2%	79.8%	98.5%	99.2%
Difference	0.1%	-2.9%	0.3%	0.9%	1.7%	1.1%	2.8%	1.9%	0.3%	0.2%

Points of interest ?

Grade 9 in 2021

Narrowing gap at Grade 4

How does this compare with your results ?
How does this compare with 2022 predicted grades ?

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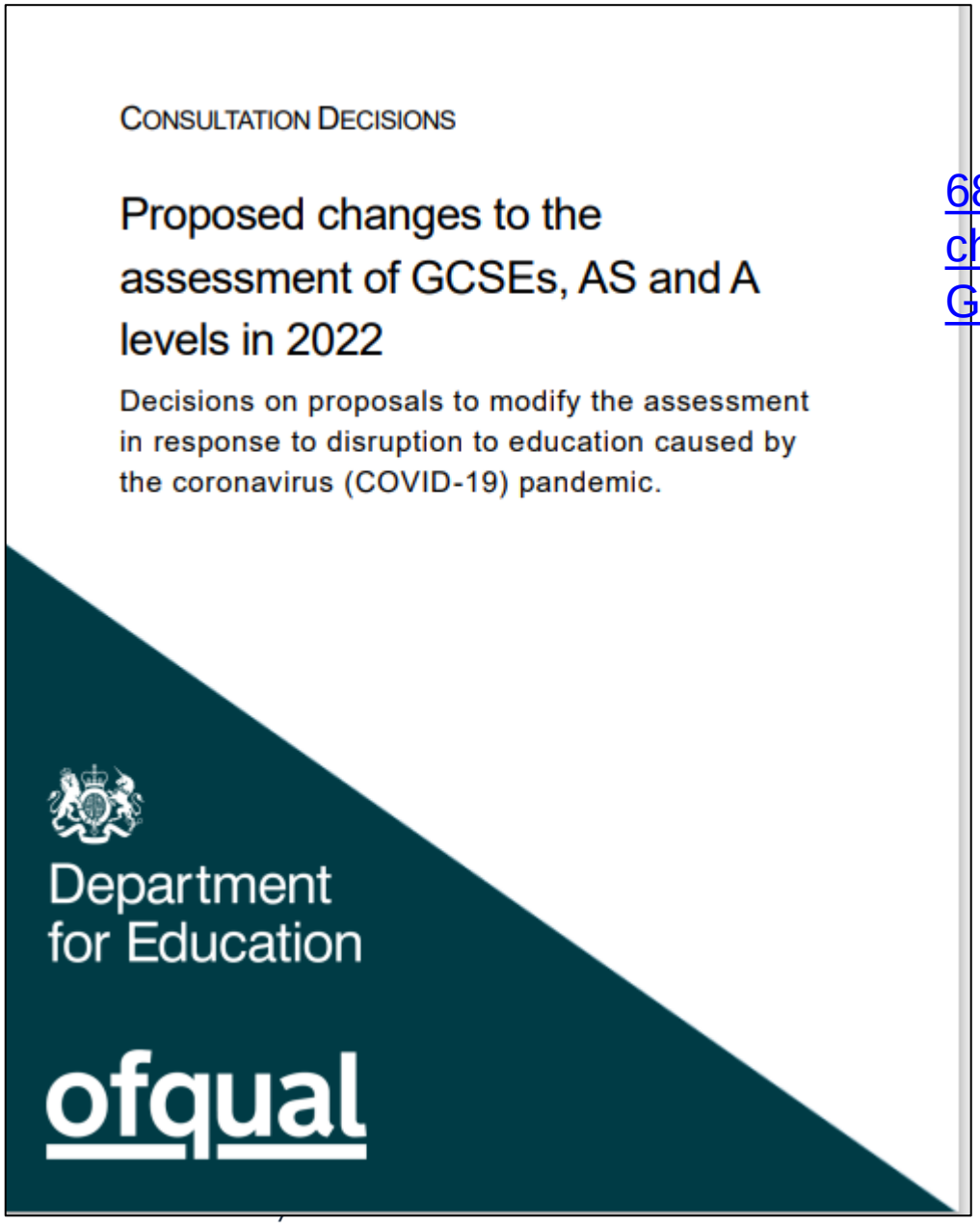

6834_Decisions_for_proposed_changes_to_the_assessment_of_GCSEs__AS_and_A_levels_in_2022.pdf

In the **summer 2022** and **November 2022** GCSE (9-1) Maths exams, students will be given a formulae sheet alongside each of their question papers. This is one of the changes to 2022 assessments announced by Ofqual and DfE following their public consultation.

Separate formulae sheets will be provided to Foundation tier and Higher tier students, as appropriate. The **Higher** tier formulae sheet will include additional formulae.

The formulae sheet given to both **Foundation** tier and **Higher** tier students in 2022 will include the below formulae	The formulae sheet given to **Higher** tier students in 2022 will also include the below formulae
• area of a trapezium • volume of a prism • circumference of a circle • area of a circle • Pythagoras' theorem • trigonometry formulae (sin, cos, tan) • compound interest • P(*A* or *B*)	• quadratic formula • sine rule • cosine rule • area of triangle = ½*ab* sin*C* • P(*A* and *B*)

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Please note that formulae that have been provided **in questions** in previous years (e.g. curved surface area of a cone, surface area of a sphere, volume of a cone, volume of a sphere and kinematics formulae) will continue to be provided as required **in questions** on our GCSE (9-1) Maths question papers in 2022. This means you can use our OCR past papers with the formulae sheet, to give students a mock exam consistent with the question paper approach to be used in 2022.

The formulae sheets will be published as pdf files on the public OCR website in the first half of November (subject to final confirmation from Ofqual), so teachers can begin familiarising and preparing students with them.

Students will get a clean printed copy in each exam.

As well as formulae sheets, we will also be providing advance information on the focus of content of GCSE (9-1) Maths exams in 2022, to support student revision. For the summer 2022 series, this advance information will be released to centres by 7 February 2022. For the November 2022 series, this advance information will be released to centres by July 2022.

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Foundation Tier Formulae Sheet

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Taken from OCR website Nov2021

Perimeter, Area and Volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

Area of a trapezium $= \frac{1}{2}(a+b)h$

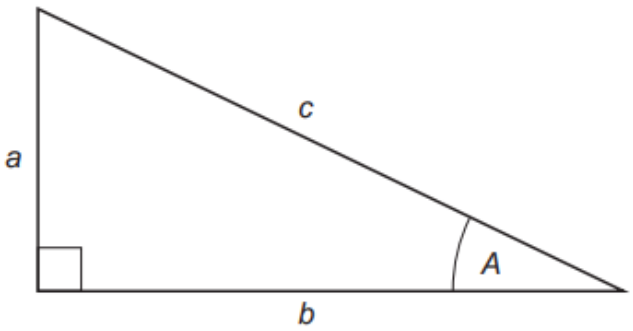
Volume of a prism = area of cross section × length

Where r is the radius and d is the diameter:

Circumference of a circle = $2\pi r = \pi d$

Area of a circle = πr^2

Pythagoras' Theorem and Trigonometry



In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:

$a^2 + b^2 = c^2$

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

$\sin A = \frac{a}{c}$ $\cos A = \frac{b}{c}$ $\tan A = \frac{a}{b}$

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is the number of times that the interest is compounded:

Total accrued $= P\left(1 + \frac{r}{100}\right)^n$

Probability

Where $P(A)$ is the probability of outcome A and $P(B)$ is the probability of outcome B:

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

Higher Tier Formulae Sheet

Perimeter, Area and Volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

Area of a trapezium $= \frac{1}{2}(a+b)h$

Volume of a prism = area of cross section × length

Where r is the radius and d is the diameter:

Circumference of a circle $= 2\pi r = \pi d$

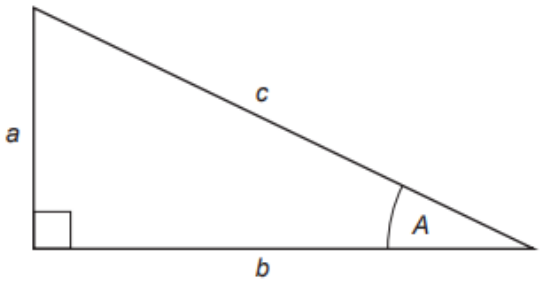
Area of a circle $= \pi r^2$

The Quadratic Formula

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Pythagoras' Theorem and Trigonometry



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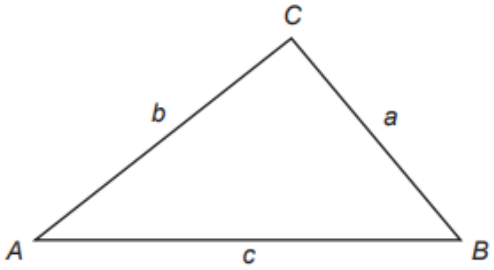
$$\sin A = \frac{a}{c} \qquad \cos A = \frac{b}{c} \qquad \tan A = \frac{a}{b}$$



In any triangle ABC where a, b and c are the length of the sides:

sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

cosine rule: $a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle $= \frac{1}{2}ab\sin C$

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is the number of times that the interest is compounded:

Total accrued $= P\left(1 + \frac{r}{100}\right)^n$

Probability

Where $P(A)$ is the probability of outcome A and $P(B)$ is the probability of outcome B:

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$P(A \text{ and } B) = P(A \text{ given } B)P(B)$

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Taken from OCR website Nov2021

Advance information

To make exams in 2022 less daunting students will be told in advance some of the content that will or won't be on the exam papers, helping them to manage their exam preparation. This information will be issued in the spring term to help students to focus their revision time.

However, the DfE have confirmed that if the impact of the pandemic worsens, it could be issued earlier in the academic year. We will update you on the timing of the advance information release once this has been confirmed.

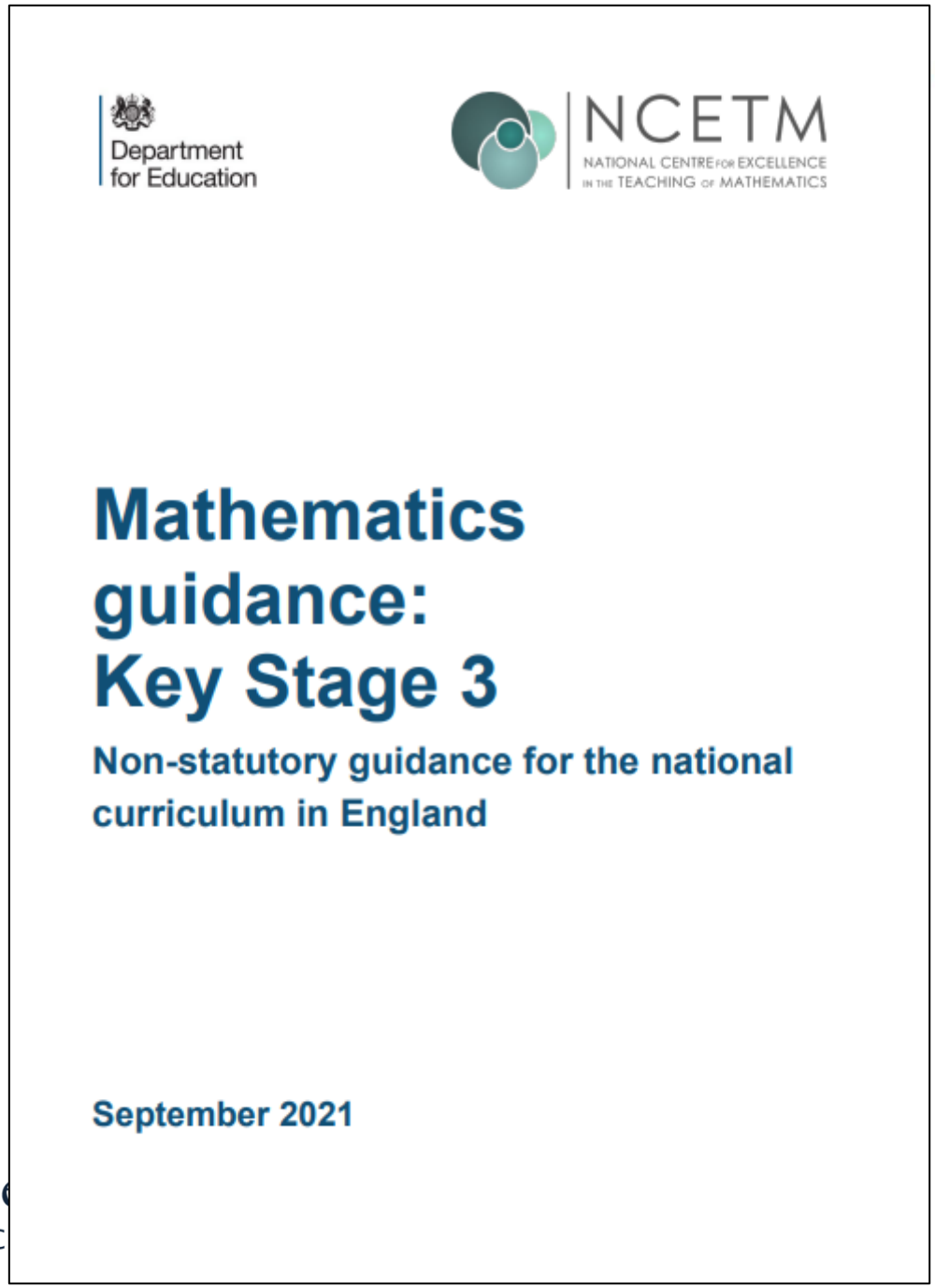
Date is still 7th Feb 2022

These changes will apply to exams in 2022.
It is the intention that exams will go ahead as normal in 2023

Advance information will also be provided for the November 2022 series of exams in GCSE English language and mathematics. This will be different advance information to the summer series, and will be released in July 2022, unless further disruption justifies earlier release. For the GCSE mathematics exams in November 2022 the same formulae sheets will be provided as for summer series exams.

Revision and final curriculum provision for Year 11

What are your plans ?



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Aims

This publication aims to:

- Bring greater coherence to the national curriculum for mathematics by exemplifying the statutory guidance for Key Stage 3 (DfE, 2013) and giving schools, mathematics departments and teachers further guidance on how learning in mathematics develops across Key Stage 3.
- Highlight the most important knowledge and understanding developed during Key Stage 3, the connections between different mathematical topics, and how they link back to Key Stage 2 and forward to Key Stage 4.

- A sample model curriculum framework
- Fundamental concepts are highlighted
- Building on KS2 curriculum
- Developing fluency, efficiency and flexibility
- Reasoning and problem-solving

Sample curriculum framework using NCETM materials

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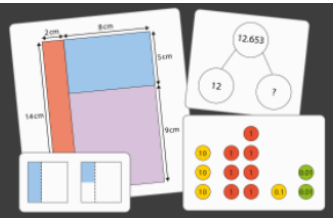
SECONDARY MASTERY PROFESSIONAL DEVELOPMENT

Materials that will assist you in your professional development and support you in teaching for mastery with confidence

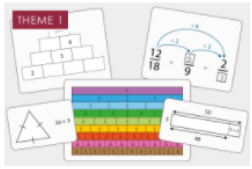


[Secondary Mastery Professional Development | NCETM]

These materials offer a 'fine-grained' description of the key themes and big ideas of the national curriculum by detailing:

- six broad mathematical **themes**
- a number of **core concepts** within each theme
- a set of **'knowledge, skills and understanding' statements** within each core concept
- a collection of focused **key ideas** within each statement of knowledge, skills and understanding.

MATERIALS AND GUIDANCE

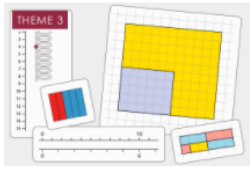


The structure of the number system

Theme 1 comprises four interconnected core concepts, each of which covers a set of 'knowledge, skills and understanding' statements.

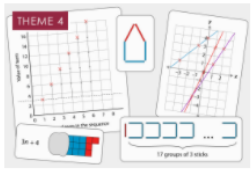
Operating on number

Theme 2 comprises two interconnected core concepts, each of which covers a set of 'knowledge, skills and understanding' statements.



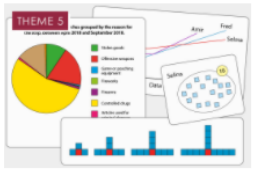
Multiplicative reasoning

Theme 3 comprises two interconnected core concepts, each of which covers a set of 'knowledge, skills and understanding' statements.



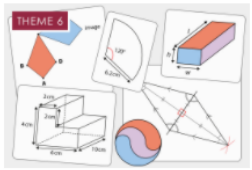
Sequences and graphs

Theme 4 comprises two interconnected core concepts, each of which covers a set of 'knowledge,



Statistics and probability

Theme 5 comprises three interconnected core concepts, each of which covers a set of 'knowledge,



Geometry

Theme 6 comprises four interconnected core concepts, each of which covers a set of 'knowledge,

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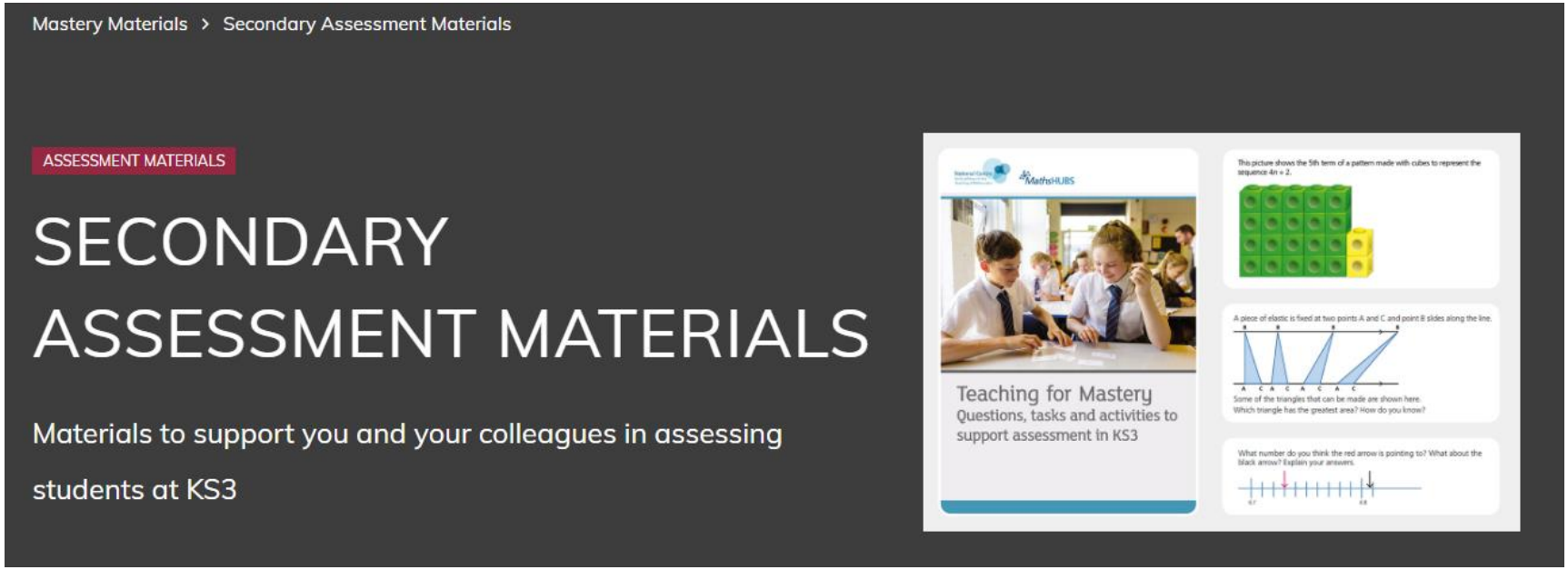

[Secondary Assessment Materials | NCETM]

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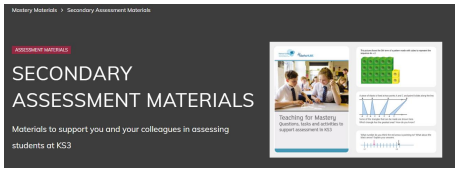

Number

What is the scaffolded version of this task?

Which task goes before this?

Write down a number over 100 that is a multiple of 7.
…and that contains a 4
…and that doesn't contain a 1
Explain your method.

Which task goes next ?

What is the greater depth version of this task?

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Write down a number over 100 that is a multiple of 7.
…and that contains a 4
…and that doesn't contain a 1
Explain your method.

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What are the possible strategies ?

Counting on from a known multiple:70,77,84,91, 98, 105

Counting on from a known multiple:105, 210, 315, 420

Using a known multiple and scaling e.g. 70 x 10 = 700

Using the distributive law
e.g. 7 x 7 = 49
So 49 x 10 = 7 x (7x10) and therefore 490 is a multiple of 7

Other strategies / required knowledge / next steps ?

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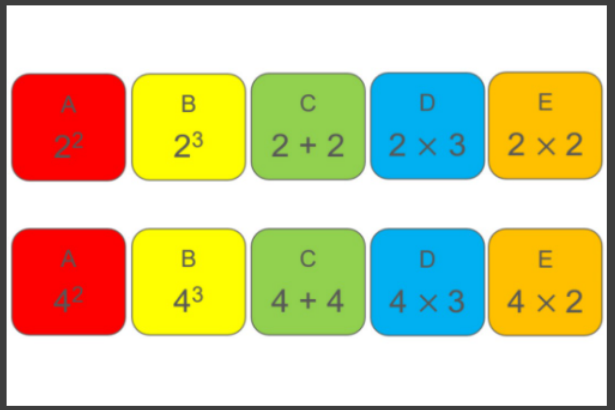
NEW DIAGNOSTIC CLASSROOM RESOURCES TO FIND OUT WHAT YOUR YEAR 7S CAN DO



Addressing two years of disrupted schooling, Checkpoints activities will help you to formatively assess understanding of key topics

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Year 7: Checkpoint

- 10 minute formative assessment task with
- ideas for follow up tasks to address gaps in knowledge and understanding

Checkpoint 2: All the 3s

Write these numbers in digits:

a) three hundred and thirty thousand and thirty-three
b) thirty thousand three hundred and thirty-three
c) three hundred thousand and thirty-three
d) thirty three thousand and thirty-three
e) three hundred and thirty thousand, three hundred and thirty-three
f) thirty three thousand three hundred and thirty-three
g) three hundred and thirty three thousand three hundred and thirty-three
h) three million and thirty-three

? Write your set of numbers in ascending order. Can you think of any other numbers that use only the digits 3 and 0? Where would they fit in your set?

NCETM

Support the ‘checkpoint’ for Y7 by an awareness of

- prior learning from primary
- future learning in secondary

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Understand place value in integers

Previous learning	In Key Stage 3 students need to
Key Stage 2 curriculum: • Year 4: numbers greater than 1 000 • Year 5: numbers up to 1 000 000. Further information about how students may have experienced this key idea in Key Stages 1 and 2: • Primary Mastery Professional Development, Spine 1 Number, Addition and Subtraction • Teaching mathematics in primary schools, 6NPV–2 Place value in numbers up to 10 000 000 (pp 286–88)*; 6NPV–3 Numbers up to 10 million in the linear number system (pages 289–93)* * Page numbers reference the complete Years 1–6 document.	• Be able to say any number and understand where it fits in the number system, i.e. an ordered list of numbers and on a number line. • Know the general structure of the place-value system is based on powers of ten and begin to see how this naturally extends to decimals. • Progress beyond recalling place-value column headings when answering questions, such as, 'What does the 8 represent in 43 872?', appreciating that 43 872 has 438 hundreds and, later, that 43 872 is, in fact, 438.72 hundreds or 438.72 × 100. • Have a deep understanding of place value to understand two further ideas developed in Key Stage 3 which require rounding to a number of decimal places or significant figures and interpreting and writing numbers in standard form.

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Checkpoint 2: Guidance

Adaptations	Assessing understanding
Support If students find it challenging to unpick so many similar numbers at once, provide place-value grids, or only show one or two parts at a time. For more practice, repeat this task with a different digit, or with two digits. You may wish to start with a number where the language doesn't change in the 10s column, such as eight (*eighty*). **Challenge** Students who are more confident may start to think more logically about the different 5-, 6- and 7-digit numbers that can be generated with just 3 and 0, and which are missing from the set given. **Representations** Use a place-value grid with counters or a Gattegno chart alongside this activity. Guidance on using representations can be found here: Using mathematical representations at KS3 | NCETM.	Students are often very familiar with numbers up to 4 digits but may struggle to place the digits in numbers larger than this. A common misconception is that 'one million' has 5 zeros. Assess understanding the repeating pattern of ones, tens and hundreds. A place-value chart could be used. Focus on what is the same and what is different about two similar numbers to draw attention to the language that denotes place value – for example, parts c) and h).
Additional resources • On p9 of the Year 5 Primary Assessment Materials | NCETM there is an activity exploring place value around 1 million. • Further questions exploring numbers over 1 million can be found on p5 of the Secondary Assessment Materials | NCETM.	

Next Meeting : MS Teams
Wednesday 2nd February 2022 : 1315 start

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2 hour meeting

Focus on task design for a mixed attainment (or broad attainment) class, thinking about cognition and metacognition, variation, access and success for all.

Please come to the meeting ready to share tasks that have worked well

Tasks can be:
extended investigations
a sequence of connected shorter problems
recall and retrieval tasks
or……?

These can be emailed to me in advance if you prefer jo.lees@hants.gov.uk

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Next Meeting
MS Teams
1315 start
Wednesday 2nd February 2022
Look forward to seeing you all there

Please let me know if there is anything you would like to address at that meeting and I will add it to the agenda.

(email me at jo.lees@hants.gov.uk)

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