

Red House Academy: Medium Term Scheme of Work

Subject: **Maths Year 7 Foundation Autumn 1**

Year: 7	Weeks 1+2.	Unit: 1/8	Grade/Level Range: 1-5
Title: Autumn 1		Duration: 10 lessons	
Outline of unit:			
Basic number skills, inequality terminology and algebraic manipulation, Order of operations, angle calculations, probability terminology			
Relevant Prior Knowledge		Knowledge of algebra basics and mental and written calculation methods.	
Range and Content [concepts, knowledge, skills]			
Key Words Inequality Positive Negative Integer Expand Multiply Out Factorise			
Key Processes [Pupils should be able to]			
Order positive and negative integers, calculate confidently with positive and negative integers and decimals. Calculate missing angles, problem solve in context.			
Diversity [differentiation]			
All Can use the basic skills Most Can factorise using letter and number factors Some Can apply the skills to contextual problems			

Learning Outcome and Resources	Lesson Activities	Evaluation
<p>Lesson 1 – Order positive and negative integers</p>	<p>Starter: Relevance: Which is warmer? Give a series of temperatures of places in the world and students decide which is warmer.</p> <p>ALL: Order a list of positive and negative temperatures, including different negative values. !! – emphasise -8 is smaller than -3 not the other way round.</p> <p>Students to design number lines to help in their work.</p> <p>Students to set each other ordering problems using their own number sets.</p> <p>AFL What are the key things to be careful of when ordering? What mistakes are easy to make?</p> <p>SOME: Create own ordering lists using +ve and –ve, integers. Can you create a worded problem to test this skill?</p> <p>Self Assessment Plenary</p>	
<p>Lesson 2 – Ordering decimals</p>	<p>Starter: Times table Q+A.</p> <p>Relevance: shopping, business, day to day life. The maths you are most likely to use when you leave school.</p> <p>ALL Students identify main misconception that can result in mistakes when ordering. Students create a set of number cards, including positive and negative values, including decimals. Team challenge amongst tables to order numbers in quickest time.</p> <p>SOME: Extend to including fractions. How can you tell when a fraction is bigger than the other? Introduce inequality symbols for the most able to create statements.</p> <p>Plenary – Peer assessment. What skills does your partner need to practice further and why?</p>	
<p>Lesson 3 – Written methods of calculation (addition and subtraction)</p>	<p>Starter: Times tables Q+A Including division questions</p> <p>All: Pre assess by giving a series of addition and subtraction questions. Students to then explain what techniques they used.</p> <p>Establish the formal methods. Differentiate by giving more able larger (or smaller including decimals) values to calculate with.</p>	

	<p>SOME – Apply to worded problems and use in context.</p> <p>Plenary: Check your work from today and your identified area from last lesson. Can you attempt one question to practice/improve this skill?</p>	
<p>Lesson 4 – Written methods of calculation (multiplication and division)</p>	<p>Starter Ordering positive and negative values – recap task. Relevance: Ability to calculate with decimals essential in many, many careers. ALL: Students to attempt multiplication questions using whichever methods they are aware of. Formalise it using the grid method (relates to algebra later on) Demonstrate long division methods. Students to then practice questions using this technique. SOME: Apply to worded questions. Plenary: Student led summary on board. RAG</p>	
<p>Lesson 5 – Introduction to algebra</p>	<p>Starter: 1 litre of paint covers $5m^2$. How much will..... Cover? Relevance: Video games – algebra is used in programming and game design. How does the PS4 decide if your long range effort on FIFA is in the top corner or in the stands? All sorts of careers use formulas for something or another from building to medicine to fashion design. ALL: Explain that algebra is used to create rules where we don't know the actual numbers.... But we do know what we would do with them. Turn worded phrases into algebraic expressions, emphasising that when we don't know the number, we use a letter. P101 Ex 7C RESOURCE: http://www.math-worksheet.org/verbal-expressions Sheets 2 and 3 (3 most like the above) The first sheet deals with describing only number calculations which may be of use to the least able. Some: Go on to using 2 step expressions – eg I think of a number. I multiply it by 5 then add 2 ($5n + 2$) Plenary: What is $a+a$? $a+a+a$? RAG</p>	
<p>Lesson 6 – Simplifying expressions by collecting like terms</p>	<p>Starter – match algebraic expressions with a series of worded descriptions. ALL: Explain how we can add and subtract letters the same way we do numbers. The only rule is they have to be the same or same combination of letters in order to simplify them. Set differentiated questions.</p>	

	<p>Resource: https://www.tes.com/teaching-resource/simplifying-expressions-6277952</p> <p>SOME: Expand to include more variety of letters and integers. Consider including terms with powers for the most able.</p> <p>Plenary: Describe in your own words the key things to remember when simplifying expressions.</p>	
Lesson 7 – multiplying terms	<p>Starter – Recap questions with simplifying expressions How could we find the correct bracket from the expanded version? ALL: What is axa? axaxa? $3c \times 5c$?</p> <p>SOME: Use higher powers or multiple letters. Students to write their own ‘tips’ as to how to handle the difference between the addition and multiplication of terms</p> <p>Resource: https://www.tes.com/teaching-resource/simplifying-expressions-6277952</p> <p>Plenary: Self assess any further practice needed and next steps. Justify your RAG rating to a partner.</p>	
Lesson 8 – Expanding single brackets	<p>Starter – 2 digit x 1 digit number multiplication questions</p> <p>All – Link numerical multiplication to expanding a single bracket – ie both terms inside the bracket are multiplied by the value outside. Differentiated questions. Use match activities to support less able.</p> <p>Some – Use questions with 2 separate brackets that are then added together for the most able.</p> <p>Resource: https://www.tes.com/teaching-resource/expanding-single-brackets-6192729 https://www.tes.com/teaching-resource/expanding-brackets-worksheet-6096487</p> <p>Stick to just numbers outside the brackets but can extend to include negative values.</p> <p>Plenary: RAG.</p>	
Lesson 9 – Powers and roots	<p>Starter – list square numbers up to 15^2</p>	

	<p>All – Emphasise the opposite of squaring are square roots. After answering square and root questions, pupils go on to use cube numbers and solve problems with cube roots</p> <p>Resources: http://www.powershow.com/view/14ec79-NzVmM/Squares_and_Square_Roots_powerpoint_ppt_presentation</p> <p>https://www.tes.com/teaching-resource/powers-and-roots-levels-4-6-lesson-6290712</p> <p>Some – Estimate square roots by working out which square number the value is closest to.</p> <p>Extension to include students calculating square decimal numbers 0.1, 0.2, 0.3 etc</p> <p>Plenary: RAG. Self assess any further needs. Additional homework: learn square numbers up to 15^2</p>	
Lesson 10 – BIDMAS	<p>Starter – $5 + 3 \times 2$. What is the answer? What else do you think it could be?</p> <p>All – The order we calculate in is important. We need to all do it the same way to avoid any confusion between different mathematicians!</p> <p>Explain how brackets are used to do any addition or subtraction FIRST. Questions.</p> <p>https://www.tes.com/teaching-resource/bidmas-powerpoint-presentation-6129258</p> <p>https://www.tes.com/teaching-resource/bidmas-worksheet-6339058</p> <p>Some – Design a BIDMAS poster explaining what each term means and giving a worked example at each line</p> <p>Plenary: How can you make $5 + 3 \times 2 = 16$???</p>	
Lesson 11 – More BIDMAS or NRICH investigation	<p>Provide students with further BIDMAS practice if necessary or allow students to undertake a mathematical investigation.</p>	
Lesson 12 – NRICH investigation		
Lesson 13 – Angle properties: points and straight lines	<p>Starter – Angle vocab – what words do you know that are to do with angles?</p> <p>Relevance – Engineering, design, opticians</p>	

	<p>All: Question students and use them to demonstrate the three types of angle: Acute, Obtuse and Reflex. Students to ensure they can recognise each type and can ESTIMATE sizes of angles accordingly. Questions around calculating missing parts of right angles and angles on straight lines. https://www.tes.com/teaching-resource/angles-on-a-straight-line-worksheet-6317911</p> <p>Some: Can use these properties to form and solve equations.</p> <p>Plenary: What additional information do you now know concerning angles? RAG</p>	
<p>Lesson 14 – Angles in triangles Property, obtuse, acute, reflex, scalene, isosceles, equilateral</p>	<p>Starter: Types of triangles. Name them. Can you describe the properties of each? What do the angles in a triangle add up to?</p> <p>All: Students able to calculate missing third angles in triangles.</p> <p>Some: Most able to calculate missing angles in isosceles triangles and to combine exterior angles in triangles too. http://www.mathworksheets4kids.com/triangles.php</p> <p>Extension: A triangle ABC has angle A = 128 degrees. How big are angles B and C? Is there more than one answer? How do you know?</p> <p>Plenary: RAG</p>	
<p>Lesson 15 – Angles round points</p>	<p>Starter: Angle on a straight line. 1 angle labelled. Pupils to work out the missing angle.</p> <p>All: Students recognise angles round a point add up to 360 degrees. Key terminology: Vertically opposite angles are equal. Questions testing these skills. https://www.tes.com/teaching-resource/angles-round-a-point-worksheet-6317913</p> <p>Some: Most able to design a question combining the different able elements.</p> <p>Plenary: Peer assessment – identify RAG for your partner and advise them what their next steps should be.</p>	
<p>Lesson 16 – Angles in quadrilaterals</p>	<p>Starter: List the skills you have developed and need from this topic.</p> <p>All: Demonstrate how any quadrilateral can be split into two triangles. Use this to prove the angle sum is 360 degrees.</p> <p>Use this fact and prior properties to problem solve.</p>	

	<p>http://www.mathworksheets4kids.com/quadrilateral.php</p> <p>Some: Most able to solve problems where the diagram is given as a description</p> <p>Plenary: What key skills do you still need to practice? What is the most important skill you have acquired this week?</p>	
<p>Lesson 17 – Theoretical probability</p>	<p>Starter: Which is more likely? Give students a series of events and ask them to order them according to likelihood</p> <p>Relevance: Used in weather, business, sport/games etc</p> <p>All: Introduce the probability scale. Both in terms of worded terminology and then link it to the numerical scale from 0 to 1. Students to come up with their own events and assign them a “worded” probability and an estimated value (really to demonstrate whether it is between 0 and 0.5 or 0.5 and 1).</p> <p>http://www.primaryresources.co.uk/maths/powerpoint/Language_of_Probability.ppt https://www.tes.com/teaching-resource/the-probability-line-6109870</p> <p>Extension: I’ve rolled a dice and got 3 6s in row. Does this make the dice biased? Does it make it more or less likely that I will get a 4th 6?</p> <p>Plenary: Think of an event that has a probability of 0. What about a probability of 1?</p>	
<p>Lesson 18 – Calculating theoretical probabilities and understanding probabilities add up to 1.</p>	<p>Starter: Fraction and decimal equivalence questions</p> <p>All: What is the probability of rolling a 6 on an ordinary dice? What is the probability of me selecting a boy and random from this class? Students to find the probabilities of a series of theoretical events, giving their answers as fractions each time. Go on to work out the probability of the events not happening.</p> <p>Some: Order the events in order of likelihood. What probability would something need to have in order to make it a ‘safe bet?’ Is there even such a thing?</p> <p>http://www.powershow.com/view/1332a5-ZWUwZ/Theoretical_Probability_powerpoint_ppt_presentation</p> <p>https://www.worksheetworks.com/math/probability/theoretical.html</p> <p>Plenary: Sunderland have won 3 out of their last 10 matches. Does that mean the probability of winning their next match is 3/10? Why?</p>	

<p>Lesson 19 – 2 way tables for combined events</p>	<p>Starter: Horse racing. Students choose a number from 1 to 12. 2 dice are rolled and scores added. First number to come up 5 times wins</p> <p>Two way tables are used to find probabilities of combined events. Students to complete a table showing all the outcomes when 2 dice are rolled and their scores added together. Students to then use the table to solve a series of probability questions.</p> <p>Use the at the races part with the table</p> <p>Extension: What if the scores are multiplied? Or you find the difference between the scores? Or use a 6 and a 4 sided dice? Expand the problem and use the new tables to calculate probability.</p> <p>Plenary: RAG self assessment</p>	
<p>Lesson 20 – Experimental probability</p>	<p>Starter: Probability bingo – 2 dice rolled and added together. Students complete a 3x3 grid with numbers from 2 to 12 to use</p> <p>Main: what is the probability the next car to go past will be red? DO we know? How could we estimate it? Key term: Relative frequency.</p> <p>Students to play rock paper scissors and record how many wins, draws and losses they have. They then use this to work out their relative frequency for each.</p> <p>Extension: Students to come up with a survey question to ask the class and use this to gather data and to then make a series of probability estimate statements using the relative frequencies.</p> <p>Plenary: Is rock paper scissors a game of skill or chance? Do your results support your opinion?</p>	
<p>WEEK 6 – Revision and Test</p>		

<p>WEEK 7 – Test feedback and problem solving</p>	<p>Test feedback – Students to go through with green pens and correct their tests and identify strengths and weaknesses. Students to complete similar questions to their identified weaknesses to demonstrate progress.</p> <p>Work with Chapter 1 in problem solving book. Differentiated according to star difficulty. Nrich resources also available to relate to the topics covered</p>	

Functional skills

Literacy	<p>Speaking and Listening: Variety of opportunities for discussion built into each lesson – see Power Points for examples (oracy development)</p>
	<p>Reading: Each lesson to involve reading – Two versions of the textbook to be available for GCSE course for different ability pupils. For pupils with low literacy levels, use the information from the revision guides to complete tasks.</p>
	<p>Writing: Problem solving and an emphasis on clarity of reasoning throughout</p>

Numeracy	Academy numeracy strategy adhered to in the 14 lessons.
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ICT	Use of ICT in most lessons Powerpoint and access to relevant clips online
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How this unit embeds SMSC and helps to promote British Values

British Values and SMSC are promoted by encouraging students to be tolerant and respectful of each others’ opinions and working with different students. An environment of active participation and one where it is ok to take risks and make mistakes is fostered.