Subject: MATHS	White Rose Maths Year 6	**OUR TOPIC: Algebraic Reasoning**
Class: T6 **DB HH**	**Teacher: Jacqui Shepherd**	**Term:** Weeks 1-5 Autumn Term 1
Key Vocabulary: Integer Expression Function machine Algebra Formulae	**Alternative Learning Environments**	**Resources: Pencils, Rulers, Rubbers, White Rose scheme resources, white board, base 10 cheese, cubes** **Pupil specific activities at the beginning of each lesson on board including lesson descriptor rules and/or formula**

Learning Intentions.

Current Unit –	Prior Learning –	Future Learning –
Year 6 - Spring Block 6 – Algebra	**Percentages** **Fractions** **Decimals** **Addition** **Subtraction** **BIDMAS**	SOLVING AND BALANCING EQUATIONS SUBSTITUTION IN FORMULAE
Geometry: Position and direction : The first quadrant Four quadrents Translations Reflections	**Names of 2 d and 3d shape** **Types of triangle** **Co-ordinates** **First quadrant on a graph**	**Positive and negative** **Bearings**
Recap – BIDMAS		

Pupil Asset Milestones to be achieved:

Stage: 6

Find a rule – one and two step function
Machines

Find a rule – two step
Problem solving numerical inputs

Forming Expressions one and two step function machines – simple algebraic inputs
Conventions when writing algebraic expressions

Substitution – substittute simple expression to find particular value link concept of function machine.

Formulae – substitute into familiar formulae e.g Area, volume.

Reasoning and problem solving with formulae

Forming equations – know difference between expression and an equation

Reasoning and problem solving with Equations

One-step equations – solve simple equations involving 4 operation

One-step equations – problem solving

Two-step equations – balance and solve

Two-step equations – reasoning and problem solving
Finding pairs of values – use of substitution (focus integer values)

Finding pairs of values – Reasoning and problem solving 1and 2

Geometry: Position and direction : The first quadrent
Four quadrents
Translations
Reflections

LINK TO PUPIL ASSET OBJECTIVES FOR LEVELS

Week	Session 1	Session 2	Session 3	Session 4
1				**Lesson Objective** **Introduction to expectations and terms work.** **Vocabulary for maths – algebra**

				Activities
2	**Lesson Objective:** Recap. Develop independent working skills, thought, problem solving. Alongside developing mental maths skills and rehearsing number bonds YR6 - SP BLOCK 3 Find a rule – one step Reasoning and problem solving **Activities:** 20 questions on board relating to topic differentiated for all students Students completing activities with a range of concrete materials as required. WS Peer support – working in set groups with staff support.	**Lesson Objective** **Algebra – Function machine** White Rose Maths Stage 6 sP Block 3 Algebra : Find a rule – 2step Encourage children to refer to the order of operations to help them understand why the outputs are different. **Activities** Teaching Slides as resource WS **For all students** RECAP BIDMAS	**Lesson Objective** **Algebra – forming expressions** White Rose Maths Stage 6 spring 6 Algebra Forming Expressions one and two step function machines – simple algebraic inputs Conventions when writing algebraic expressions In this step, children use simple algebraic inputs e.g. y. Using these inputs in a function machine leads them to forming expressions e.g. y + 4. The use of cubes to represent a variable can aid understanding. Children are introduced to conventions that we use when writing algebraic expressions. e.g. y × 4 as $4y$. **Activities** Teaching Slides as resource White Rose worksheets as above	**Lesson Objective** Stage 6 students: Algebraic Formula challenges on board Repeat learning from previous lesson to ensure understanding. Use coloured cubes. **Activities** Additional plenary questions on board regarding algebra function machines. Times tables/ number bonds/ BIDMAS test and recap.
3	**Lesson Objective:** Substitution – substittute simple expression to find particular value link concept of function machine.	**Lesson Objective** Formulae – substitute into familiar formulae e.g Area, volume.	**Lesson Objective** Reasoning and problem solving with formulae White Rose Maths	**Lesson Objective** White Rose Maths

	White Rose Maths Stage 6 sP Block 3 Algebra : Recap confirm understanding of previous weeks topics, develop independent working skills, thought, problem solving. Alongside developing mental maths skills and rehearsing number bonds Children substitute into simple expressions to find a particular value. They have already experienced inputting into a function machine, and teachers can make the links between these two concepts. Children will need to understand that the same expression can have different values depending on what has been substituted. **Activities:** 20 questions on board relating to topic differentiated for all students Students completing activities with a range of concrete materials as required. Peer support – working in set groups with staff support.	White Rose Maths Stage 6 spring 6 **Activities** Teaching Slides as resource Introduce topic Children substitute into familiar formulae such as those for area and volume. They also use simple formulae to work out values of everyday activities such as the cost of a taxi or the amount of medicine to take given a person's age. All students will be given this task assisted where required. Special awareness and perception are qualities that all students are developing and is important as such. Assisted with physical (concrete) and pictorial resources.	Stage 6 spring 6 **Activities** White Rose worksheets as above Students completing activities with a range of concrete materials as required. WS Peer support – working in set groups with staff support.	Stage 6 students: Algebraic Formula challenges on board **Activities** Additional plenary questions on board regarding algebra function machines. Times tables/ number bonds/ BIDMAS test and recap. Weekly plenary questions on board from all levels to give opportunity to improve and develop knowledge and understanding; incorporating extension activities and further real-world applications and examples for all students combining themes

4	**Lesson Objective** Reasoning and problem solving with formulae White Rose Maths Stage 6 spring 6 **Review previous learning on Algebra. Ensure understanding of concepts before moving on** **Activities** White Rose worksheets as above Students completing activities with a range of concrete materials as required. WS Peer support – working in set groups with staff support.	**Lesson Objective:** One-step equations – solve simple equations involving 4 operation White Rose Maths Stage 6 spring 6 Algebra Recap confirm understanding of previous weeks topics, develop independent working skills, thought, problem solving. Alongside developing mental maths skills and rehearsing number bonds Children solve simple one step equations involving the four operations. Children should explore this through the use of concrete materials such as cubes, counters and cups. Pupils learn to solve equations using a balancing method using inverse operations. **Activities:** Students completing activities with a range of concrete materials as required Teaching Slides as resource with additional resources for addition multiplication as required Peer support – working in set groups with staff support.	**Lesson Objective:** One-step equations – solve simple equations involving 4 operation White Rose Maths Stage 6 spring 6 Algebra Recap confirm understanding of previous weeks topics, develop independent working skills, thought, problem solving. Alongside developing mental maths skills and rehearsing number bonds Children solve simple one step equations involving the four operations. Children should explore this through the use of concrete materials such as cubes, counters and cups. Pupils learn to solve equations using a balancing method using inverse operations. **Activities:** Students completing activities with a range of concrete materials as required Teaching Slides as resource with additional resources for addition multiplication as required Peer support – working in set groups with staff support.	**Lesson Objective** Stage 6 students: Algebraic Formula challenges on board **Activities** Additional plenary questions on board regarding algebra function machines., finding pairs of values Times tables/ number bonds/ BIDMAS test and recap. Challenge: exam style questions for TD, BN

5	**Lesson Objective** Two-step equations – reasoning and problem solving Finding pairs of values – use of substitution (focus integer values) White Rose Maths Stage 6 spring 6 Algebra Some pupils progress from solving equations that require one-step to equations that require two steps. Pupils should think of each equation as a balance and solve it through doing the same thing to each side of the equation. This should be introduced using concrete and pictorial methods alongside the abstract notation as shown. Only when secure in their understanding should children try this without the support of bar models or similar representations. **Activities** Teaching Slides as resource Introduce topic With additional resources for addition multiplication as required. Board work Peer support – working in set groups with staff support.	**Lesson Objective** Two-step equations – reasoning and problem solving Finding pairs of values – use of substitution (focus integer values) White Rose Maths Stage 6 spring 6 Algebra **Activities** White Rose worksheets as above Recap and ensure understanding of previous lessons objectives. Teaching Slides as resource Introduce topic With additional resources for addition multiplication as required. Board work Peer support – working in set groups with staff support.	**Lesson Objective** Two-step equations – reasoning and problem solving Finding pairs of values – use of substitution (focus integer values) White Rose Maths Stage 6 spring 6 Algebra Exam style questions students to explain why and how they found the answers Peer teaching **Activities** White Rose worksheets as above Recap and ensure understanding of previous lessons objectives. Teaching Slides as resource Introduce topic With additional resources for addition multiplication as required. Board work Peer support – working in set groups with staff support.	**Lesson Objective** White Rose Maths Stage 6 students: Algebraic Formula challenges on board **Activities** Additional plenary questions on board regarding algebra function machines. Times tables/ number bonds/ BIDMAS test and recap. Weekly plenary questions on board from all levels to give opportunity to improve and develop knowledge and understanding; incorporating extension activities and further real-world applications and examples for all students combining themes

6	**Lesson Objective** Finding pairs of values – Reasoning and problem solving 1and 2 Recap confirm understanding of previous weeks topics, develop independent working skills, thought, problem solving. Alongside developing mental maths skills and rehearsing number bonds White Rose Maths Stage 6 spring 6 Algebra	**Lesson Objective** Finding pairs of values – Reasoning and problem solving 1and 2 **Children use their understanding of substitution to consider what possible values a pair of variables can take.** **focus on integer values, but other** **solutions could be a point for discussion.** **Pupils can find values by trial and improvement, but should be**	**Lesson Objective:** Finding pairs of values – Reasoning and problem solving 1and 2 **Activities:** Pupils confirm understanding of previous weeks topics, develop independent working skills, thought, problem solving. Alongside developing mental maths skills and rehearsing number bonds Teaching Slides as resource	**Lesson objective:** applying algebra in real world situations. **Activities:** Some: Problem solving and independent working. Students completing activities with a range of concrete materials as required

	Children use their understanding of substitution to consider what possible values a pair of variables can take. **focus on integer values, but other** **solutions could be a point for discussion.** **Pupils can find values by trial and improvement, but should be encouraged to work systematically.** **Activities** With additional resources for addition multiplication as required. Board work Peer support – working in set groups with staff support.	**encouraged to work systematically.** **Activities** With additional resources for addition multiplication as required. Board work Peer support – working in set groups with staff support. Pupils to complete treasure map/ domino line of algebraic questions	Introduce topic With additional resources for addition multiplication as required. Board work Peer support – working in set groups with staff support. Students completing activities with a range of concrete materials as required Peer support – working in set groups with staff support.	Peer support – working in set groups with staff support. End of topic test
7	**Lesson Objective** Review of Shape Identify names of 2 d shapes **Activities** Students to id 2d shapes Id key features of triangles and names for different triangles Review terms : length, width, base, height. All: id 2d shapes, basic area and perimeter Some: review working out area of triangles	**Lesson Objective** To recognise and understand term First Quadrent Activities Starter: Name that shape Recap work from prev year – reading and plotting co-ordinates. Use of worksheets – reading and mapping co-ordinates (under the sea co-ordinate sheet)	**Lesson Objective:** First Quadrent Reasoning and problem solving **Activities:** **Starter: review terminology Name of shapes,** **Order of plotting** **Complete plotting of co-ordinates** **Worksheets to be completed.** Teaching Slides as resource Introduce topic	**Lesson objective:** Times tables and shapes test **Activities:** Some: Problem solving and independent working. Students completing activities with a range of concrete materials as required

	Few: to work out area of triangle With additional resources for addition multiplication as required. Board work Peer support – working in set groups with staff support. Calculators (only use so students focus on formulae)	Ploting co-ordinates. Draw 2d shape on grid from given co-ordinates. Which axis do we look at first? Draw co-ordinates in first quadrent and use ruler to join – describe shape to partner. With additional resources for addition multiplication as required. Board work Peer support – working in set groups with staff support.	With additional resources as required. Board work Peer support – working in set groups with staff support. Students completing activities with a range of concrete materials as required Peer support – working in set groups with staff support.	Peer support – working in set groups with staff support.
8	**Lesson Objective:** Four Quadrent Reasoning and problem solving **Activities:** **Starter: review terminology** **Name of shapes,** **Order of plotting** **Negative** **Complete plotting of co-ordinates with negatives** **Worksheets to be completed.** Teaching Slides as resource Introduce topic With additional resources as required.	**Lesson Objective:** Four Quadrent: Translations Reasoning and problem solving **Activities:** **Starter: review terminology** **Order of plotting** **Negative** **Complete plotting of co-ordinates with negatives** **Worksheets to be completed.** Teaching Slides as resource Introduce topic	**Lesson Objective:** Four Quadrent: Reflections Reasoning and problem solving **Activities:** **Starter: review terminology** **Order of plotting** **Negative** **Complete plotting of co-ordinates with negatives** **Worksheets to be completed.** **Where does the mirror line go? Which axis? How does reflecting differ from translation?**	**Lesson objective:** Completion of end of topic test. **Activities:** Some: Problem solving and independent working. Students completing activities with a range of concrete materials as required Peer support – working in set groups with staff support.

	Board work Peer support – working in set groups with staff support. Students completing activities with a range of concrete materials as required Peer support – working in set groups with staff support.	With additional resources as required. Board work Peer support – working in set groups with staff support. Students completing activities with a range of concrete materials as required Peer support – working in set groups with staff support.	Teaching Slides as resource Introduce topic With additional resources as required. Board work Peer support – working in set groups with staff support. Students completing activities with a range of concrete materials as required Peer support – working in set groups with staff support.	End of topic test
Evaluation				