Greenfields Academy (Secondary) - Long Term Planning – MATHS

Academic Year Overview 2020/21 – YEAR 10

Term	Autumn		Spring		Summer	
	1	2	3	4	5	6
TRANSITION FROM Year 9	**Similarity** • Congruence, similarity and enlargement • Trigonometry	**Developing Algebra** • Equations and inequalities • Representing solutions • Simultaneous Equations	**Geometry** • Angles & bearings • Working with circles • Vectors	**Proportions and Proportional Change** • Ratios & Fractions • Percentages and Interest • Probability	**Delving into Data** • Collecting, representing and interpreting data	**Using Number** • Non-calculator methods • Types of number and sequences • Indices and roots

Topic Medium Term Plan Links:

Similarity

1. Congruence, similarity and enlargement
2. Trigonometry

Developing Algebra

3. Equations and inequalities
4. Representing solutions
5. Simultaneous Equations

Geometry

6. Angles & bearings
7. Working with circles
8. Vectors

Proportions and Proportional Change

9. Ratios & Fractions
10. Percentages and Interest
11. Probability

Delving into Data

12. Collecting, representing and interpreting data

Using Number

13. Non-calculator methods
14. Types of number and sequences
15. Indices and roots

Term 1

Weekly Sequence	New Learning & Knowledge **Similarity**	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1	• Revisit angle rules, including angles in parallel lines • Understand the difference between congruence and similarity • Enlarge a shape about a given point • Understand and use similarity • Find missing sides in similar shapes including pairs of similar triangles • Understand and use the conditions for a pair of congruent triangles	• What are the size of the angles in each shape? • Do they stay the same or change then the shape is enlarged? Is this true for all shapes? • What is the ratio of sides? • Does this change depending on which lengths you are comparing? • Does enlargement always make a shape bigger? • Which scale factors make the shape larger / smaller / stay the same? • Do fractional scale factors always make the shape smaller? • What happens to the shape using a scale factor of -1? • How would the shape change if the shape was enlarged by a negative fractional scale factor eg-1/2 • Can you predict the position of each shape before drawing it? How could how find the centre of enlargement from a diagram? • How can you confirm that two shapes are similar? • How can you use ratio to show that two shapes are / are not mathematically similar? • What do you notice about the angles of similar shapes? • Which angles / lengths correspond to each other? How do you know?	
2			
3			Computing Week

		• How does the order of the letters of the shape, eg.ABC and FGH help you decde which lengths / angles match up (correspond)? • Where are the parallel lines in the diagram? • Which angles would be corresponding / alternate / co-interior? • What other angle rules do you know? • Why do you only need two pairs of equal angles to show that two triangles are similar? • What's the same and what's different about the pairs of triangels? • Which diagrams include pairs of parallel lines? How fo we show they are parallel? • If you know two shapes are congruent, what else do you know about the shapes? • If you know two shapes are similar, what else do you know about the shapes? • What is the ratio of corresponding lengths in a congruent shape? • What is the miniumum information needed for triangles to be congruent? • Does it matter which two angles and sides are given for the angle-side-angle condition to be true?	
4	• Revisit angle rules, including angles in parallel lines • Revisit equations, especially variants of $ax = b$ • Revisit Pythagoras' theorem • Understand trigonometric ratios • Work out missing lengths and angles in right-angled triangles • Know and use the exact values of key angles	• When the side-lengths are in the same ratio, what fo you notice about the position of these two-side lengthsin each triangle? What do you notice about the given angle? • Will the ratio reman constant if the given angle gets bigger / smaller? Why / Why not? • Why can the same side on a right angled triangle be labelled the "opposite" on some occasions, and the adjacent on others? • Where can you see a right angled triangle in this shape? [examples of different shapes such	
5			
6			

		as isosceles triangle, hexagon, trapezium, parallelogram etc) • What does the “tangent of an angle” mean? • How deos it relate to similar triangles and scale factors? • Why do we need to use division when the missing side is the adjacent side? • How do we know which trigonometric ratio to use? • Why do we always label the hypotenuse first? • Why does sine 30^o = cosine 60^o? • Can you find the other pairs of angles where sine x = cosine y? What do you notice about these pairs of angles? • How do we know which trigometric ratio to use? • Is there more then one method of finding a missing side length? Explain your thinking? • What is an inverse trigometric function? • What is the notation for an inverse trigometric function? • What is the difference between sin x and $\sin^{-1}x$? • Why do we need to use an inverse trigometric function to find a missing angle? • How can we use side lengths to explore whether a triangle is right angled? • What other topics could Pythagoras’ theorem link to? • Which calculation to solve this problem is most efficient? • In this problem is it more efficient to use Pythagoras’ Theorem or Trigonometry? Which has least steps? • What do we mean by “leave your answer as an exact value?	

		• What is a surd? • How do we simplify a fraction? • When angle x decreases in size, what happens to the length of the opposite side? • Why can't we say that a number divided by infinity is 0?	
7	• Consolidation and Assessment		

Term 2

Weekly Sequence	New Learning & Knowledge **Developing Algebra**	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (8)	• Context for equations to include probability, area, angles, ratio problems, etc… • Form and solve equations and inequalities in a variety of contexts, including with unknowns on both sides • Represent solutions to inequalities on a number line • Represent solutions to equations graphically		
2 (9)			
3 (10)			Computing Week
4 (11)	• Understand the meaning of solution, appreciating that some equations have multiple solutions • Form and solve a pair of linear simultaneous equations graphically • Form and solve a pair of linear simultaneous equations algebraically		
5 (12)			
6 (13)			
7 (14)	• Consolidation and assessment		

Term 3

Weekly Sequence	New Learning & Knowledge **Geometry**	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (15)	• Revisit trigonometry • Revisit area and volumes of other shapes, and compound shapes • Estimation, rounding and significant figures • Review KS3 angles rules • Understand and use bearings		
2 (16)			
3 (17)	• Revisit area and volumes of other shapes, and compound shapes • 7Estimation, rounding and significant figures • Review area and circumference • Name parts of a circle and perform related calculations • Find areas and volumes related to circles – cylinder, cone, sphere, etc…		Computing Week
4 (18)			
5 (19)	• Understand vector notation • Vector arithmetic – addition, subtraction and multiplication by a scalar • Vectors and translations		
6 (20)			

Term 4

Weekly Sequence	New Learning & Knowledge **Proportions and Proportional Change**	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (21)	• Revisit formal methods of calculation • Revisit fraction arithmetic • Use ratios, including with mixed units • Fractions in ratios • Fractions from ratios • Combining ratios • Unit pricing ('best buys') • Currency conversions		
2 (22)			
3 (23)	• Revisit formal methods of calculation • Revisit fraction arithmetic • Convert fractions, decimals and percentages • Find percentages and percentage changes • Find one number as a percentage of another • Calculate simple and compound interest • Evaluate exponential change, e.g. depreciation • Find original values		Computing Week
4 (24)			
5 (25)	• Review of single event probability – comparing theoretical and experimental • Understand and work with mutually exclusive and independent events • Construct and interpret tree diagrams • Find probabilities from frequency trees, tables and Venn diagrams		
6 (26)			

Term 5

Weekly Sequence	New Learning & Knowledge **Delving into Data**	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (27)	• Use equations, e.g. solving problems about the mean • Use non-calculator methods when appropriate • Understand sampling, including the possible limitations • Construct and interpret tables and line graphs for time series data • Understand and represent with grouped data • Understand and identify correlation • Use lines of best fit, understanding dangers of extrapolation • Construct and interpret frequency polygons • Evaluate measures of location and dispersion • Use statistical diagrams and measures to compare distributions.		
2 (28)			
3 (29)			Computing Week
4 (30)			
5 (31)			
6 (32)			

Term 6

Weekly Sequence	New Learning & Knowledge **Using Number**	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (33)	• Convert FDP • Revisit trigonometric values • Revisit area and volume (without a calculator) • Find exact answers in terms of π • Solve problems involving financial mathematics • Use four operations with integers (positive and negative), decimals and fractions with and without context (include all areas of previous study) • Work with exact answers, e.g. area and volume • Evaluate calculations involving percentages		
2 (34)			
3 (35)	• Use factors, multiples, primes and prime factorisation • Recognise arithmetic and geometric sequences • Recognise and use other sequences		Computing Week
4 (36)			
5 (37)	• Work out powers and roots • Use the rules of indices • • Calculate with numbers in standard index form		
6 (38)			
7 (39)	• Consolidation and Assessment		