Northumberland's P.R.U.

# KS4 Mathematics Programme of Study (Year 1)

| Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

## Autumn 1 – 'Equality & Diversity'

## Autumn 2 – 'Living in the Wider World'

### Subject Area Topic: Algebra,Algebraic & Properties of shape

### Subject Area Topic : Fraction, probability, Statistical Diagrams & Statistic measures

**Solving Equations involving brackets**

- Simplify and manipulate algebraic expressions
- Solve linear equations
- Derive an equation and , solve the equation, and interpret the solution

**Simplifying harder expressions**

- Simplify and manipulate algebraic expressions

**Using Complex Formulae**

- Recognise and use relationships between operations, including inverse operations
- Understand and use standard mathematical formulae
- Substitute numerical values into formulae
- Translate simple situations or procedures into algebraic expressions or formulae

**Identities**

- concepts and vocabulary of expressions, equations, formulae and identities
- difference between an equation and an identity
- Substitute numerical values into formulae
- Translate simple situations or procedures into algebraic expressions or formulae

**Congruent triangles and proof & Proof using similar and congruent triangles**

- basic congruence criteria for triangles
- Apply angle facts, triangle congruence, and properties of quadrilaterals to conjecture and derive results

**Solving simultaneous equations using elimination, substitution and graphically**

- simultaneous equations in two variables (linear/linear) algebraically
- Find approximate solutions to two simultaneous equations using a graph
- Derive two simultaneous equations, solve the equations and interpret the solution

**To be competent with fractions and apply understanding to worded problems F/H**

- Find equivalent fractions
- Canceling fractions
- Converting between mixed and improper
- Fractions of amounts
- Multiply and divide fractions (including cases where cross canceling is necessary)
- Add and subtract fractions
- Solve worded problems

**To know and use probability scale and find probability of events occurring- F/H**

- Probability scale
- Probability of an event occurring
- Interpret, create and find probabilities from Venn diagrams
- Venn diagram notation
- Statistical independence and mutually exclusive events
- Know the formal notation for conditional probability and find these from Venn diagrams
- Interpret, create and find probabilities from sample space diagrams
- Interpret, create and find probabilities from two way tables

**ASSESSEMENT**

| | | | |
|---|---|---|---|
| **Notes/Links/Interleaving**<br>Use of calculator for more complex calculations.<br>Using linear Graphs for trends and data in Science | **Additional Higher Content;**<br>•<br>• | **Notes/Links/Interleaving**<br>Use of calculator for more complex calculations.<br>Substituting into a real life formula<br>Scale drawings in Science and Product design | **Additional Higher Content**<br>• To write recurring decimals as fractions<br>• Venn diagram notation and set notation -H |

## Spring 1 – 'The Circle of Life'

**Subject Area Topic Reasoning with Number**

| **NUMBERS** | **USING PERCENTAGES** | **MATHS AND MONEY** |
|---|---|---|
| • Use and manipulate directed numbers<br>• Solve problems with integers<br>• Solve Problems with decimals<br>• Identify and use the HFC and LCM<br>• To manipulate fractions using the four operations<br>• Solve problems involving fractions<br>• To write numbers in standard index form | • Calculate and use equivalent Fractions, Percentages and Decimals<br>• Find a percentage of an amount without a calculator<br>• Find a percentage of an amount with a calculator<br>• Calculate percentage increase and decrease<br>• Express change as a percentage<br>• Solve reverse percentage problems | • Calculate Simple Interest<br>• Calculate compound interest<br>• Solve problems involving VAT<br>• Use bills and banks statements to solve problems and budget<br>• Calculate the amount of tax needed to be paid on a wage<br>• Use exchange rates |

| **Notes/Links/Interleaving** | **Additional Higher Content** |
|---|---|
| Use of calculator for more complex calculations.<br>Using standard from in Science | • Understand and use Surds<br>• Calculating with numbers in Standard Form<br>• Solve problems with repeated percentage change<br>• Solve unit pricing problems |

## Spring 2 – 'Conflict'

**Subject Area Topic Reasoning with Geometry**

| **DEDUCTION** | **ROTATION AND TRANSLATION** | **ASSESSMENT** |
|---|---|---|
| • Calculate angles on straight lines<br>• Calculate angles in Triangle and Quadrilaterals<br>• Understand, find and use angles in parallel lines.<br>• Form equations to find unknown angles<br>• Use conjecture to determine properties and similarities of 2D shapes | • Identify the order of symmetry of a shape<br>• Compare and contrast rotational symmetry with lines of symmetry<br>• Rotate a shape about on the shape<br>• Rotate a shape abut a point not in the shape<br>• Translate shapes and points by a given vector<br>• Compare rotation and reflection of shapes | |

| **Notes/Links/Interleaving** | **Additional Higher Content** |
|---|---|
| Use of calculator for more complex calculations.<br>Forming equations for unknown quantities and results in science | • Using vectors and vector notation<br>• Compare and use multiple transformations |

## Summer 1 – 'Health & Leisure'

**Subject Area Topic Reasoning with Proportion**

| **PYTHAGORAS' THEOREM** | **REASONING AND PROPORTION** | **SOLVING RATIO AND PROPRTION PROBLEMS** | **ASSESMENT** |
|---|---|---|---|
| • Find Squares and square roots<br>• Calculate the hypotenuse of a right angled triangle<br>• Calculate a shorter side of a right angled triangle<br>• Use Pythagoras' on a coordinate grid | • Understand and apply enlargement and similarity<br>• Enlarge a shape a positive integer scale factor<br>• Enlarge a shape a positive integer scale from a point factor<br>• Enlarge a shape a positive fractional scale factor<br>• Applying scale factors to find unknown lengths of similar shapes | • Understand and use direct proportion<br>• Plot and use direct proportion graphically<br>• Apply inverse proportion to solve problems<br>• Calculate an amount given a ratio<br>• Solve problems with ratio when given one part | |

| **Notes/Links/Interleaving** | **Additional Higher Content** |
|---|---|
| Links with vectors in Science<br>Use of calculator for more complex calculations. | • Apply Pythagoras' Theorem to 3D problems<br>• Enlarge a shape a negative scale factor<br>• Solve problems with similar triangles<br>• Explore rations in right angle triangles<br>• Use graphs showing inverse proportion. |

## Summer 2 – 'Crime & Punishment'

**Subject Area Topic Rate, Representation and Revision**

| **RATES** | **PROBABILITY** | **REVISION AND ASSESSMENT** |
|---|---|---|
| • To calculate speed, distance and time without a calculator<br>• To calculate speed, distance and time with a calculator<br>• Plot and use distance time graphs<br>• Solve problems involving Density, Volume and Mass.<br>• Calculate rates and change and their units | • To understand and use a probability line<br>• To recognize all probability can represent between 0 and 1<br>• To identify the probability of a single event occurring<br>• To identify the probability of a single event not occurring<br>• Use sample space to calculate expected outcomes<br>• Calculate and use relative frequency | |

| **Notes/Links/Interleaving** | **Additional Higher Content** |
|---|---|
| • Compound measures in Science | • Converting compound units<br>• Use Tree Diagrams<br>• Use Tree diagrams without replacement |