The following pages have suggestions for some challenging work on the topics we have covered this year, organised by unit.

At the end of the document there are links to the maths challenge past papers and some other extra-curricular maths.

**Curriculum Challenge**

Dr Frost Website drfrostmaths.com

Each link takes you directly to a video. On the page directly below the video are three options for practice questions: ‘practice this skill’, topic test – standard’ and ‘topic test – advanced’.

For some topics there aren’t any videos, but there are lots of advanced practice questions on the Dr Frost website which are self-marking. Go to the Dr Frost website, click on the Questions menu, then choose Topic Tests then Advanced.

There are questions on all sorts of topics. The selection below applies to the topics we have studied this year but feel free to try any you want.

|  |  |
| --- | --- |
| **Unit 1** | **Number** |
| **Dr Frost**  | <https://www.drfrostmaths.com/videos.php?skid=52> add or subtract in standard form |
|  | <https://www.drfrostmaths.com/videos.php?skid=49> convert to standard form |
|  | <https://www.drfrostmaths.com/videos.php?skid=63> fractional indices |
|  | <https://www.drfrostmaths.com/videos.php?skid=62> negative indices |
|  | <https://www.drfrostmaths.com/videos.php?skid=31> Find factors and multiples |
|  | <https://www.drfrostmaths.com/videos.php?skid=67> Simplify Surds  |
| **Activelearn** | Problem Solving p19 |
|  |  |
| **GCSE Question sheets** | Indices | <https://www.drfrostmaths.com/resource.php?rid=332> |
|  | Surds | <https://www.drfrostmaths.com/resource.php?rid=331> |
|  | Counting Strategies | <https://www.drfrostmaths.com/resource.php?rid=334> |
|  | HCF/LCM | <https://www.drfrostmaths.com/resource.php?rid=506> |
|  |
| **Unit 2** | **Algebra** |
| **Dr Frost**  | <https://www.drfrostmaths.com/videos.php?skid=3> Collect Like Terms |
|  | <https://www.drfrostmaths.com/videos.php?skid=468> Continue a Sequence  |
|  | <https://www.drfrostmaths.com/videos.php?skid=89> Determine if a term belongs to a sequence  |
|  | <https://www.drfrostmaths.com/videos.php?skid=86> Determine the nth term formula linear sequences  |
|  | <https://www.drfrostmaths.com/videos.php?skid=77> Expand a single bracket  |
|  | <https://www.drfrostmaths.com/videos.php?skid=78> Expand two or more brackets |
|  | <https://www.drfrostmaths.com/videos.php?skid=87> Determine the nth term formula for quadratic sequences  |
|  | <https://www.drfrostmaths.com/videos.php?skid=481> Solve linear equations where the unknown appears on both sides |
|  | <https://www.drfrostmaths.com/videos.php?skid=79> Factorise out a single term  |
| **Activelearn** | Problem Solving p48 |
|  |  |
| **GCSE Question sheets** | Factorising | <https://www.drfrostmaths.com/resource.php?rid=346> Questions 1-7 |
|  | Sequences | <https://www.drfrostmaths.com/resource.php?rid=371> |
|  | Equations | <https://www.drfrostmaths.com/resource.php?rid=349> |
|  |
| **Unit 3** | **Interpreting and Representing Data** |
| **Dr Frost**  | Stem and Leaf Diagrams (Advanced practice questions) |
|  | Pie Charts (Advanced practice questions) |
|  | Scatter Graphs and Correlation (Advanced practice questions) |
|  | Mean Mode Median Range from Listed data (Advanced practice questions) |
|  | <https://www.drfrostmaths.com/videos.php?skid=462> Two Way Tables  |
| **Activelearn** | Problem Solving p81 |
|  |  |

|  |  |
| --- | --- |
| **Unit 4** | **Fractions Ratio and Percentages** |
| **Dr Frost**  | <https://www.drfrostmaths.com/videos.php?skid=20> Add Subtract proper/improper fractions  |
|  | <https://www.drfrostmaths.com/videos.php?skid=38> Convert between non-recurring fractions, decimals, and percentages  |
|  | <https://www.drfrostmaths.com/videos.php?skid=54> Determine a percentage change |
|  | <https://www.drfrostmaths.com/videos.php?skid=74> Find a quantity within a ratio where either the total amount, a particular amount or a difference in an amount is given. |
|  | <https://www.drfrostmaths.com/videos.php?skid=58> Find a value before a percentage change or before a percentage was taken  |
|  | <https://www.drfrostmaths.com/videos.php?skid=57> Use decimal multipliers to represent finding a percentage of an amount or a percentage change.  |
| **Activelearn** | Problem Solving p110 |
| **GCSE Question sheets** | Ratio | <https://www.drfrostmaths.com/resource.php?rid=342> |
|  | Percentages | <https://www.drfrostmaths.com/resource.php?rid=335> |
|  | Fractions Decimals Percentages | <https://www.drfrostmaths.com/resource.php?rid=383> |
|  |
| **Unit 5** | **Angles and Trigonometry** |
| **Dr Frost**  | <https://www.drfrostmaths.com/videos.php?skid=170> Appreciate that base angles of an isosceles triangle are equal.  |
|  | <https://www.drfrostmaths.com/videos.php?skid=160> Determine angles in a right-angled triangle using trigonometry.  |
|  | <https://www.drfrostmaths.com/videos.php?skid=159> Determine the length of sides in a right-angled triangle using trigonometry. |
|  | <https://www.drfrostmaths.com/videos.php?skid=374> Interior and Exterior angles of regular and irregular polygons |
|  | <https://www.drfrostmaths.com/videos.php?skid=134> Introduce and use algebraic angles  |
|  | <https://www.drfrostmaths.com/videos.php?skid=130> Know that the sum of the angles in a triangle is 180°.  |
|  | <https://www.drfrostmaths.com/videos.php?skid=131>Know that the sum of the angles on a straight line is 180° and angles around a point 360°.  |
|  | <https://www.drfrostmaths.com/videos.php?skid=132> Recognise vertically opposite, alternate, corresponding and co-interior angles.  |
|  | <https://www.drfrostmaths.com/videos.php?skid=149> Solve 2D problems using Pythagoras’ theorem.  |
|  | <https://www.drfrostmaths.com/videos.php?skid=133>Understand angle properties of a quadrilateral.  |
|  |  |
| **Activelearn** | Problem Solving p143 |
| **GCSE Question sheets** | Angles | <https://www.drfrostmaths.com/resource.php?rid=380> |
|  | Pythagoras | <https://www.drfrostmaths.com/resource.php?rid=384> |
|  | Trigonometry | <https://www.drfrostmaths.com/resource.php?rid=377> |
| **Problem Solving** | Pythagoras and Trigonometry | <https://nrich.maths.org/9344> |
|  | Angles and Polygons | <https://nrich.maths.org/9341> |
|  |
| **Unit 6** | **Graphs** |
| **Dr Frost**  | <https://www.drfrostmaths.com/videos.php?skid=97> Appreciate that a point on a line must satisfy its equation and determine x or y.  |
|  | <https://www.drfrostmaths.com/videos.php?skid=101> Appreciate that parallel lines have the same gradient  |
|  | <https://www.drfrostmaths.com/videos.php?skid=96> Be able to draw a line using its equation |
|  | <https://www.drfrostmaths.com/videos.php?skid=100> Determine the equation of a straight line  |
|  | <https://www.drfrostmaths.com/videos.php?skid=98> Find the gradient of a line given two points  |
|  | <https://www.drfrostmaths.com/videos.php?skid=99> Find the gradient or y-intercept of a line given its equation  |
|  | <https://www.drfrostmaths.com/videos.php?skid=102> Know the relationship between gradients of perpendicular lines  |
|  | <https://www.drfrostmaths.com/videos.php?skid=107> Plot and recognise graphs/equations of circles centred at origin  |
|  | Use graphs to find approximate solutions to equations (Advanced practice questions) |
| **Activelearn** | Problem Solving p186 |
|  |  |
| **GCSE question sheets** | Straight lines | <https://www.drfrostmaths.com/resource.php?rid=373> |
| **Maths and Art** | Straight lines | <https://nrich.maths.org/7031> |

|  |  |
| --- | --- |
| **Unit 7** | **Area and Volume** |
| **Dr Frost**  | <https://www.drfrostmaths.com/videos.php?skid=166> Convert between metric units of area and volume  |
|  | <https://www.drfrostmaths.com/videos.php?skid=138> Find the area of a full circle  |
|  | Find the circumference of a full circle (Advanced practice questions) |
|  | Find the area or circumference of a circle, including simple fractions of circles (Advanced practice questions) |
|  | <https://www.drfrostmaths.com/videos.php?skid=137> Find the area of non-rectangular quadrilaterals, including trapeziums, parallelograms and kites  |
|  | <https://www.drfrostmaths.com/videos.php?skid=136> Find the area of a triangle  |
|  | <https://www.drfrostmaths.com/videos.php?skid=139> Find the area of composite shapes by adding or subtracting areas  |
|  | <https://www.drfrostmaths.com/videos.php?skid=417> Find the area or arc length of more general sectors  |
|  | <https://www.drfrostmaths.com/videos.php?skid=125> Find the volume of a prism  |
|  | <https://www.drfrostmaths.com/videos.php?skid=442> Find the volume of a cylinder  |
|  | <https://www.drfrostmaths.com/videos.php?skid=475> Find the surface area of a cylinder |
|  | <https://www.drfrostmaths.com/videos.php?skid=127> Find the volume of a pyramid, cone or sphere  |
|  | Find the surface area of a cone or sphere/hemisphere (Advanced practice questions) |
|  |  |
| **GCSE question sheets** | Area | <https://www.drfrostmaths.com/resource.php?rid=382> |
|  | Volume and Surface Area | <https://www.drfrostmaths.com/resource.php?rid=376> |
| **Activelearn** | Problem Solving p225 |
|  |

|  |  |
| --- | --- |
| **Unit 8** | **Transformations and Constructions** |
| **Dr Frost**  | <https://www.drfrostmaths.com/videos.php?skid=11> Describe a rotation  |
|  | <https://www.drfrostmaths.com/videos.php?skid=12> Enlarge a shape by a given scale factor around a given centre of enlargement  |
|  | <https://www.drfrostmaths.com/videos.php?skid=6> Reflect a shape in a line with a given equation |
|  | <https://www.drfrostmaths.com/videos.php?skid=10> Rotate a shape by a given angle around a given point  |
| **Activelearn** | Problem Solving p265 |
|  |  |
| **Problem solving** | Rotation | <https://nrich.maths.org/13431> |
|  | Transformations | <https://nrich.maths.org/9350> |
|  | Constructions | <https://nrich.maths.org/9369> |
|  |  |  |

You will find more practice questions with answers on work we’ve done this year on the P Drive under p:\Maths\Year 9

* Year 9 2019-20 Homework
* Challenging Unit Tests

Other Websites for curriculum based Mathematics are

* BBC Bitesize Daily Lessons
* The National Academy Online Classroom
* Corbett Maths
* Pixi Maths

**Extra-Curricular Challenge**

If you want to get your brain around something different try the following websites:

* NRICH for puzzles, games and problem solving website: nrich.maths.org
* Intermediate Maths challenge past papers can be found at

<https://www.ukmt.org.uk/competitions/solo/intermediate-mathematical-challenge/archive>

* Parallel Maths by Simon Singh. Website parallel.org.uk

This is a website for pupils wanting to stretch themselves. It sets challenges involving ideas outside of the Maths curriculum. They may involve videos, history, songs, lectures or Maths in the headlines. Every Thursday at 3pm you can access a new set of challenges. You have until midnight on Sunday to complete and submit. You will need to set up an account to use parallel maths. If you would like to link your account to Ribston Hall then use the teacher coder g4ujo when prompted.