

A GUIDE TO THE
MATHS CURRICULUM
AT ACLE ACADEMY



PARENT VERSION

MFM – JULY 2019

A GUIDE TO THE MATHS CURRICULUM AT ACLE ACADEMY

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1. Introduction

The Spiral Curriculum

The Maths Scheme of Learning (SoL) is based around continuous progression rather than by year. This is in the form of a “Spiral” scheme. A spiral curriculum can be defined as a course of study in which students will see the same topics throughout their school career, with each encounter increasing in complexity and reinforcing previous learning.

Traditionally in school, students are taught by year, and although the material and depth will change between different ability sets, it is often taught as a set of discrete subject areas with minimal differentiation to the abilities of the individual students.

In our curriculum, students are taught according to stages within the curriculum, and there is ample opportunity to offer support or to further challenge students to the next level as their progress suggests. Students are given a pre-topic assessment so that the teacher can pitch learning at the right level, followed by a brief assessment at the end.

In addition, Acle Academy is running our adapted AQA 2 year GCSE programme. This allows students the opportunity to spend longer on each topic area and to be able to go into more depth where possible. The new Maths GCSE has an ever increasing “Problem Solving” element, especially in the final exams. So it is crucial to be able to build student subject knowledge of general problem solving and of the links between different elements of the course. The scheme also has plenty of opportunities for reviews by a few topics at a time, and by Assessment Objectives – Number, Algebra, Shape, Data.

The flexibility of our schemes allow us to ensure students are adequately prepared for GCSE study by the end of year 9, and then to produce a student with a much more rounded subject knowledge, rich in pure and applied Maths skills.

Numeracy

There are natural connections between Maths and Numeracy, and it is important to us that we ensure students have good Numeracy skills. We promote the use of times tables practice and the use of apps such as the “PiXL Times Table App” that all our students have access to. But it’s more than this.

- **Numeracy is “the state of being numerate”. Being numerate means “to be able to do Mathematics”. Therefore, there is a massive overlap between Numeracy and Maths.**
- **For our purposes, we regard Numeracy as the state of having the tools to do Maths – ie. Being able to use arithmetic and having a sense of logic.**
- **Maths – and therefore, Numeracy – is all about being able to recognise patterns.**
- **BUT, NUMERACY IS NOT JUST FOR MATHS!**
- We **MUST, AND DO ALL WORK** to remove the stigmas associated with Maths and Numeracy.
- Students come to this school believing that they cannot do Maths. This may be because their parents find Maths/Numeracy hard. It may be because they just don’t see the importance of it.
- It may be because they hear others (US) saying that we can’t do Maths, or that it’s not important. “It’s enough to be able to just add up.”
- It may be that they just don’t enjoy it.

- WHATEVER THE REASON, WE ALL HAVE A RESPONSIBILITY TO PROMOTE IT AND TO ENCOURAGE STUDENTS TO EMBRACE IT.
- NUMERACY SHOULD BE FUN!

Literacy

Literacy is a national school target area in all subjects – Maths is no exception. Maths has its own language and it can be very pedantic. Therefore a punctuation mark missing, or in the wrong place can completely change the perception of a solution to a problem. So can the misunderstanding of Maths specific vocabulary. For example, many use the word “sum” to denote any calculation. But it is reserved for addition only. All our staff are very clear about promoting, using and demonstrating the correct way to communicate about Maths.

When we introduce keywords and new vocabulary, we try to explain their origins. For example, the word “Algebra” is from the Arabic “Al Jabr”, meaning “the reunion of broken parts”. In fact, Algebra itself is in many ways Maths’ own language, and can be viewed as one of the last surviving truly international languages.

We also spend a lot of time ensuring students understand command words such as those they may see in exam questions, such as Write Down, Evaluate, Solve, Explain, Prove, Justify, etc.

Many words in Maths have similar meanings to those in everyday language, whereas others have more specific meanings in Maths, and these are always clearly explained.

2. Expectations

We have very high expectations of students at Acle Academy. Not only do we expect full effort in class, but we also promote a keen sense of independence and demand that students make full use of resources we make available to them. This includes powerful websites and apps such as MyMaths, Mathswatch, PiXL and Kerboodle. Each student is given a copy of the following expectations at the start of the year to emphasise this point.

MATHS DEPARTMENT EXPECTATIONS

The following is a guide to MINIMUM EXPECTATIONS OF ALL STUDENTS regardless of year or ability. It is based on the premise that as a school, we are all here to help YOU succeed to the best of your ability. The emphasis is therefore on YOU to ensure YOU have put everything in place to help you do this.

EVERY LESSON

- Please line up quietly ON TIME for your Maths lesson;
- Ensure you have all necessary equipment ready – please see “Maths Department Equipment Policy”;
- On entry, be courteous and polite, and immediately get everything ready for the lesson, including exercise books, planners, text books and all other equipment. Blazers must be worn on entry, but you may remove these once everything else is ready. Stand behind chairs;
- Once greeted and instructed to sit down, do so quietly in a manner to allow the lesson to get underway without disruption.

YOUR WORK

- Start as you mean to go on. Try to be neat and tidy at all times. Use Blue or Black pen to write, pencils for drawings and diagrams, and always use rulers;
- Ensure your exercise book has a constantly updated target sticker and that your book is labelled correctly and clearly showing: Your name, Class label, Teacher(s) name(s) and “Mathematics”. You can also label books as “Book 1”, etc;
- All handouts and worksheets, etc MUST be stuck into your book in DATE ORDER. You can use glue, staples or security tags as you wish. BUT your book MUST remain tidy at all times, with NO LOOSE OR MISSING SHEETS;
- If in doubt, ASK.

INDEPENDENT WORK

- YOU are expected to do everything necessary to ensure YOUR learning and understanding. We all learn differently and we all pick some things up quickly and some things need to be revisited. That is why we spend a lot of money on providing you with access to materials and resources such as: Quality teaching, Text books, Intervention opportunities and Websites – including Mathswatch, MyMaths, PiXL Maths, Sam Learning, etc. Please see the sheet “Useful Resources For Maths And The Links You Will Need To Access Them”.
- You cannot expect to perform at your best by simply attending lessons. We all need our own space and time to absorb learning. Therefore, it is an EXPECTATION that YOU MUST:
 - Access resources in your own time to ensure understanding and learning;
 - Seek help from peers and teaching staff as necessary;
 - Build up revision notes and resources to help you retain material;
 - Practice and re-practice questions to ensure skills are embedded;
 - Make sure Homework is always done on time and to a good standard.
- Homework will ALWAYS be set on a Monday (Tuesday by exception – this is rare), and should be completed before the end of Tuesday. You will then have until the following

Tuesday to seek help if you are struggling. I will never accept excuses for leaving this until the last minute. If you do not have access to the internet at home, use school computers in your own time to complete work.

- If you are ill or you miss school for any other reason, you are EXPECTED to complete ALL missed work including homework. You MUST see your teacher to find out what work needs to be done to catch up.

MARKING AND ASSESSMENT

- For each topic, there will be a short pre-test to check your prior knowledge at the start, progress checks and a brief assessment (sometimes referred to as a “BAM Test” – Building A Mathematician) at the end of the material. Your work will be marked in line with the school’s “Feedback 4” Marking Policy and YOU MUST complete follow up work as directed in “NEXT STEPS”. YOU are expected to know how you are performing at all times;
- YOU MUST ensure you keep all assessments in a safe place;
- There are 4 key assessment “Tracking Points” throughout the year, as well as end of year exams. YOU MUST be adequately prepared for these and can use your revision notes and resources to do this. You will be given the information you need on these in good time.

ATTITUDE TO LEARNING

- YOU are EXPECTED to behave appropriately at all times and this includes your attitude to learning and appropriate effort to learn. YOU MUST be READY TO LEARN, RESPECTFUL OF YOURSELF AND OF OTHERS, AND BE SAFE.

By adhering to the principles, you will help to ensure you have a good, rewarding and enjoyable learning experience. Thank YOU for YOUR cooperation.

Mr M Freeman (Head of Maths)

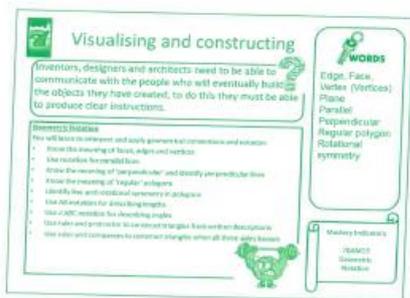
Revised: September 2018

3. Assessment

a. Pre-tests, Topic tests

In each Maths topic, we need a clear understanding of what students already know. There are various mechanisms we can use to assess this. One of these is the “Pre-test”. (see below).

Pre-test Factors and Multiples



Question 1

(a) Caroline buys 1.4 kilograms of bananas at 95 pence per kilogram. She also buys 0.8 kilograms of apples. Her total bill is £1.93. How much per kilogram was she charged for the apples?

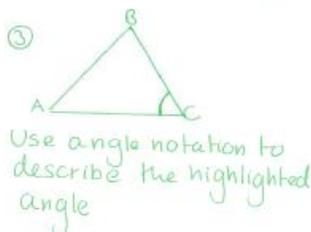
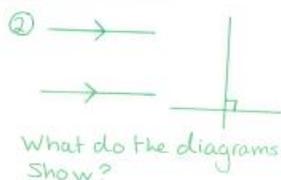
Answer pence
(4)

(b) Jane spends £4.50 on fruit. Her total bill is £22.50. What percentage of her total bill is for fruit?

Answer %
(2)
(Total 6 marks)

① Complete the table

Cuboid	Properties
Vertices	...
Edges	...
.....	6



④ Using compasses and a ruler construct a triangle of 5cm, 4cm and 4cm

From here, we can go on to teaching the topic with confidence that we are pitching material at the right level. Then after formal teaching, there is normally a short assessment to show progress and to ensure the material has been learnt.

b. Tracking Assessments

Throughout the year, there are a number of more formal “Tracking Assessments” which are used to assess a student’s general understanding of Mathematics. These are often comprised of past exam papers whether at KS3 or KS4. We can then use our department flight path to try to gauge where a student is at in relation to the 9-1 grading system, and whether they are “on track” for their year target.

c. End of Year Exams

After the year 11 students have finished their final exams, we run exams under formal conditions for years 7 to 10. This gives us a far more accurate idea of how students are doing and gives us invaluable information going into the new school year. Students may move sets following this, although this would never be based solely on these exam results, and set moves can take place at any point in the school year if it was felt necessary.

d. Feedback

At Acle Academy, we operate the “Feedback 4” policy to allow us to communicate effectively with students about their progress. In the Maths department, we don’t mark the student exercise books in great detail, although we do monitor them and advise students as necessary. Instead, we give constructive feedback after topic tests. In addition, after every tracking point and end of year exams, we record student scores for each and every question on to our “Formative Marking”

sheets. In this way students have an easy colour coded mechanism which quickly highlights areas in which they have done well and areas for development. We can also inform them of relevant video clips and exercises through Mathswatch, for example.

10 Jul 19, Maths KS3 SATs 2007 Paper 1, 5-7			
Student: Name A Student			
Question	Objective	Marks	Your Score
1	Basic Algebra	3	3
2	Multiplication Grid	3	3
3	Probability	2	2
4	Negatives	2	2
5	Area	2	2
6	Percentages	3	3
7	Linear Equations	3	3
8	Fractions	2	2
9	Conversion Graphs	2	2
10	Ratio	3	3
11	Probability	3	3
12	Angles	3	3
13	Fractions	3	2
14	Solving Equations	2	2
15	Circle Areas	1	0
16	Fraction Arithmetic	2	2
17	Surface Area	1	0
18	Stem and Leaf Diagrams	2	2
19	Squares and Roots	2	2
20	Sequences	4	4
21	Angles	2	2
22	Fractions	2	2
23	Loci	2	1
24	Indices	2	0
25	Ratio	2	2
26	Deduction	2	0
TOTAL		60	52
Comment:			
Please copy and try the following question(s)			
Question		Page	

We have a number of opportunities to check progress. An example of the Progress Check sheets we use are shown here.



PROGRESS CHECK QUESTION - Expanding Double Brackets

Remember: $(+ +) + (- -) +$
 $(+ -) - (- +) -$

① $(x + 3)(x + 4)$

$$\begin{array}{r|l} & x & +4 \\ x & & \\ +3 & & \end{array}$$

② $(x + 8)(x - 7)$

③ $(x - 4)(x - 6)$

④ $(4x + 5)(3x + 6)$



Did you use your book? Yes No

What went well/ Even better if

Expand double brackets with:

- 1) positive signs
- 2) positive and negative signs
- 3) negative signs
- 4) more than one x .

Literacy



Using correct mathematical language where needed:
expand, linear expression, simplify, collecting like terms,
quadratic expression.



Next step

Corrections and actions completed.

Vle.mathswatch.co.uk username: APupil@acle password APupil

INTERVENTION BELOW EXPECTATION MEETING EXPECTATION EXCEEDING EXPECTATION

Success criteria:

- Show your workings
- Simplify your answer

4. KS3 Schemes of Learning (SoL) Overview

There are various elements to the schemes. At KS3, each class will be studying from a specific stage. It may be that for some areas, we need to dip into higher or lower stages as the needs of the class dictate, but essentially it is likely that a class will study one main stage throughout the year. Within each stage, we have short term and long term plans which indicate what should be taught, when and to what depth. These are shown in the following sections.

a. Stages

There are various stages at KS3. Each group will essentially be working through a specific stage according to setting, previous experience, ability, and so on. We may need to dip in and out of adjacent stages, and flexibility to be able to do this is good Assessment for Learning (AfL) practice since students are then always supported or challenged appropriately. Each stage is broadly equivalent to the skill level required at GCSE grades, and as such, there is a lot of overlap between specific stages and content in the Foundation GCSE curriculum. The following gives an overview of all of this for the year 2019-20, although this is subject to change at any time. We also exemplify useful starter and homework material we can use.

LEVEL OF STUDY 2018/19			
STAGE 5 - catch up pupils	STAGE 6 - GCSE grade 1/2	STAGE 7 - GCSE grade 2/3	STAGE 8 - GCSE grade 3/4
	STAGE 9 - GCSE grade 4/5		

Year 7	STAGE	starter/homework		Year 8	STAGE	starter/homework
set x1	stage 7	mathsbox yr7		set x1	stage 8/9	mathsbox FB
set x2	stage 7	mathsbox yr7		set x2	stage 8 (review 7 content)	mathsbox yr8
set X3	stage 7	mathsbox yr6		set X3	stage 7 (ext to 8)	mathsbox yr7
set X4	stage 6	numeracy ninja/Timestable practice/mathsex yr5		set X4	stage 7 (Review stage 6)	numeracy ninja/Timestable practice/mathsex yr6
set x5 catchup group	stage 6 (review 5 content)	mathsbox yr 5				

b. Long Term Plans

More detail about the content of each stage is shown on the next pages. This indicates expected timing throughout the school year, but is again subject to change.

Maths Curriculum Map for KS3 Years 7 and 8

Stage 5 (catch up pupils)

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Learning Focus: Numbers and the number system Key skills: Fractions and multiples; Prime numbers; Square and cube numbers</p> <p>Learning focus: Counting and comparing Key skills: Place value; Counting</p> <p>Learning focus: calculating, addition and subtraction Key skills: four-digit numbers; column addition and column subtraction</p> <p style="color: blue;">Tracking 1- October</p>	<p>Learning focus: Visualising and constructing Key skills: 3D shapes using nets and isometric paper</p> <p>Learning focus: Calculating Multiplication and division Key skills: mental arithmetic; multiplication 4-digits by 1-digit and 2-digit numbers; division 3-digit and 4-digit number with and without remainders</p> <p>Learning focus: Investigating shapes Key skills: Polygons; properties and differences</p> <p>Learning focus: Pattern spotting Key skills; Counting forwards and backwards in tens, hundreds and thousands</p> <p style="color: blue;">Tracking 2 -December</p>	<p>Learning focus: Exploring time Key skills; telling the time on a 12 and 24 hour clock; time and timetables; interpreting and solving problems</p> <p>Learning focus: Exploring fractions, decimals and percentages Key skills: Comparing fractions; decimals to 1, 2 and 3 decimal places; percentages as part of 1 hundred as a fraction and a decimal</p> <p style="color: blue;">Tracking 3 -January</p>	<p>Learning focus: Measuring space Key skills: Converting measurements between kilometres, metres, centimetres, millimetres; kilograms and grams; litres and millilitres</p> <p>Learning focus: Investigating angles Key skills: How to measure and name angles; using a protractor to measure and draw</p> <p>Learning focus: Calculating fractions, decimals and percentages Key skills: Fractions and mixed numbers; adding and subtracting fractions with multiple denominators; multiplying by a whole number; fraction equivalences</p> <p style="color: blue;">Tracking 4- March</p>	<p>Learning focus: Completion of calculating fractions, decimals and percentages</p> <p>Learning focus: Calculating space Key skills: Perimeter of rectangular shapes; calculating the area of shapes – rectangles, irregular straight sided shapes and ones with curved lines; estimating volume; estimating capacity</p> <p>Learning focus: Checking approximating and estimating Key skills: rounding to the nearest 10 000 or 100 000; approximate to whole number- 1 & 2 decimal place; estimate calculations of 4 digit</p>	<p>Learning focus: Mathematical movement Key skills: Describe a translation using mirror lines,, carry out reflection using mirror lines on parallel axis including touching the object and crossing the object</p> <p>Learning focus: Presentation of data Key skills: Interpreting line graphs and bar charts; reading value and answering how much questions</p> <p style="color: blue;">End of year Test - May</p>
<p>Assessment: There will be a short <u>PRE TEST</u> question to determine the correct starting points; <u>PROGRESS CHECK</u> sheets within the topic to determine understanding and pace and a short <u>END OF TOPIC</u> assessment to determine understanding and inform <u>INTERVENTION</u> (independent & tutor led). TESTS will be reviewed within lessons where whole class gaps appear. There is opportunity to complete functional skills project at the end of each term. This overview is intended as a rough guide for progress. Classes will cover each stage at the pace they need.</p>					

Stage 6 (approx. grade 1 of GCSE)

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Learning Focus: Numbers and the number system</p> <p>Key skills: Place value, whole numbers 10, 100, 1000; multiply and divide; negative numbers; find common multiples of 2 numbers and factors of 2 numbers</p> <p>Learning focus: Calculating</p> <p>Key skills: mental arithmetic '-', '+, x, ÷ to 4 digits; written methods of mixed problems</p> <p>Learning focus: visualising and constructing</p> <p>Key skills: Draw 2D shapes from known angles and measurements; classify 3d shapes, draw their nets</p>	<p>Learning focus: Calculating Division</p> <p>Key skills: Divide a 2, 3 & 4 digit number by a 2 digit number; how to write remainders; solve problems with division</p> <p>Learning focus: Investigating properties of shape</p> <p>Key skills: Polygons – classify with sides & symmetry; Find unknown angles; solve problems about 2D shapes; vocabulary of circles</p> <p>Learning focus: Exploring fractions, decimals and percentages</p> <p>Key skills: Cancelling fractions; compare and order fractions; fractions and their decimal and percentage equivalents</p> <p>Learning focus: Algebraic proficiency – using formulae</p> <p>Key skills; simple 1 and 2 step formula written in words; simple formula expressed in symbols</p>	<p>Learning focus: Proportional reasoning</p> <p>Key skills; Ratio problems including scaling, sharing and grouping</p> <p>Learning focus: Pattern spotting</p> <p>Key skills: recognise a linear sequence; find next terms; find missing numbers; create a linear sequence from description</p> <p>Learning focus: Measuring space</p> <p>Key skills: Convert large measurements into smaller measurements e.g. Cm to Km; Convert small measurements into large measurement e.g. Km to Cm; convert time; solve measurement problems</p>	<p>Learning focus: Investigating angles</p> <p>Key skills: Find missing angles at a point, on a straight line and vertically opposite; use known facts to find missing angles</p> <p>Learning focus: Calculating fractions, decimals and percentages</p> <p>Key skills: Add and subtract fractions with different denominators; Add and subtract mixed numbers; multiply proper fractions by a proper fraction and a whole number; Multiply by decimals -tenth and hundredth; calculate percentages of a quantity</p>	<p>Learning focus: Solving equations and inequalities</p> <p>Key skills: Solve number problems; use algebra to solve a number problem with 2 unknowns; basic rules of algebraic notation</p> <p>Learning focus: Calculating space</p> <p>Key skills: Calculate area of a parallelogram and triangle; estimate and calculate the volume of cubes / cuboids; use formula to calculate area and volume; convert units of measurement</p> <p>Learning focus: Checking approximating and estimating</p> <p>Key skills: Approximate any number by rounding; use estimating to check a calculation and predict a solution</p>	<p>Learning focus: Mathematical movement</p> <p>Key skills: Use Cartesian coordinates; describe and plot points on all four quadrants; draw and translate simple shapes; carry out reflection</p> <p>Learning focus: Presentation of data</p> <p>Key skills: Interpret and construct pie charts; interpret and construct line graphs</p> <p>Learning focus: Measuring data</p> <p>Key skills: Understand the term average; calculate and interpret the mean in a set of data; use the mean to find missing number data</p>

Assessment: There will be a short PRE TEST question to determine the correct starting points; PROGRESS CHECK sheets within the topic to determine understanding and pace and a short END OF TOPIC assessment to determine understanding and inform INTERVENTION (independent & tutor led). TESTS will be reviewed within lessons where whole class gaps appear. There is opportunity to complete functional skills project at the end of each term. This overview is intended as a rough guide for progress. Classes will cover each stage at the pace they need.

Stage 7 (approx Grade 2 & 3 of Foundation GCSE)

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Learning Focus: Numbers and the number system Key skills: Prime numbers up to 150, highest common factor and lowest common multiple; powers, square & square roots; cube & cube roots</p> <p>Learning focus: Counting and comparing Key skills: Place order for negative numbers, mixed positive and negative numbers; ordering fractions and mixed fractions, decimals and percentages</p> <p>Learning focus: Calculating Key skills: Use place value to multiply and divide by a decimal, order of calculation; use of brackets</p>	<p>Learning focus: Visualising and constructing Key skills: Geometric notation -Faces, edges and vertices; use of AB & ABC notation; constructing triangles</p> <p>Learning focus: Investigating properties of shape Key skills: Nets of 3D shapes; properties of shapes – triangles, quadrilaterals and polygons; use know properties to solve problems</p> <p>Learning focus: Algebraic proficiency -Tinkering Key skills: Manipulating expressions; use of letters, identifying like terms and simplify; multiply with brackets; explore functions and evaluate algebraic statements</p>	<p>Learning focus: Exploring fractions, decimals and percentages Key skills: explore links between fractions and percentages; write fractions as their lowest term; write percentages as fractions</p> <p>Learning focus: Proportional reasoning Key skills: Ratio – a to b; convert different units of measurement; use ratio to divide a quantity</p> <p>Learning focus: Pattern spotting Key skills: Explore linear and non-linear sequences; find the term to term rule; describe a number sequence; solve problems using this rule</p> <p>Learning focus: Measuring space Key skills: measuring accurately with a ruler and protractor; convert different units of measurement to solve problems</p> <p>Learning focus: Investigating angles Key skills: Identify angles at a point, on a line and opposite; find missing angles in triangles</p>	<p>Learning focus: Calculating fractions, decimals and percentages Key skills: Use calculators to find the percentage of problems; compare 2 quantities using percentages; calculate percentages in problems; add, subtract, divide and multiply fractions, improper fractions and mixed numbers;</p> <p>Learning focus: Solving equations and inequalities Key skills: solve two and three step equations with brackets and when the solution is a whole number and a fraction</p>	<p>Learning focus: Calculating space Key skills: Formulae for area; finding perimeter when you know the area; area for a trapezium by the formulae area; surface area of cuboids and 3D shapes</p> <p>Learning focus: Checking, approximating and estimating Key skills: Rounding up and down; identify first significant number; use estimation to predict; use cancellation to simplify calculations' use inverse operations to check solutions</p> <p>Learning focus: Mathematical movement Key skills: Algebraic graphs – write, identify and draw parallel lines using x & y formula; reflection, translation as a 2d vector;; rotation using angle and direction</p>	<p>Learning focus: Presentation of data Key skills: Categorical and discrete data; interpret and construct data, frequency tables, pictograms, bar charts, pie charts and line charts</p> <p>Learning focus: Measuring data Key skills: Find the mode, median, mean and range of a set of data; analyse and compare sets of data</p>

Stage 8 (Approx. grade 3 & 4 Foundation GCSE)

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Learning Focus: Numbers and the number system Key skills: Prime numbers up to 100, number as a product of its prime factors, using Venn diagrams; highest common factor and lowest common multiple; using standard form and rounding to significant numbers</p> <p>Learning focus: Calculating Key skills: Add and subtract positive and negative numbers; multiply and divide with negative numbers; square and cube a negative number; use a scientific calculator; order operations with root and powers</p> <p>Learning focus: Understanding risk Key skills: Probability vocabulary, list and identify outcomes; know how to represent probability</p>	<p>Learning focus: Visualising and constructing Key skills: Enlargements of 2D shapes; scale drawing using bearings; represent 3D shapes – plans and elevations</p> <p>Learning focus: Algebraic proficiency -Tinkering Key skills: Indices and the multiplication law; simplify expressions; use fractions in algebra; factorise; re-arrange formulae, substitute positive and negative numbers, change the subject of a formula when 1 and 2 steps are required</p>	<p>Learning focus: Exploring fractions, decimals and percentages Key skills: Fraction and decimal equivalents; lowest fraction; changing fractions to decimals using a calculator; decimals and fractions as percentages</p> <p>Learning focus: Proportional reasoning Key skills: Identify ratio in real life context and to describe a situation; identify proportion, find multiplier; use fractions in situations involving ratio and proportion; know the connection between speed, distance and time – solve problems</p> <p>Learning focus: Pattern spotting Key skills: Generate a term –to-term rule; use position-to-term rule in sequences; use algebra to describe rule in a linear sequence; generate a sequence using a spread sheet</p>	<p>Learning focus: Investigating angles Key skills: Identify alternate and corresponding angles – use this information to calculate missing angles; angles in polygons – use of 180 rule; interior angles of a polygon; external angles of polygons</p> <p>Learning focus: Calculating fractions, decimals and percentages Key skills: Recognise when a fraction should be interpreted as a number and an operator; identify the multiplier when the percentage is greater than 100%; solve problems with percentages, finance and exact calculation with fractions</p> <p>Learning focus: Solving equations and inequalities Key skills: Solve linear equations with unknown on both sides when the solution is a negative number, fraction, involves brackets; link point of intersection on a graph to the equation</p>	<p>Learning focus: Calculating space Key skills: Pi; formula for the circumference of a circle; calculate circumference, radius & perimeter; formula for the area of a circle; calculate the area of a circle and shapes that include sections of a circle</p> <p>Learning focus: Algebraic proficiency – visualising Key skills: Use table of values to calculate points on a linear graph; understand concept of a gradient on a straight line and finding the Y-intercept; quadratic graphs – plot graph; real life graph, plot and interpret distance and time graph</p>	<p>Learning focus; Understanding risk II Key skills: Develop understanding and ability to use probability information, Venn diagrams, use of table information and frequency trees; use theoretical probability to calculate expected outcomes</p> <p>Learning focus: Presentation of data Key skills: Interpret and construct groups frequency table; construct and interpret histograms; plot, construct and interpret scatter diagrams</p> <p>Learning focus: Measuring data Key skills: Find the modal, median and midpoint of some class data; estimate range, calculate mean, analyse and compare data; select and justify appropriate statistics</p>

Stage 9 (Approx. Grade 4 & 5 Foundation GCSE)

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Learning Focus: Calculating Key skills: Calculate with roots and powers; Use of standard form, add, subtract, multiply and divide; use a scientific calculator with standard form problems; understand the difference between truncating and rounding and use both; solve problems involving rounded numbers ; Percentage review</p> <p>Learning focus: Visualising and constructing Key skills: Constructions using a ruler and compass – clean arc, bisector of a line segment, bisect an angle; understand loci – use to identify which construction is to be used to solve a problem; construct 2D shapes; represent 3D in 2D plan and elevations</p>	<p>Learning focus: Algebraic proficiency -Tinkering Key skills: Difference between equations and Identities; why 2 algebraic expressions are equivalent, creating mathematical arguments; manipulating quadratics – multiply, expand, simplify; factorise; construct algebraic statements, identify variables, create an expression or formula</p> <p>Learning focus: Proportional reasoning Key skills: Direct and inverse proportion, features of a graph and an expression, understand connection between multiplier – expression- graph; know congruence and similar shapes, identify and use to solve problems, finding missing lengths; use compound units in a range of situations – speed, density & pressure</p>	<p>Learning focus: Pattern spotting Key skills: Fibonacci sequences and numbers, generate Fibonacci type sequences, finding next 3 terms; quadratic sequences – substitute numbers into formulae, generate terms from a written rule and nth term, identify sequences and find the next 3 terms</p> <p>Learning focus: Solving equations and inequalities I Key skills: Meaning of inequality and solving inequalities, understand symbols; represent practical situations and recognise linear inequality; find integers; use formal method to solve inequality with unknown on both sides, brackets and negative numbers; know when to use an open/ filled circle</p> <p>Learning focus: Calculating space Key skills: Perimeter, area and volume; vocab. of circles, find arc length, calculate arc; area of a sector; surface area of a prism and cylinder; calculate with multiplies of Pi; calculate with multiplies of Pi;</p>	<p>Learning focus: Calculating space2 Pythagoras and trigonometry Key skills: Pythagoras' Theorem- identify the hypotenuse, apply the theorem to solve problems; Trigonometry- Identify the hypotenuse, adjacent and opposite apply the theorem to solve problems in 2d and worded problems; memorise exact trig values;</p> <p>Learning focus: Proof Key skills: Congruence of triangles and geometrical situations; form mathematical arguments and prove them, test conjectures and simple proofs using known facts; Pythagorean triples</p> <p>Learning focus: Algebraic proficiency- visualising Key skills: Linear graphs – find equation and interpret gradient; curved graphs; create and use graphs of non-standard functions; interpret and sketch quadratic graphs; kinematics – use graphs to solve problems about objects in motion</p>	<p>Learning focus: Algebraic proficiency- visualising Key skills: Linear graphs – find equation and interpret gradient; curved graphs; create and use graphs of non-standard functions; interpret and sketch quadratic graphs; kinematics – use graphs to solve problems about objects in motion</p> <p>Learning focus: Solving equations and inequalities II Key skills: Simultaneous equations – understand concept, find approx.. solutions, understand solving by elimination; find the value of first and second variable in a pair of simultaneous equations; interpret the solution</p> <p>Learning focus: Vectors Key skills: Understand how vectors can be represented (both graphically and via mathematical notation); Add and subtract vectors; Know the definition of a resultant vector; Find the magnitude of a vector; Multiply by scalar quantities; Understand what makes a vector parallel to another</p>	<p>Learning focus: Understanding risk Key skills: Tree diagrams, list and label with probabilities; know when to add and multiply 2 or more probabilities; use to calculate probabilities of independent and dependent events; understand relative frequency in relation to sample size</p> <p>Learning focus: Presentation of data Key skills: Construct and interpret time series graphs; construct and interpret compound bar charts; Interpret a wide range of graphs and charts including scatter diagrams and line graphs; use a best fit line to estimate values</p> <p>Learning focus:</p>

In year 9, the last year of KS3 provision, students follow a slightly different format whereby we deliver material at the “Developing” tier or “Mastery” tier according to setting and ability. Content is covered to ensure students are GCSE ready and that they have the basic skills in place to be able to study effectively in years 10 and 11. Below, you can see an example of a route map for year 9.



Mathematics - Adapted year 9 Developing tier Route Map

Year 9

SEPTEMBER				OCTOBER				NOVEMBER	
Wk1 Basic number	Wk2 Factors and multiples	Wk3 Angles	Wk4 Scale diagrams and bearings	Wk5 Basic algebra		Wk7 Review and revision	Wk8 Holiday	Wk9 Basic fractions	Wk10 Coordinates and linear graphs
NOVEMBER			DECEMBER				JANUARY		
Wk11 Basic decimals	Wk12 Rounding	Wk13 Collecting and representing data		Wk15 Year 9 examinations and revision	Wk16 Holiday	Wk17 Holiday	Wk18 Sequences		Wk20 Basic percentages
JANUARY		FEBRUARY				MARCH			
Wk21 Introduction to perimeter and area	Wk22 Review and revision		Wk24 Holiday	Wk25 Introduction to circumference and area	Wk26 Ratio and proportion		Wk28 Basic probability		Wk29 Review and revision
APRIL				MAY				JUNE	
Wk31 Holiday	Wk32 Holiday	Wk33 Equations		Wk35 Scatter graphs	Wk36 Review and revision		Wk38 Holiday	Wk39 Transformations	
JUNE		JULY							
Wk41 Summer examinations and Revision	Wk42 Summer examinations and Revision	Wk43 Pythagoras' theorem	Wk44 2D representations of 3D shapes						

We also have a number of “Functional Skills” resources. We try to do one of these at least termly as they are good for building problem solving skills. Within each folder are the various resources required for each project. These are on a number of themes, many of them real world, and this helps to contextualise the material for our students.

We subscribe to a number of resources which have proved to be extremely valuable. One of the most popular with staff and students is Mathswatch. We also subscribe to MyMaths, Maths Box and various other sites. In addition, Acle Academy is a PiXL school, so our students have access to the PiXL Maths App (PMA) and the PiXL Times Table App. The students have free access to these, and other useful sites are publicised. Access to the main ones is described further below.

The department staff are actively developing opportunities for further enrichment within the curriculum. Already, we have a number of resources we use including various websites, games, discussions and Functional Skills activities which are taught over a series of lessons. These are all designed to try to contextualise Maths in the real world and to make it more accessible for all. Future ideas include taking Maths out of the classroom, eg “People Loci” on the school field, and possibly trips out, for example Bletchley Park where students can see how important Maths became in the war effort. We have a set of Code Breaking lessons which exemplify how the “Enigma” machine worked and why it was so difficult to break the German codes.

The department has also done a lot of STEM work (Science, Technology, Engineering and Maths), and in fact we were in the top 5 schools for the Rolls Royce STEM Awards in 2018.

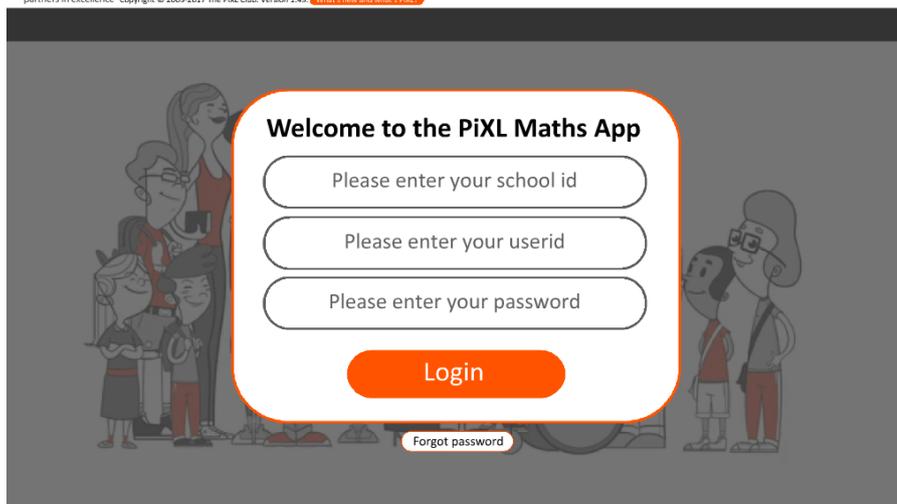
Therefore some of the activities we run are closely linked to this and we intend to further promote this connection and to broaden student interest in this type of career.

Also, we plan to get guest speakers in, run year 7 careers day, Maths carousel workshops and "Finance Days".

USEFUL RESOURCES FOR MATHS AND THE LINKS YOU WILL NEED TO ACCESS THEM.

PiXLmaths

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<https://mathsapp.pixl.org.uk/PMA.swf>

The PiXL Maths App (PMA) has a plethora of resources available to ALL students in the school. If you don't know your login, please ask any member of the Maths team. Particularly useful for year 11s are the Walking Talking Mocks (see below), and for all years, the Arithmetic section is ideal.

Login: The school id is **AC3282**. User id and password are both the same at first. This is the surname followed by

the first name initial. For example, John Smith would be **SMITHJ**. Please edit your profile and change your password on first use.

One of the most useful tools on PiXL is the Walking Talking Mock (WTM). This alongside Walking Talking Marking (WTMa) has videos showing how to tackle exam papers, and what the marker is looking for when marking exam papers. This gives a good indication of which marks are awarded for what. This can be found on the PMA by going to "Homework Tasks", and then "WTM/a".

Also, Acle Academy is taking part in the "PiXL WAVE" programme. When we run full sets of PPE exams at Christmas and Easter, the results are sent to PiXL where they are combined with those from hundreds of other schools. We then get a report saying how we are performing, and our students get individual consolidation tasks sent directly to their PMA profile. These are accessed through selecting "Gap Analysis", "My School Filter" and then choosing the relevant "FF" file.

That's not all. The same login details will get you on to the PiXL times tables app too. This features the opportunity to practice individual times tables and mixed questions as well as a number of games played against other students to win points for your school. These are "Raft Race", "Bounce" and "Survival".

Download this app now, or play it at <https://timestable.pixl.org.uk/Timestables.html>



This is **ESSENTIAL** for all GCSE studies. It has copies of your full text books and homework books as well as answers. It also has links to related material on “MyMaths” and to videos showing you key skills. This is a MUST for plugging gaps in your knowledge. All year 10 and 11 students have access so see Maths staff if you forget your login.

Login: The school institution code is “nqf0”. (Careful, it’s a zero and not a letter “o”). The username and password are both the same at first. It is the first initial followed by the surname. Eg JSmith. You will be prompted to change your password on first use.



<https://www.kerboodle.com/users/login>



The next site is “Mathswatch”. This has a Selection of very useful videos which show you step by step how to perform key skills. Attached to the videos are worksheets and interactive questions to try. To login to this, you need the site <https://vle.mathswatch.co.uk/vle/> The username will be your forename initial and surname with capitals at the start, eg AStudent@acle. The password is the same but without @acle although if your name is short, you may need to attach acle to your password. Eg Username: JDay@acle; Password: JDayacle. Just ask your teacher if

<https://www.mymaths.co.uk/>



The old favourite. You will know this from homework and every student can access the whole site at any time.

Login: The school username is “Acle”, then the password is “Access”. You get your personal login from Maths staff, but all students should know this off by heart.



OTHER USEFUL SITES  YouTube has many useful videos covering just about any aspect of Maths at all levels. This includes many very good videos from the “Mr Barton Maths” website <http://www.mrbartonmaths.com/> <http://www.emaths.co.uk/> This site has the old style SATs papers on it and is still a good resource for practising those KS3 skills. It is open to everyone without a login being necessary.

Another useful site is <http://bland.in/>. This has selections of past GCSE paper questions grouped together.

Finally, arguably the most important sites. Past papers from a number of previous years are available complete with mark schemes. A MUST for all year 11 students. No login required. You may find it easier to just Google “AQA past papers”, and Edexcel have some similar resources too that could still be useful for your revision.

5. KS4 Schemes of Learning (SoL) Overview

The exam board used by Acle Academy is AQA. In line with this, we follow our “Route Maps” in our schemes. This shows our adapted 2 year GCSE. Each of these courses (Foundation or Higher) is backed up by a clear scheme and various resources to support all of the teaching.

AQA Route Maps – Long Term Plans (subject to change)

The following route maps show progression through the 2 year GCSE scheme. This allows more time for students to assimilate key subject knowledge and to develop important problem solving skills required by the new curriculum. It also allows time for review points and an opportunity to assess understanding in each of the main attainment objective areas within the curriculum.

Foundation Route Maps

GCSE Mathematics (8300) Adapted 2 year foundation tier Route Map



Year 10

SEPTEMBER				OCTOBER				NOVEMBER	
Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Wk8	Wk9	Wk10
Review and revision	Standard form		Calculating with percentages	Measures		Review and revision	Holiday	Statistical measures	
NOVEMBER			DECEMBER				JANUARY		
Wk11	Wk12	Wk13	Wk14	Wk15	Wk16	Wk17	Wk18	Wk19	Wk20
Indices	Constructions and loci		Year 10 examinations and revision	Year 10 examinations and revision	Holiday	Holiday	Algebra recap and extension	Congruence and similarity	
JANUARY		FEBRUARY				MARCH			
Wk21	Wk22	Wk23	Wk24	Wk25	Wk26	Wk27	Wk28	Wk29	Wk30
Introduction to trigonometry		Review and revision	Holiday	Further perimeter and area		Graphs recap and extension	Further circumference and area		Review and revision
APRIL				MAY				JUNE	
Wk31	Wk32	Wk33	Wk34	Wk35	Wk36	Wk37	Wk38	Wk39	Wk40
Holiday	Holiday	Simultaneous equations		Properties of polygons		Review and revision	Holiday	Real life graphs	
JUNE			JULY						
Wk41	Wk42	Wk43	Wk44	Wk45					
Summer examinations and revision	Summer examinations and revision	Review of basic probability	Probability						

GCSE Mathematics (8300) Adapted 2 year Higher tier Route Map

Year 10

SEPTEMBER				OCTOBER				NOVEMBER	
Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Wk8	Wk9	Wk10
Review and revision	Calculating with percentages	Measures	Surds	Review and revision	Holiday	Statistical measures			
NOVEMBER			DECEMBER				JANUARY		
Wk11	Wk12	Wk13	Wk14	Wk15	Wk16	Wk17	Wk18	Wk19	Wk20
Indices	Properties of polygons	Examinations and revision	Examinations and revision	Holiday	Holiday	Number recap and review	Congruence and similarity		
JANUARY		FEBRUARY				MARCH			
Wk21	Wk22	Wk23	Wk24	Wk25	Wk26	Wk27	Wk28	Wk29	Wk30
Pythagoras theorem and basic trigonometry	Review and revision	Holiday	Simultaneous equations		Probability		Statistics recap and review		Review and revision
APRIL			MAY				JUNE		
Wk31	Wk32	Wk33	Wk34	Wk35	Wk36	Wk37	Wk38	Wk39	Wk40
Holiday	Holiday	Algebra: introduction to quadratics and rearranging formulae	Volume		Review and revision	Holiday	Algebra recap and review	Sketching graphs	
JUNE		JULY							
Wk41	Wk42	Wk43	Wk44	Wk45					
Summer examinations and revision	Summer examinations and revision	Linear and quadratic equations and their graphs		Geometry and measures recap and review					

GCSE Mathematics (8300) Adapted 2 year Higher tier Route Map

Year 11

SEPTEMBER				OCTOBER				NOVEMBER	
Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Wk8	Wk9	Wk10
Review and revision	Algebra: further quadratics, rearranging formulae and identities		Trigonometry recap and extension	Growth and decay	Review and revision	Holiday	Equation of a circle	Further equations and graphs	
NOVEMBER			DECEMBER				JANUARY		
Wk11	Wk12	Wk13	Wk14	Wk15	Wk16	Wk17	Wk18	Wk19	Wk20
Further equations and graphs	Direct and inverse proportion		Mock examinations and revision	Mock examinations and revision	Holiday	Holiday	Inequalities	Vectors	
JANUARY		FEBRUARY				MARCH			
Wk21	Wk22	Wk23	Wk24	Wk25	Wk26	Wk27	Wk28	Wk29	Wk30
Further sketching graphs	Review and revision	Holiday	Sine and cosine rules	Transforming functions	Numerical methods	Circle theorems		Review and revision	Holiday
APRIL			MAY				JUNE		
Wk31	Wk32	Wk33	Wk34	Wk35	Wk36	Wk37	Wk38	Wk39	Wk40
Holiday	Gradients and rate of change	Pre-calculus and area under a curve		Algebraic fractions	Revision		Holiday	Revision	
JUNE		JULY							
Wk41	Wk42	Wk43	Wk44	Wk45					
June examinations	June examinations								

Each topic covers specific elements of the National Curriculum, and these are available to view in the ppt file associated with each scheme. An example is shown here for reference.



Basic number

	Specification content	Specification notes
N1	<ul style="list-style-type: none"> Order positive and negative integers Use the symbols =, ≠, <, >, ≤, ≥ 	including use of a number line
N2	<ul style="list-style-type: none"> Apply the four operations, including formal written methods, to integers – both positive and negative Understand and use place value (e.g. when working with very large or very small number, and when calculating with decimals) 	including questions set in context (knowledge of terms used in household finance, for example profit, loss, cost price, selling price, debit, credit and balance, income tax, VAT, interest rate)
N3	<ul style="list-style-type: none"> Recognise and use relationships between operations including inverse operations (e.g. cancellation to simplify calculations and expressions) 	
N14	<ul style="list-style-type: none"> Estimate answers Check calculations using approximation and estimation, including answers obtained using technology 	including evaluation of results obtained

The ppt document for each tier and course length is also available on request.