

# Hazel Oak Maths Policy 2016

*Fluency, reasoning, problem solving*

## Key Stage 1

Classes 1 and 2 follow the Early Years Foundation Scheme where mathematical concepts are discovered through play-based learning. Numicon is introduced in Class 1, which continues to be used throughout the school when working with numbers below 100.

Pupils will grasp a basic understanding of number, shape, position and measure and will gradually be introduced to problem solving.

Teachers use a variety of practical resources to support understanding and encourage pupils to discuss the mathematics that they are learning.

## Key Stage 2 and Key Stage 3

### Pupils accessing the P Scales

The P Scales were designed for pupils who are not yet ready to progress to the National Curriculum. At Hazel Oak School, these pupils will follow reception objectives which are supplemented by the Willow Dene School P Scale scheme of work. This scheme explores concepts of number, shape and space, measure and data handling through a variety of multi-sensory experiences.

The activities are an extension of the play-based EYFS lessons but with the beginnings of more formal recording of their work. We strongly believe that pupils should not be rushed through the P Scales as this forms a foundation for the remainder of their mathematical journey.

### Pupils accessing the National Curriculum

From 2016-17, Hazel Oak School has adopted a mastery approach to mathematics which underpins itself on the philosophy that everyone can do maths. This is achieved by following a CONCRETE – PICTORIAL – ABSTRACT approach (CPA). Using this approach, pupils have the chance to develop a real understanding for new concepts and can explore them in a variety of ways.

Pupils who are accessing the National Curriculum will follow the schemes of work, which have been published by the White Rose Maths Hub. As well as following the CPA approach, the scheme also allows for fluency, reasoning and problem solving; three key elements of the new curriculum.

### **Weekly Structure**

Pupils have four lessons of mathematics a week in Key Stage 2 and three lessons a week in Key Stage 3. The emphasis is that pupils learn skills over a longer period, striving for depth of understanding rather than quickly moving onto something else.

In each lesson, the teacher will model several questions with the whole class using concrete materials, pictorial representations and abstract statements. The class will then proceed to practice either using just concrete materials, concrete and pictures or concrete, pictures and abstract statements. The variety of representations is encouraged to promote depth of understanding. Pupils who grasp concepts quickly (rapid graspers) are encouraged to solve more challenging questions but that still lie within the same learning objective.

Pupil activities will initially focus on the 'fluency' aspect of understanding. These are the basic techniques of a concept. They then move onto 'reasoning' - a form of systematic thinking such as explaining whether an answer to a question is right or wrong. Pupils who excel in both of these areas will attempt the 'problem solving' aspect. These problems require a combination of fluency, reasoning and logic.

At the end of each lesson, pupils will have a chance to reflect on the objective with:

- 1) A self assessment using thumbs (up, middle, down)
- 2) Discussion of what the pupils have discovered

More in-depth self or peer assessment takes place at the end of a topic.

Teachers assess pupils progress using the 'HOPIS' which are a series of development walls. Formative assessment takes place throughout every lesson as the teacher gauges how well the pupils are understanding the objective.

### **Key elements of a mastery lesson**

***Questions in Context*** – Wherever possible, questions will be delivered in a context as this makes the maths more relevant and meaningful.

***Depth instead of moving on*** – Every child in the group will stick to the same objective. Some pupils may need some scaffolding whereas others will be encouraged to show depth in their learning in the following ways:

- 1) Explain their understanding
- 2) Describe patterns and make connections
- 3) Show their working in a variety of ways
- 4) Link their learning to other areas of maths where possible
- 5) Write their own questions

***Remember CONCRETE – PICTORIAL – ABSTRACT***

Teachers will use these stages as a progression when teaching a concept.

**CONCRETE** – Using physical resources to make the numbers and manipulate them appropriately

**PICTORIAL** – Drawing pictures which represent the concrete materials. This includes place value mats with pictures of hundreds, tens and ones used in the calculation, part-whole diagrams with pictures to show the amounts and number lines where possible.

**ABSTRACT** – Using written numerals to show their calculations and also write number sentences. They use the ‘bar method’ for addition and subtraction, arrays for multiplication and division, circles or bars for fractions.

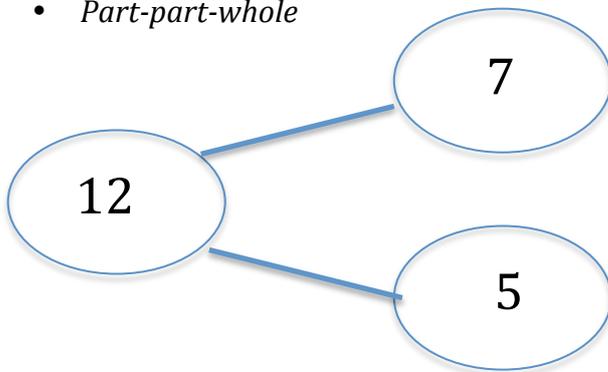
***Resources*** – Pupils will have access to a range of physical resources. These include:

- Two-sided counters
- Multi-link cubes
- Numicon
- Base 10 Kit
- Place value mats
- Tens sheet
- Place value cards
- Part-whole sheet

***Language*** – There is a significant emphasis on the language used during maths lessons. Every classroom has the ‘bright pi’ vocabulary list in sight.

***Frequent models and use of resources***

- *Part-part-whole*



Tens Frame – Used for early number use

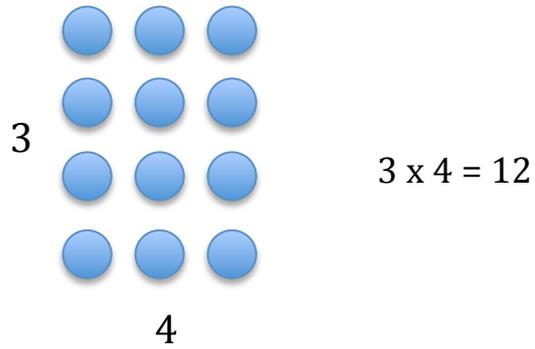

- *Place value mat – primarily used for place value, addition and subtraction*

Hundreds	Tens	Ones
		

- *Bar model – used primarily for addition and subtraction but can also be used for multiplication, division and fractions*

25	
11	14

- *Arrays – used primarily for multiplication and division*



- *Number Lines*

- *Marked number line*



- *Unmarked number line*



# Key Stage 4

Pupils in Key Stage 4 will continue to learn mathematics using the mastery approach of concrete, pictorial and abstract methods. They will have four lessons of mathematics a week.

Throughout Key Stage 4, all pupils will take the OCR Entry Level Mathematics exams. These consist of three written tests which are taken during lesson time and will either be taken at the end of Year 10 or Year 11. Some pupils will also sit the OCR GCSE Foundation Mathematics GCSE at the end of Year 11. This is a far more challenging qualification, consisting of three 1.5 hour examinations.

## **OCR Entry Level Mathematics**

These examinations test the pupil's knowledge of a broad range of early mathematical concepts. Depending on the percentage score, pupils will either achieve an Entry Level 1, Entry Level 2 or Entry Level 3 certificate.

The Entry Level covers material in the areas of:

- Whole Numbers and Calculation
- Shapes and Solids
- Multiples
- Lists and Outcomes
- Estimation and Approximation
- Symmetry and Transformations
- Formulae
- Units and Measures
- Fractions, Decimals and Percentages
- Proportionality
- Scales and Graphs
- Averages and Trends

For more information, [click here](#).

## **OCR Foundation GCSE**

Pupils in Year 11 during the 2016/17 academic year will be the first to take the new style mathematics GCSE. The traditional A\* to G grading has been replaced with a 9 to 1 system with 1 being equivalent to a G/F and 4 being roughly equivalent to a C.

The Foundation GCSE covers material from grades 1 to 5 in the areas of:

- Numbers operations and integers
- Fractions, decimals and percentages
- Indices

- Approximation and estimation
- Ratio and proportion
- Algebra
- Graphs of equations
- Basic geometry
- Congruence and similarity
- Mensuration
- Probability
- Statistics

For more information, [click here](#).

## Key Stage 5

Pupils in Key Stage 5 have two types of lessons. These are:

- OCR Functional Skills (2 hours a week)
- SEQ Maths (1 hour a week)

### **OCR Functional Skills**

Functional Skills is an additional accredited qualification which employers are increasingly recognising. This course focuses on using mathematics in real life situations such as budgeting, time keeping and arranging information. Pupils will take an examination at either Entry Level 1, Entry Level 2, Entry Level 3, Level 1 or Level 2.

For more information, [click here](#).

### **SEQ Maths**

SEQ Maths is a lesson where pupils use maths which supports their social enterprise project. They will practice these skills so that they can become more independent with their projects.

Sometimes, pupils will use this lesson to consolidate their mathematical understanding with the use of 'Mathletics'.

### **GCSE Re-sit**

Some pupils may wish to re-sit their GCSE examinations during Key Stage 5. The pupil, parents and staff will discuss this possibility before any decisions are made. Due to the nature of the Sixth Form timetable, course content may have to be covered during lunch times.

# Whole School Initiatives

## **Calculation Methods**

We use the calculation policy as provided by the White Rose Maths Hub. This is located in the mastery folder in the work drive. The policy clearly outlines concrete, pictorial and abstract methods for calculation.

## **Differentiation**

In KS2, 3 and 4, classes are split into ability groups. Within the groups, the majority of pupils will learn the same objective and complete the same activities. However, differentiation will be obtained through the CPA approach. Pupils will begin working at the concrete level and will progress through the pictorial and abstract approaches.

## **Marking**

Mathematics is marked in alignment with the whole school marking policy. Objective sheets are stuck into children's books where clear traffic lighting is shown.

## **Assessment**

Pupils are frequently encouraged to be thinking about their understanding and progress through each objective. Traffic lighting is used by teachers for each objective with peer and self-assessments used at the end of a series of lessons. Throughout KS2 and KS3, teachers use the Hazel Oak Performance Indicators as a form of summative assessment. Accredited courses of Entry Level and GCSE are used throughout KS4 with Functional Skills used in KS5.

## **Monitoring and Review**

Assess and review weeks take place at the end of each half term (October, February and May). Pupils are given 'Next Steps' targets to work towards and are given opportunities to practice objectives which require more attention.

## **Mathletics**

All pupils in Key Stages 2, 3, 4 and 5 have access to 'Mathletics'. This is an app which pupils have individual logins to access a wealth of material. Pupils can earn points by completing a variety of questions based on the national curriculum and online challenges against other mathletics users. By logging onto a desktop computer, the pupils will have the opportunity to trade in their points for prizes.

[www.mathletics.co.uk](http://www.mathletics.co.uk)

## **Homework**

Homework in most cases will focus on the fluency aspect of the curriculum. This includes the practice of number bonds, times tables and for some pupils, quick recall of percentage and fraction calculations. Homework will be set once a week on most occasions.

## **Star of the Week**

Pupils in lower school and upper school have the opportunity to be 'Star of the Week'. They win a specially designed postcard which is presented in the Friday assembly.

## **Adam Up Maths**

Adam Up is a website created by two members of the Hazel Oak staff team. It is a series of catchy songs designed to help pupils retain important mathematical information such as timetables, multiplication tricks and measure conversions.

[www.adamup.co.uk](http://www.adamup.co.uk)

## **World Maths Day**

World Maths Day is celebrated in October each year. We participate in this event by having a day dedicated to maths. The pupils participate in a carousel of activities.

## **Money Day**

The importance of money is paramount for children and on money day, we look at how money is spent and saved. We also provide a variety of engaging money based games.