



Cross Curricular and Numeracy Policy

Date Policy Reviewed: April 2018

Date Passed to Governors: May 2018

Date of Next Review: April 2020

Statutory Statement

Teachers should use every relevant subject to develop pupils' mathematical fluency. Confidence in numeracy and other mathematical skills is a precondition of success across the national curriculum. Teachers should develop pupils' numeracy and mathematical reasoning in all subjects so that they understand and appreciate the importance of mathematics. Pupils should be taught to apply arithmetic fluently to problems, understand and use measures, make estimates and sense check their work. Pupils should apply their geometric and algebraic understanding and relate their understanding of probability to the notions of risk and uncertainty. They should also understand the cycle of collecting, presenting and analysing data. They should be taught to apply their mathematics to both routine and non-routine problems, including breaking down more complex problems into a series of simpler steps. (The National Curriculum in England: KS3&4 framework document. December 2014).

Roles and Responsibilities

AHT: to liaise with Numeracy Coordinator to ensure smooth running of Numeracy initiatives

Numeracy Coordinator: to analyse and interpret data on students' performance against school expectations and other comparative data to establish if there is a raising of standards in Numeracy. Monitor of students' work by regular book/file scrutiny to ensure quality, consistency and to identify areas for improvement. Evaluate through follow up departmental numeracy audits to be carried out annually in order to establish the extent of the success of the initiatives put into place to support students in non-Mathematics lessons. A review of the policy will then be made and new priorities established.

All staff should:

- ensure that they are familiar with correct mathematical language, notation, conventions and techniques, relating to their own subject, and encourage students to use these correctly.
- be aware of appropriate expectations of pupils and difficulties that might be experienced with numeracy skills.
- provide information for mathematics teachers on the stage at which specific numeracy skills will be required for particular groups.
- provide resources for mathematics teachers to enable them to use examples of applications of numeracy relating to other subjects in mathematics lessons.

Rationale

Numeracy supports the process of Teaching & Learning across the Curriculum and is integral to all areas to:

- raise the standards of numeracy of all students
- develop the ability of all pupils to use numeracy skills effectively in all areas of the curriculum
- develop the numeracy skills necessary to cope confidently with the demands of further education, employment and adult life.

One in eight (12%) of workplaces in England report a literacy and/or numeracy gap whereby at least one member of staff is unable to perform certain literacy or numeracy tasks to the level required in their day- to-day job. More workplaces report a literacy gap than a numeracy gap (8.6% vs 6.6%). Only 3.2% of workplaces report a deficit in both.

(DBIS: Impact of Poor Basic Literacy and Numeracy on Employers, 5th February 2016, Department for Business, Innovation & Skills).

Outcomes

- to develop, maintain and improve standards in numeracy across the school;
- to ensure consistency of practice including methods, vocabulary, notation, etc.;
- to provide materials to support numeracy in other subjects
- to identify students with the necessary skills to support other students in lessons ☐
to indicate areas for collaboration between subjects;
- to assist the transfer of pupils' knowledge, skills and understanding between subjects.

Procedures

- **Consistency of Practice** Departmental audits are carried out in order that all staff work together and take ownership of agreed strategies.
See *Appendix 1* which looks at the practice of Maths Staff and the practice of all other staff
- **Areas of Collaboration Whole school approach on the use of calculators**
 - See *Appendix 2* which looks at areas for collaboration
 - See *Appendix 3* which looks at the decisions staff should take in using calculators
- **Vocabulary**
 - See *Appendix 4* which looks at the common approach to take
- **Transfer of Skills**
 - See *Appendix 5* which looks at style of delivery

Other Related Documents:

The National Curriculum in England: KS3&4 framework document. December 2014. Mathematics: Made to Measure – Ofsted report 22 May 2012

‘The best schools tackled mathematical disadvantage with expert insight and ambitious determination, with policies and approaches understood and implemented consistently by all staff to the benefit of all pupils. Developing such expertise should be the goal for all schools.’

Appendix 1:

Teachers of mathematics should:

- be aware of the mathematical techniques used in other subjects and provide assistance and advice to other faculty areas, so that a correct and consistent approach is used.
- provide information to other staff on appropriate expectations of pupils and difficulties likely to be experienced in various age and ability groups.
- seek opportunities to use topics and examination questions from other subjects in mathematics lessons.
- On a rolling program of implementation, the numeracy coordinator will produce mastery resources that take examples of mathematical skills from subject areas and collate them into a unit of work. For example, exponential graphs from Science topics, linear graphs and speed distance time graphs from mathematics and climate graphs from Geography would be taught as a unit of work across all three departments, according to their individual curriculum maps. Pupils are then exposed to, recognition, repeated practice and application of core cross curriculum skills.

Appendix 2:

Areas of Collaboration:

- CPD to be provided on the variety of arithmetical techniques used by pupils in Key Stages 1, 2 and 3.
- There is an acceptance that pupils are able to tackle the same questions with a variety of methods. These approaches rely on mixing skills, ideas and facts; this is done by students drawing on their personal preferences and the particular question. However, emphasis must be placed on techniques that are in line with current examination board assessment requirements. For example, division by chunking is no longer recognised as an appropriate technique by the examination boards of Mathematics.
- All departments should give every encouragement to pupils using mental techniques but must also ensure that they are guided towards efficient methods and do not attempt convoluted mental techniques when a written or calculator method is required.
- CPD to be provided to bring all staff up to date with the methods used for basic numeracy. Emphasis being made of “non-standard” methods. This area needs highlighting as per KS2 curriculum and primary Teaching and Learning.
- The desire for pupils to progress to formal algorithms and the most efficient methods will only be encouraged where appropriate and not at the expense of having only a method rather than a cohesive and full understanding.
- Numeracy Leaders to be identified in each year group and badges issued so staff can identify pupils who have the required skills to support other students in form time activities.
- A booklet of basic cross-curricular Numeracy examples to be provided for all classrooms and a numeracy card for all KS3 pupils.
- A subject-specific Numeracy Mat to be provided for all classrooms.
- A decimal number line will be placed either in class rooms or corridors.

Appendix 3 Whole school approach on the use of calculators

In deciding when pupils use a calculator in lessons ensure that:

- pupils' first resort should be mental methods;
- pupils have sufficient understanding of the calculation to decide the most appropriate method: mental, pencil and paper or calculator;
- pupils have the technical skills required to use the basic facilities of a calculator constructively and efficiently, the order in which to use keys, how to enter numbers as money, measures, fractions, etc.;
- pupils understand the four arithmetical operations and recognise which to use to solve a particular problem;
- when using a calculator, pupils are aware of the processes required and are able to say whether their answer is reasonable;
- pupils can interpret the calculator display in context (e.g. 5.3 is £5.30 in money calculations);
- staff help pupils, where necessary, to use the correct order of operations – especially in multi-step calculations, such as $(3.2 - 1.65) \times (15.6 - 5.77)$.
- staff and pupils understand the limitation of calculators regarding negative numbers;

Appendix 4 Vocabulary

The following are used as important aspects of helping pupils with the technical vocabulary of Mathematics:

- Using a variety of words that have the same meaning e.g. add, plus, sum
- Encouraging pupils to be less dependent on simple words e.g. exposing them to the word 'multiply' as a replacement for 'times'
- Discussion about words that have different meanings in Mathematics from everyday life e.g. take away, volume, product range in Science topics means the greatest and smallest values in the data set, whereas in Mathematics, range demonstrates the *difference* in value between the largest and smallest values in a data set. etc.
- Highlighting word sources e.g. quad means 4, cent means 100 so that pupils can use them to help remember meanings. This applies to both prefixes and suffixes to words.
- The use of keywords
Pupils should become confident that they know what a word means so that they can follow the instructions in a given question or interpret a mathematical problem. For example, a pupil reading a question including the word perimeter should immediately recall what that is and start to think about the concept rather than struggling with the word and then wondering what it means and losing confidence in his / her ability to answer the question. The instant recall of vocabulary and meanings can be improved through flash card activities in starters. Within mathematics lessons key words are already highlighted on the department's seven point Ofsted lesson title slide.
Pupils need to be able to use all the units of measurement confidently, converting between them and most importantly, having a sense of the relative size of them and visualising what a particular dimension looks like.

Appendix 5 Transfer of Skills

The Mathematics Faculty will deliver the National Curriculum knowledge, skills and understanding through the Numeracy Strategy Framework using direct interactive teaching, with a greater emphasis on problem solving across the maths curriculum.

They will make references to and utilise applications of Mathematics in other subject areas and give contexts to many topics on a rolling program as they are developed throughout the academic year. Graphic skills will be the first cross curriculum unit of work. Other curriculum teams will also be building on this knowledge and help pupils to apply them in a variety of situations. Liaison between curriculum areas is vital to students being confident with this transfer of skills and the Mathematics team willingly offers support to achieve this.

The transfer of skills is something that many students find difficult. It is essential to start from the basis that students realise it is the same skill that is being used; sometimes approaches in subjects differ so much that those basic connections are not made. With the development of cross curriculum units of work approaches to learning will have a consistent approach.