

# Numeracy across the Curriculum Policy

Date: June 2016

LT Lead: AHT Numeracy with Numeracy Co.

## 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).

## 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 students 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, February 2016).

Blackfen recognises that KS3 is the 'bedrock' of future success, ... 'If you get Year 6 to Year 10 right then Year 11 looks after itself'. (KS3: the wasted years. Ofsted September 2015).

## 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 students' 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:**  
See *Appendix 2* which looks at areas for collaboration
- **Whole school approach on the use of calculators**  
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

## Key roles

*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.

*Mathematics Department Link:* to make other subject areas more aware of the underlying numeracy skills and approaches that go with the applications that they use.

## Other Related Documents:

The National Curriculum in England: KS3&4 framework document. December 2014.

Mathematics: Made to Measure – Ofsted report 22 May 2012

**Review Date:** June 2017 by Numeracy Coordinator

## **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 students and difficulties likely to be experienced in various age and ability groups.
- work to ensure that Numeracy Leaders have appropriate numeracy skills to be able to assist with the work in other subject areas.
- seek opportunities to use topics and examination questions from other subjects in mathematics lessons.

### **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 students 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.

## **Appendix 2:**

### **Areas of Collaboration:**

- CPD to be provided on the variety of arithmetical techniques used by students in Key Stages 1, 2 and 3.
- There is an acceptance that students 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.
- All departments should give every encouragement to students 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. Particular emphasis being made of “non-standard” methods, particularly for grid multiplication and division by chunking.
- The desire for students 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 students who have the required skills to support other students.
- A booklet of basic cross-curricular Numeracy examples to be provided for all classrooms
- A subject-specific Numeracy Mat to be provided for all classrooms
- Activities to be produced for Community Time by working with the Community Form Tutor Coordinator, to help improve Numeracy and Lateral thinking skills

## **Appendix 3**

### **Whole school approach on the use of calculators**

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

- students' first resort should be mental methods;
- students have sufficient understanding of the calculation to decide the most appropriate method: mental, pencil and paper or calculator;
- students 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.;
- students have their own scientific calculator so they can become familiar with the specific differences of their model;
- students understand the four arithmetical operations and recognise which to use to solve a particular problem;
- when using a calculator, students are aware of the processes required and are able to say whether their answer is reasonable;
- students can interpret the calculator display in context (e.g. 5.3 is £5.30 in money calculations);
- staff help students, where necessary, to use the correct order of operations – especially in multi-step calculations, such as  $(3.2 - 1.65) \times (15.6 - 5.77)$ .

## **Appendix 4**

### **Vocabulary**

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

- Using a variety of words that have the same meaning e.g. add, plus, sum
- Encouraging students 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 etc.
- Highlighting word sources e.g. quad means 4, cent means 100 so that students can use them to help remember meanings. This applies to both prefixes and suffixes to words.
- The use of keywords on the lesson flip chart

Students 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 student 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.

Students 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 the applications of Mathematics in other subject areas and give contexts to many topics. Other curriculum teams will build on this knowledge and help students 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.

Cross Curricular examples enable the Mathematics Department to cover work for other subject areas at appropriate times. This can form the starter activity where key skills are rehearsed and sharpened so that students gain more from the forthcoming application in the other subject.