



# **Isca Academy**

## **Numeracy Policy**

Date of publication: May 2018

Review date: May 2020

Raising the standards of numeracy of all of our students is paramount at Isca Academy. The Academy believes that through 'number confidence' there is every chance our students will be successful across all areas. It is essential that the Numeracy Policy has a strong connection to the Literacy policy. The two cannot operate in isolation. We recognise that literacy confidence is key to promoting a greater depth of numerical application.

We measure our success, not only on the confident application of number within the Academy but also our students' ability to employ numerical methods outside of the academy and in future educational and social environments.

With the advent of the new 9-1 specifications there is now much more emphasis on numerical techniques across all subject areas.

The Maths department has a member of the team who will liaise with other teams to identify mathematical concepts which can be taught simultaneously across teams and subject areas.

The purposes of our Academy numeracy policy is:

- I. to develop, maintain and improve standards in numeracy across the academy;
- II. to ensure consistency of practice including methods, vocabulary, notation, etc.;
- III. to indicate areas for collaboration between subjects and address the needs of the new 9-1 syllabus requirements;
- IV. to assist the transfer of students' knowledge, skills and understanding between subjects.
- V. to ensure numeracy confidence promotes enjoyment of problem solving across all areas.

#### **Contextual Information:**

The development of the concept of "numeracy":

1959 – (Crowther report) - Numeracy is defined as a word to represent the mirror image of literacy.

1982 – (Cockcroft report) - A numerate pupil is one who has the ability to cope confidently with the mathematical needs of adult life. There was an emphasis on the wider aspects of numeracy and not purely the skills of computation.

1995 (OED) – numerate means acquainted with the basic principles of Mathematics

A current definition of numeracy:

Numeracy is a proficiency which is developed mainly in mathematics but also in other subjects. It is more than an ability to do basic arithmetic. It involves developing confidence and competence with numbers and measures. It requires understanding of the number system, a repertoire of mathematical techniques, and an inclination and ability to solve quantitative or spatial problems in a range of contexts.

Numeracy also demands understanding of the ways in which data are gathered by counting and measuring, and presented in graphs, diagrams, charts and tables.

(Framework for Teaching Mathematics)

The Mathematical Association recommends that teachers of Mathematics and teachers of other subjects co-operate on agreed strategies to improve numeracy across a school community. We at Isca Academy endorse this.

In particular that:

Teachers of mathematics should:

1. Be aware of the mathematical techniques used in other subject and provide assistance and advice to other departments, so that a correct and consistent approach is used in all subjects.
2. Provide information to other subject teachers on appropriate expectations of students and difficulties likely to be experienced in various age and ability groups.
3. Through liaison with other teachers, attempt to ensure that students have appropriate numeracy skills by the time they are needed for work in other subject areas.
4. Seek opportunities to use topics and examination questions from other subjects in mathematics lessons.

Teachers of subjects other than mathematics should:

1. 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.
2. Be aware of appropriate expectations of students and difficulties that might be experienced with numeracy skills.
3. Provide information for mathematics teachers on the stage at which specific numeracy skills will be required for particular groups.
4. Provide resources for mathematics teachers to enable them to use examples of applications of numeracy relating to other subjects in mathematics lessons.

We adopt this approach at Isca Academy and some of the following:

### **Mental Arithmetic Techniques**

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. The Maths Department uses Numeracy Ninja in all KS3 classes which provides regular practice and develops confidence.

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.

### *Written Calculations*

Some students will use “non-standard” methods, particularly grid or box method for multiplication and the chunking method for division. In line with the guidance from the DfE, the message from the Mathematics department is that students should be encouraged to

progress to formal algorithms and the most efficient methods that encourage a cohesive and full understanding. We are seeing more of our Year 7 students arriving at Isca Academy confident in the use of more traditional algorithms.

### *Role & Use of Calculators*

In deciding when students use a calculator in lessons we will 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 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
- we help students, where necessary, to use the correct order of operations – BIDMAS

### **Vocabulary**

The following are all important aspects of helping students with the technical vocabulary of Mathematics, which can also be used in many other subjects:

- Use of Word walls
- 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

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. Starter activities are essential in promoting numeracy confidence.

## **Measures**

We are particularly aware that most young people still lack confidence in the application of everyday units of measurement. There is a general confusion in how Imperial and Metric units relate to each other. We will ensure that, throughout their time at Isca, our students will feel comfortable in calculating in measures across all subject areas. Knowing their personal statistics of height and weight in all metric and imperial units is key to this.

Technology teachers at Isca Academy have traditionally used millimetres and although the Mathematics department uses millimetres the focus is more on metres and centimetres. This is an area that students would need help with so that they can use all the divisions of a metre confidently, converting between them and, perhaps most importantly, having a sense of the relative size of them and visualising what a particular dimension looks like.

QCA and HMI have highlighted the use of rulers and protractors as a national weakness at Key Stage 2 and there is a need to increase student confidence and competence with these and other practical equipment. We encourage all students to use this equipment effectively in all lessons where appropriate.

## **Statistics**

Students use the statistical enquiry cycle from Key Stage 1 through to Key Stage 4 in many subject areas. There should be consistency in the use of graphical representation. Combined subject work will take place regularly to ensure that this is the case.

**Geography**, in particular, now has much more emphasis on Statistics:

- use appropriate measures of central tendency, spread and cumulative frequency (median, mean, range, quartiles and inter-quartile range, mode and modal class)
- calculate percentage increase or decrease and understand the use of percentiles
- describe relationships in bivariate data: sketch trend lines through scatter plots; draw estimated lines of best fit; make predictions; interpolate and extrapolate trends
- be able to identify weaknesses in selective statistical presentation of data

## **Transfer of Skills:**

It is vital that as the skills are taught, the applications are mentioned and as the applications are taught the skills are revisited.

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. Liaison between curriculum areas will be entrenched as a significant feature to ensure students are confident with the transfer of skills. We will provide opportunities for this to happen regularly at Isca Academy