

## Curriculum needs analysis

Highlight and discuss any key aspects that relate to your classroom practice in either mathematics or science. What possible professional development needs may arise?

### MATHEMATICS

#### GCSE Mathematics

GCSE specifications in mathematics should provide a broad, coherent, satisfying and worthwhile course of study. They should encourage students to develop confidence in, and a positive attitude towards mathematics and to recognise the importance of mathematics in their own lives and to society. They should also provide a strong mathematical foundation for students who go on to study mathematics at a higher level post-16.

GCSE specifications in mathematics should enable students to:

- Develop fluent knowledge, skills and understanding of mathematical methods and concepts
- acquire, select and apply mathematical techniques to solve problems
- Reason mathematically, make deductions and inferences and draw conclusions
- comprehend, interpret and communicate mathematical information in a variety of forms appropriate to the information and context.

(DfE 2013)

#### Functional Mathematics

The term 'functional' should be considered in the broad sense of providing learners with the skills and abilities they need to take an active and responsible role in their communities, everyday life, the workplace and educational settings. Functional mathematics requires learners to use mathematics in ways that make them effective and involved as citizens, operate confidently and to convey their ideas and opinions clearly in a wide range of contexts.

(QCA 2007)

#### Core Maths

Core Maths is about students doing meaningful mathematical problems to increase their confidence in using maths and to be better equipped for the mathematical demands of other courses, higher education, employment and life.

(Core Maths Support Programme) <http://www.core-maths.org/about-core-maths/>

## SCIENCE

### GCSE Science

GCSE study in the sciences provides the foundations for understanding the material world. Scientific understanding is changing our lives and is vital to the world's future prosperity, and all students should be taught essential aspects of the knowledge, methods, processes and uses of science. They should be helped to appreciate how the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas relating to the sciences which are both inter-linked, and are of universal application. These key ideas include:

the use of conceptual models and theories to make sense of the observed diversity of natural phenomena

- the assumption that every effect has one or more cause
- that change is driven by differences between different objects and systems when they interact
- that many such interactions occur over a distance without direct contact
- that science progresses through a cycle of hypothesis, practical experimentation, observation, theory development and review
- that quantitative analysis is a central element both of many theories and of scientific methods of inquiry.

GCSE specifications in the three sciences studied concurrently should enable students to:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science, through different types of scientific enquiries that help them to answer scientific questions about the world around them
- develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills, both in the laboratory, in the field and in other learning environments
- develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively.

(DfE 2015)

### Key Stage One Science

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of

appropriate secondary sources, such as books, photographs and videos.

(DfE 2013)

## Key Stage Two Science

### *Lower Key Stage Two*

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

### *Upper Key Stage 2*

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

(DfE 2013)