

A Case Study from Dromore High School

Planning and Implementing the revised Northern Ireland Curriculum

Key Stage 3 Science

Aim of this Case Study

This case study aims to illustrate how one school took a fresh approach to Science in the revised Northern Ireland Curriculum, using a 'Blue Skies' model of planning. Written by the school's Head of Science, it details the steps they took, the challenges and the benefits.

Before the Revised Curriculum

As a Science department, we had approached the Programme of Study for Science through a series of time specific modules.

Six modules (two Biology based, two Chemistry based and two Physics based) had been taught by one teacher per class in Year 8. A further six modules were taught by subject specialists as far as possible in Year 9. Three longer modules taught by subject specialists in Year 10 prepared pupils for the Key Stage 3 exams. Years 9 and 10 followed a content structure which reflected the required content of the Modular GCSE Double Award Science specification with, for example, Forces and Energy in Years 9 and 11 and Sound and Light in Years 10 and 12.

The disadvantages of this approach included:

- an emphasis on content rather than skills;
- the time pressure to complete a module, assess it and move on to the next one;
- the lack of time available for investigative work at Key Stage 3;
- little scope to move outside the Programme of Study;
- time given over to exam preparation and past papers and 8 weeks to fill after the 1st of May; and
- a repetition of 'all the good experiments' due to the similarity in the content at levels 5,6 and 7 in Science and Foundation level GCSE, leaving little that was 'fresh' at Key Stage 4.

Planning for the Revised Northern Ireland Curriculum

A Fresh Approach

As a pilot school for the revised Northern Ireland curriculum we were introduced to the 'Big Picture' and the subject strands in the autumn term of 2005.

As a Head of Department I became aware of the need to become familiar with these changes. In the spring term of 2006 I displayed the various aspects of the 'Big Picture' and Science strand around my room. These included the Curriculum Objectives, the Key Elements, Thinking Skills and Personal Capabilities, as well as knowledge, understanding, skills and learning outcomes specific to Science. This enabled me to become familiar with the structure of the revised Northern Ireland curriculum and get a grasp of the changes required.

It became obvious that two main aspects of development were necessary:

- the introduction of specific contexts to address the Key Elements; and
- skills based teaching and learning activities to address the Thinking Skills and Personal Capabilities framework.

I now needed to bring the department team on board.

At a whole school level, we had had some INSET on the 'Big Picture' so the staff was aware of the general changes required, but we needed to apply them to Science.

Essential Content

As a Science department our first step was to brainstorm what we were going to teach at Key Stage 3. We started with subject specialists writing down what they considered to be essential Science content at Key Stage 3. The temptation was to include everything that was there before but we knew we needed 'space'.

Some material necessary as a foundation for GCSE was included but there was also scope for material which had not been on the previous Programme of Study. We decided that a skills-based foundation, particularly in investigative work, was more essential preparation than covering subject content which would be covered again at Key Stage 4.

Expected Content

We collated our suggestions for essential Science content and then looked at the Science strand to see if we had missed areas from the expected content in the 'Learn About' section of Developing Pupils' Knowledge, Understanding, Skills (see Science Statutory Requirements, column 1).

The expected content, under the headings of:

- Organisms and Health;
- Chemical and material behaviour;
- Forces and Energy;
- Earth and Universe;

gave us a wide structure to fit in what we deemed necessary content without closing down creativity when developing schemes of work.

Planning for the Revised Curriculum

The 'Blue Skies' Approach

At this stage we needed to decide if we would simply adjust the modules in our present scheme of work or throw caution to the wind and go for a new scheme from scratch.

From my point of view, as Head of Department, the advantages of a new scheme were as follows:

- an opportunity to get creative and inject freshness into our teaching;
- a release from time-bound modules giving opportunity to explore topics;
- an opportunity to properly develop skills and investigative work;
- an opportunity to apply whole school initiatives we had been involved in, such as Thinking Skills, Literacy, Numeracy and e-learning modules; and
- a way to make sure the new aspects of the revised Northern Ireland Curriculum were being implemented.

Some of the disadvantages were:

- the time required to write a new scheme and resource it (the textbook was not available at this time);
- the risk involved in choosing our own approach and content;
- keeping everyone in the department enthused when the novelty wore off and other pressures kicked in; and
- the sheer amount of work required between March and September to be ready to teach.

Despite these drawbacks we decided to go with a new scheme. We looked at our essential and expected content again and made an outline plan of where we would teach topic areas over the three years of Key Stage 3.

Our approach was to have three thematic units of work for Year 8 with a similar thematic approach in Year 9. The topics crossed the boundaries between the Science subjects and made links to other subjects in the school. The thematic approach was not a whole school initiative. Classes in Years 8 and 9 would be taught by the same teacher for the whole year.

At present we have decided to retain subject specific units in Year 10 as a preparation for GCSE but we envisage links across the subjects. At the point of writing Year 10 has still to be developed.

The three thematic units for Year 8 are:

- Becoming a Scientist – safety, skills and investigations.
- Salt of the Earth – constituents of rock salt, speed, friction and road safety, elements and compounds.
- Your Body Matters – adapted from CCEA material, 'Your Health is Your Wealth'.

Planning for the Revised Curriculum

Addressing the Thinking Skills and Personal Capabilities

I attended some INSET provided by CCEA on Thinking Skills and Personal Capabilities and found the CCEA document entitled 'Thinking Skills and Personal Capabilities for Key Stage 3' to be useful in crystallising my thinking.

As an exercise within the Science department to brainstorm ideas, I set out large pieces of white paper and markers. At the centre of each page was a description of the meaning of each of the skill areas: Managing Information, Self-Management, Being Creative, Working with Others and Thinking, Problem-Solving and Decision-Making. My department team went around each page and wrote down any teaching and learning strategies that they did with their classes which addressed these skill areas. One of our teachers had experience teaching Learning for Life and Work and was able to contribute ideas from that approach.

This activity enabled us to recognise that we were already addressing these skills to some extent in our teaching but that there was scope for the development of new teaching and learning strategies. There was both encouragement and expectation. Again the ideas were collated and used for reference as we progressed.

Planning for the Revised Curriculum

Writing the Scheme

1. An overview outline of the unit of work

This was adapted from the outline provided by CCEA to address all areas in the Science strand. It keeps us in touch with the 'Big Picture' and includes Aims, Curriculum Objectives expressed through Key Elements, links to other subjects, Science content outline and skills addressed.

2. The scheme of work

The scheme structure provides everyday guidance on context and teacher/pupil activities for teachers as well as outlining skills, resources and opportunities for Assessment for Learning (AfL). Learning Outcomes identify content and are not as specific as Learning Intentions which are pupil orientated and are written on a WALT board.

3. Resources

The new scheme of work was facilitated by the provision of Pupil Information Sheets PINS (handouts), Teacher Information Sheets TINS (with answers and guidance), worksheets for activities and investigation sheets for practical work. Sheets were colour co-ordinated for each topic. This helped with file organisation and revision.

Once an outline of the topic had been generated the department got together to fill in the teaching and learning strategies, Thinking Skills and Personal Capabilities and opportunities for assessment. This was done during Baker time and some time set aside on exceptional closure days. We spent about ten hours together developing the scheme and resources for Year 8. Subject specialists assisted me in the production of resources which took up the greatest amount of time above the ten hours of planning.

Key Stage 3 days were allocated to those doing the word processing and we were at the run-off stage for the first 16-week unit by July.

The other two units were developed during the year. Units have since been reviewed and some changes made. As we worked through the scheme we became more confident at reducing content and more familiar with introducing skills, although we still have a good balance between the two. By the time I was observing lessons for Performance Review and Staff Development (PRSD), a wide range of activities had been introduced.

In November 2006 we began work on the outline for Year 9. A general theme for the year, Science in the House and Garden, was subdivided into:

- an initial 10 week unit on plants to include growing hyacinth bulbs for sale;
- a second 10 week unit on energy in the home including a collaborative unit with Geography and Technology based on the CCEA 'Dodging Doomsday' material;
- a third 10 week unit on Science in the kitchen addressing such topics as heat transfer, acids and alkalis and recycling; and
- finally back to the garden in June to look at food webs and habitats.

Key Elements such as Economic Awareness, Education for Sustainable Development, Employability, Citizenship and Spiritual and Ethical Awareness are being addressed in these contexts.

Benefits / What Worked Well

For me, as a Head of Department, one of the most fulfilling aspects of this new approach has been to get a group of Science teachers around a table and see ideas flow and enthusiasm grow as they make suggestions to flesh out a theme.

The 'Salt of the Earth' topic was particularly good as people expanded thinking and linked 'good Science' to everyday life contexts. (Overview page for this unit of work in appendix section.)

This unit used rock salt as a context to explore separation techniques and elements, compounds and mixtures.

The links between rock salt and road safety were used to explore friction and speed.

For example, we planned to lower the freezing point of water, write letters to the newspaper to have the Headmaster's road gritted and test small vehicles made by the Technology Department. Skills acquired in Unit 1, 'Becoming a Scientist', continued to be applied in new topics and there was a big increase in the amount of investigative work done.

The new thematic units of work set in everyday contexts enabled us to address not only the Key Elements but also Thinking Skills and Personal Capabilities through the introduction of skills activities in teaching and learning strategies.

On the whole, the introduction of the revised Northern Ireland curriculum has been an exciting challenge but is becoming easier as we become familiar with taking a more skills based approach to teaching and learning. Many areas, including some aspects of Assessment for Learning (AfL) and the assessment of Communication, Using Maths and Using ICT are still before us but the 'Big Picture' is coming to life and will develop further in the days to come.

Context

Dromore High School is situated in the town of Dromore, Co. Down, at the heart of a rural community between Banbridge and Lisburn. It is a controlled post-primary school catering for boys and girls aged 11-16 years. The enrolment stands at 780 and is drawn from a wide catchment area including town and country primary schools.

The Science Department

The Science department comprises 7 teachers with qualifications in Biology, Chemistry, Physics and Agriculture and experience in Careers Education, Learning for Life and Work and Senior Management.

The recent Specialist School in Science status has facilitated the employment of another teacher for 3 days per week and a third technician to specialise in ICT and resource management.

90% of pupils at KS4 are entered for CCEA GCSE Double Award Science with the remaining tutorial group pupils entered for CCEA GCSE Single Award Science. Science remains compulsory at Key Stage 4 in this school.

Appendix: Overview/Cover Page for Unit of Work 'Salt of the Earth'

Learning Area	<u>SCIENCE</u>	Title of Unit	<u>SALT OF THE EARTH</u>	Time Frame	<u>8 WEEKS</u>
<p>Aims of Unit:</p> <ul style="list-style-type: none"> To investigate the components of rock salt. To understand the differences between elements, compounds and mixtures. To appreciate the use of rock salt in road safety. 					
Knowledge, Understanding and Skills.	Curriculum Objectives expressed through	Key Elements		Links with other Subject Strands	
Scientific methods of enquiry Safe use of equipment Elements, compounds and mixtures Forces	Developing pupils as contributors to society	Citizenship - road safety Media awareness - letter to editor		History - chlorine in WW1 English - letter to Editor	
Learning outcomes - opportunities for the development of:					
Subject Specific Skills		Thinking Skills and Personal Capabilities		Formally Assessed Skills	
Demonstrate a range of practical skills; in undertaking experiments, including safe use of equipment. <ul style="list-style-type: none"> • Separating rock salt • Measuring speed Use investigative skills to explore scientific issues, solve problems, and make informed decisions. <ul style="list-style-type: none"> • Investigating rusting • Investigating friction Research and manage information effectively, including number and statistics where appropriate. <ul style="list-style-type: none"> • Road safety statistics • Report writing 		Work effectively with others to carry out scientific investigations. <ul style="list-style-type: none"> • Practical work in pairs • Group work for feedback Demonstrate creativity and initiative when developing own ideas. <ul style="list-style-type: none"> • Letter to editor • Planning investigations • Poem on WW1 		Communicate effectively in written, visual, mathematical and ICT formats showing a clear awareness of audience and purpose. <ul style="list-style-type: none"> • Report writing • Letter to editor • Feedback on investigations • Percentage salt • Calculating speed 	