Chapter 5

Developing a new curriculum model for science
Implementing any change needs to be carefully thought through; key questions need to be answered, steps in the process identified and all relevant people involved. Most importantly, the reasons for making the change need to be identified, shared and understood by everyone who might be affected by the change.

**ACTIVITY:**

**WHY?** The absence of a clearly argued reason for implementing change is one reason why colleagues may not come on board and support the development; it is also part of the reason that change can be stressful.

- What are your reasons for implementing a change to the curriculum model you offer to students? E.g. More students wish to study triple science than we can fit in our current model; We don’t currently deliver the non-statutory entitlement for students with Level 6 and above at Key Stage 3 to study triple science; Our local sixth form college have limited A level places and will only accept students who have B grades in the sciences they wish to study post-16; Our next cohort of students are very enthusiastic about sciences and we want to support their continued progression – generally, the most interested and able scientists want to do more science at GCSE; Our current curriculum model does not match the needs of our students and our locality

- What are your expected outcomes from implementing the change and are these realistic and measureable? E.g. Providing three GCSE equivalent time slots in the timetable instead of teaching triple science in Double Award time is expected to increase our % three A*-C at GCSE and encourage more students to progress to post-16 study in science subjects; Providing more students with the opportunity to study triple science is expected to increase the number of students studying two or more science A levels post-16.

- Discuss your reasons and the expected impact of implementing the curriculum change with colleagues in your department; use the combined wisdom to develop an argued justification for making the change.

- You could explore the factors which impact upon student progression beyond GCSE – the National Strategies research report ‘Progression to post-16 sciences’ will support this process.
Defining the process – Who, When and Why?

**ACTIVITY:**

WHEN? Having considered WHY the change is needed, the WHEN becomes an easier question to answer, enabling the planning of a local sequence of activity:

• Which cohort will the changed curriculum model be implemented with?

• When does information about the change need to be communicated and to whom?

• When does the case for the change need to be made to the school senior leadership team?

• When do structural considerations need to be addressed? Timetable constructed; resource implications addressed; staffing agreed and if necessary staff developed through CPD; specifications accessed and selected

• As with the implementation of any change, mapping the process onto a timeline enables potential time constraints and clashes to be avoided. Draw up a timeline for implementation, including as many steps as you can identify – remember to include review points during the implementation phase.

**ACTIVITY:**

WHO? This question will depend upon the structure that exists within your school. You might like to consider who the relevant members of the following groups might be, whether you would need or want to involve them in the process of changing the curriculum model in science and why:

• School senior leadership team

• School governors

• Teaching and support colleagues in science

• Parents (If so, of which students?)

• Students (If so, which ones? – Pre- and post GCSE?)

• Local employers

• Local Sixth form colleagues

Having considered who needs to be involved, add discussions with these groups into a timeline (you may have developed one during the previous activity and can add these to it).
Having identified the reason for changing the curriculum model, the next step is to identify the practical steps which need to be taken, barriers to possible implementation and how these might be overcome.

**ACTIVITY:**
WHAT? Consider the current curriculum offer alongside the one you plan to move to. The outcome of the first activity in page 7 of this iBook ‘Science as part of the school curriculum’ may help with the starting point.

- What are the similarities and differences between the existing and proposed curriculum models? How much change is involved?
- Is the curriculum offer for all students being changed or is the impact limited to those who would be following one of the existing pathways without the change? If so, which and how might this selective change impact on the perception of other students?
- Which cohorts does the change affect, directly and indirectly?
- What are the implications of the change on preceding year groups?
- Which staff will be affected and in what ways? Are they involved in the decision making process? Do they have ownership of the development?

**ACTIVITY:**
HOW? The final question we need to consider in preparation for action!

- What steps / actions do you, or others, need to take in order to implement the changed curriculum model? Hopefully, the changes you propose are included in your department development plan, or will be, before the time of implementation comes. You may find the Action Planning grid from the final chapter, ‘Self-evaluation and next steps’ in this book helpful.

- In drawing up an action plan, you may find it helpful to consider different phases of the process such as:
  - Identification and justification of the need for change;
  - Getting others on board to enable the change;
  - Exploration of the possibilities and issues that would need to be resolved – Chapter 3 of this iBook will help with this aspect.
  - Working with colleagues to prepare for the
Defining the process – What and How?

- Implementing the change
- Reviewing progress during implementation
- Reviewing the impact of the change
- Evaluating the benefits of the change and whether to continue with future cohorts.
- Reporting the impact – to governors, school senior leaders, parents, students?
Evaluating the impact – gathering feedback

If we are involved in an activity, we all develop opinions and perceptions about the experience. These perceptions inform our reaction to future events and help us to decide on the course of action we might follow.

Gathering feedback from those involved in activities or following particular courses provides valuable information about aspects which may have otherwise been missed, such as enjoyment and interest, but which play a major part in guiding future decisions.

**ACTIVITY:**

What is the student view? Some schools have established systems of student feedback, often involving student questionnaires and / or student interviews conducted with samples of students engaging in particular activities. In other schools, student forums provide an overview of the perceptions of the day to day experience of learners.

- What systems operate within your school to gather student feedback on a regular basis?
- How does science contribute to these whole school processes?

If you don’t have established systems in place, you might like to explore this further by exploring one of the following resources:

Pupil voice guidance in ‘The gender agenda’ –

‘Narrowing the gaps in science – a practical guide for science staff’ (in appendix of gender agenda pdf) for guidance and materials to support the development of the process.

Triple science case study – Using Student Voice

If you are more familiar with student feedback processes, you could sample the perceptions of students in existing GCSE groups. Keep the focus on the learning experience and course, avoiding reference to individual teachers.

- What do those students who currently study triple science say about their experience of learning triple science? How does this compare to students following courses which will enable them to gain 2 science GCSEs? What are the issues that both groups raise? What are the strengths? How are the responses of the two groups different?

- What do students in Year 7 say about their aspirations for the study of science? What are they interested in? What do they enjoy? What do they hope to find out during their secondary education?
Evaluating the impact – gathering feedback

• How do the responses of Year 7 students differ from those of the current GCSE students? What would Year 9 students say? What do they say? How can this be used to inform decisions about the nature of the learning experiences during their GCSE courses?

ACTIVITY:

What is the parent view? Parents play an important role in supporting and encouraging their children’s progress; many take an active part in helping them to decide on which curriculum pathways to follow.

• What information do parents receive to help them to guide students into the appropriate curriculum pathways?
• How do parents perceive the level and type of information they receive?
• What do parents think about the learning experience that their children receive? Whilst much of the information they receive will be second hand, from their children, it will help to fashion their perceptions of the effectiveness of the school curriculum and teaching.
• What do parents perceive the difference between science pathways to be? For example, are they keen for more students to follow triple science or keen for most students to engage in a broader range of subjects?
• Which parents are employed in science related careers? What do they think about the link between the curriculum pathways offered and progression to further engagement with science?
• You could establish a parent’s focus group to explore the curriculum pathways on offer and consider the progression routes and implications of each.
• You could survey a group of parents to establish their view of the curriculum offered in science.
ACTIVITY:
What is the view of our colleagues? It is important to make time to discuss our own views of the curriculum we present to students. Most science teachers would wish to have a curriculum which has the following aims:

The national curriculum for science aims to ensure that all pupils:

• 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 science enquiries that help them to answer scientific questions about the world around them

• are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future. Science programmes of study; [Key Stage 3 National Curriculum in England September 2013](#)

Is this the reality in our classrooms and department?

• Try to set aside some time for colleagues to share their views about developments and the purpose behind the activities we provide for students. Does our perception of the need to ‘cover the specification’ in a short period of time hamper our, and by association the students’, enjoyment of the learning experiences we create? How can practical implementation issues be resolved quickly so that the main focus can remain on the learning we are trying to encourage?

• Provide an opportunity to meet with colleagues regularly to review progress with respect to actions being taken in the department – it is better to be aware that something doesn’t feel quite right and that the impact may be less positive than hoped whilst there is time to address the potential issue, than to find out that a lot of time and effort has been put into trying to make something work which is not going to meet the desired outcomes.

Evaluating the impact – performance and progression

This page will give you the opportunity to:

• Reflect on the need for evaluation.

• Consider how to plan the evaluation before implementation.

• Explore available data to help the evaluation of impact on Students.
Student performance and their motivation to progress to the further study of sciences post-16 are both affected by their experience of GCSE science lessons. The curriculum model they are presented with contributes to their engagement.

Research into ‘Progression to post-16 sciences’ by the National Strategies revealed that students studying triple science with lessons outside the timetabled school day were not positive about studying science further unless they had a very clear career path which required science A levels.

What is the impact of the curriculum models you currently provide? How do you know?

**ACTIVITY:**

How do the curriculum models you offer to your students encourage them to study science courses beyond GCSE? How might a new curriculum model compare?

- How well do students following different curriculum models perform compared to:
  - national averages?
  - their prior attainment and expected progress?
  - previous cohorts of students?
- How well do the GCSE science results contribute to school indicators, such as eBacc and Best 8?

- How many of your current Year 11 students are planning on studying A levels or AS levels in science subjects next year?
- How many of last year’s Year 11 are currently studying science A levels or AS levels, either in your own sixth form or elsewhere?
- What other information about the progression of your students to A level science courses (not just in your own school if you have a sixth form) do you have?
- Are you still in contact with any of your ex-year 11 students? If so, what did they think about the curriculum models that were available to them?
- What do your current Year 10 and Year 11 students think of the offers?

If you have not conducted student interviews before, then you may find the first activity of ‘Evaluating the impact – gathering feedback’ in this iBook helpful.
Evaluating the impact – performance and progression

**ACTIVITY:**

Evaluation? Without evaluation processes, we would keep adding activities to our list of daily / monthly / yearly jobs. Evaluation enables us to identify those things which have a positive impact and those which don’t (within reason). We can save our energy for things which have a positive impact on students, by reducing the amount of the things which have little or no impact on them.

Reflect on a project / activity which you have introduced in the department this year, probably as part of the department development plan. Has it worked as originally planned? If not, what has gone differently and why? On the basis of the evidence you have to hand, will you continue to work on the project or conduct the activity next year? Why?

Did you have sufficient information to enable you to make a secure judgement about whether to continue the activity or to stop it? If not, what further information would be helpful and how could you gather this next time?

More information about conducting evaluations can be found within the National Strategies eLearning package: ‘Interventions in Science’.

**ACTIVITY:**

Thinking about possible changes to the curriculum models that you offer students. What information and data might help you to know whether the change has a positive impact after a year, or two, and should be continued or stopped?

- What data and information would it be wise to collect before making the change (as a baseline to enable comparisons)?
- What data and information might you want to collect during the implementation of the change?
- What data and information might you collect after the students have completed their studies and have followed the new curriculum models offered to them?

Gathering the data is not the evaluation, but it does help you to consider the impact on the students and contribute evidence to support the decision about whether or not to continue with implementation. Identifying which data to collect, from whom and when, before starting the implementation of any change helps to make the process less stressful and ensures the desired outcomes are in our mind whilst we act to bring about the change.
What are your priorities or next steps in developing a new curriculum model?

You might consider...

• Discussing the five questions considered in the first pages of this chapter with the members of the science department and briefing the school senior leaders regarding a suggested course of action.

• Reflecting on the evaluation processes currently in place within the department and particularly the range of information used to support judgements about action – are current approaches having a positive impact or is it time for change?

• Sharing feedback from students and colleagues who are experiencing and teaching different curriculum pathways within the existing model of provision. What are the strengths and weaknesses reported and what action do they suggest might be needed?