The National Strategies
Secondary

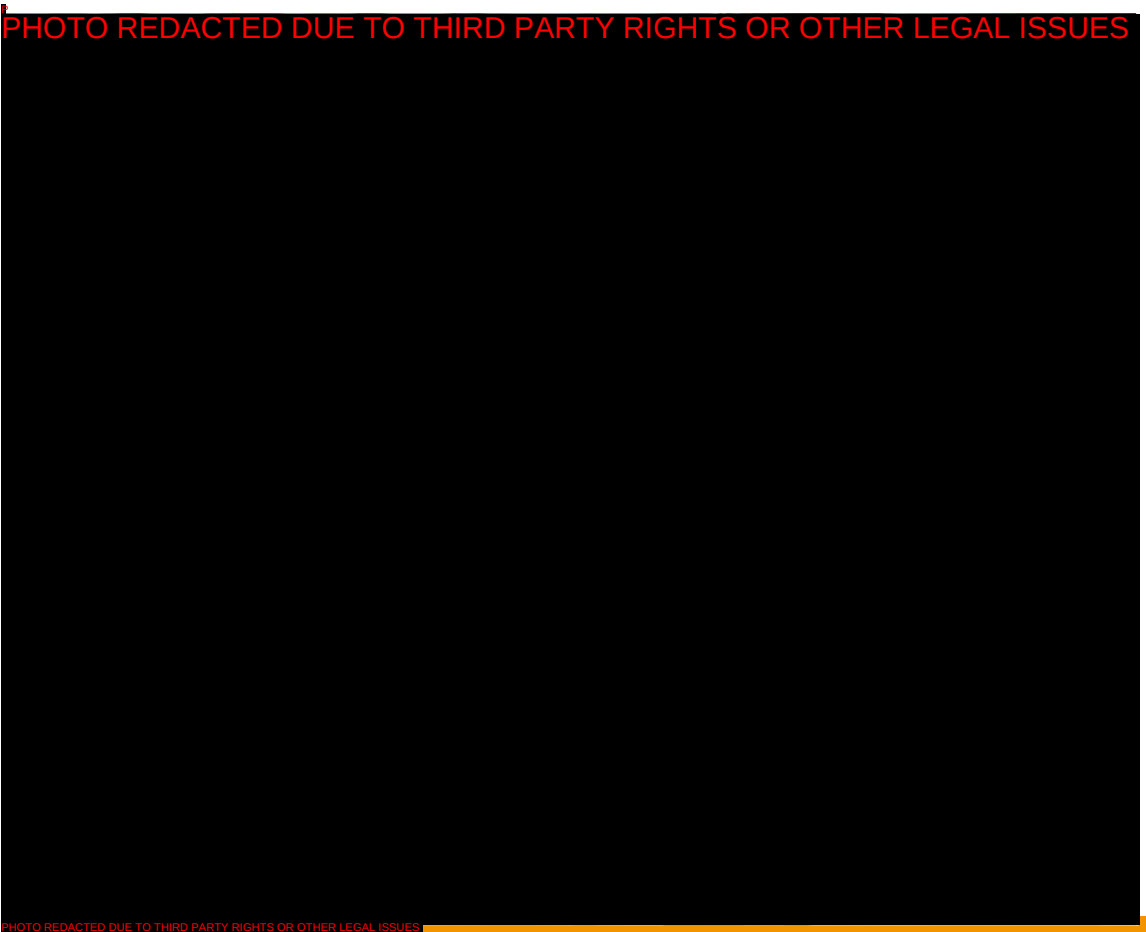


PHOTO REDACTED DUE TO THIRD PARTY RIGHTS OR OTHER LEGAL ISSUES

Science subject leader development materials

Summer 2008

department for
children, schools and families

Science subject leader development materials

Summer 2008

First published in 2008
Ref: 00314-2008DOM-EN

Disclaimer

The Department for Children, Schools and Families wishes to make it clear that the Department and its agents accept no responsibility for the actual content of any materials suggested as information sources in this publication, whether these are in the form of printed publications or on a website.

In these materials icons, logos, software products and websites are used for contextual and practical reasons. Their use should not be interpreted as an endorsement of particular companies or their products.

The websites referred to in these materials existed at the time of going to print.

Please check all website references carefully to see if they have changed and substitute other references where appropriate.

Contents

PowerPoint handouts

Part 1: The Framework for secondary science – planning

Part 2 : Developing our future scientists in your school

00314-2008DOM-EN

The National Strategies
Secondary

Dear Colleague,

Science subject leader development folder

This set of materials accompanies the Secondary National Strategy's science subject leader development day(s), which your local authority (LA) will be running in summer 2008. It builds on the materials provided for previous terms' meetings.

The discussions in the meeting will support you with the leadership aspects of your role both strategically and operationally.

This term the sessions provide you with some support and challenge in two particular areas:

- The Framework for secondary science – planning.
- Developing our future scientists in your school.

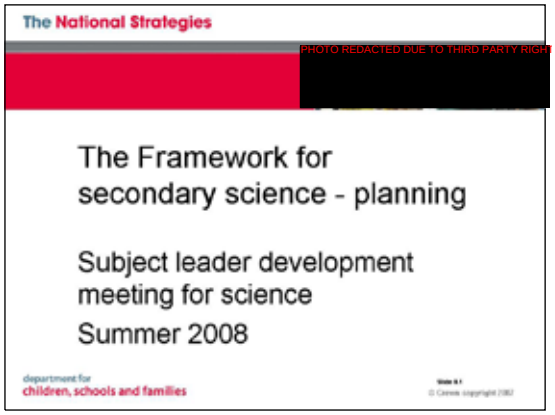
All sessions provide opportunities for you to share effective practice with colleagues from other schools. They are designed to help you to consider effective practice in teaching and learning – the main focus of the Secondary National Strategy.

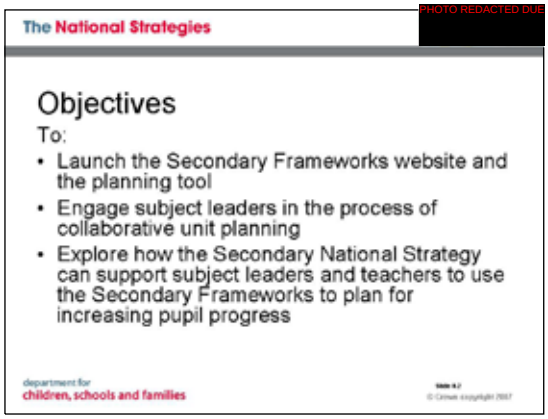
We welcome feedback via your local authority science team on the structure, content and timing of these meetings and materials. In the meantime, thank you for playing your part in the national drive for success.

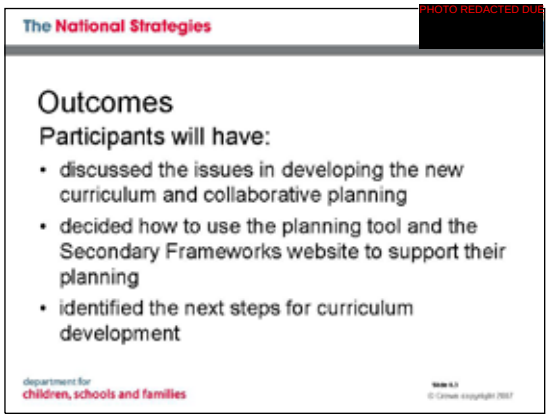
Yours sincerely,

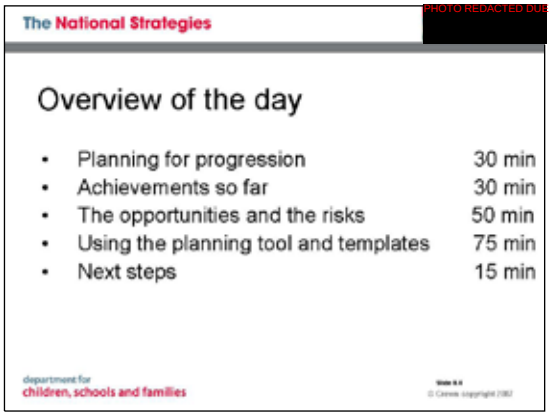
Pauline Hoyle
Senior Programme Director: Science
National Secondary Strategy
pauline.hoyle@nationalstrategies.co.uk

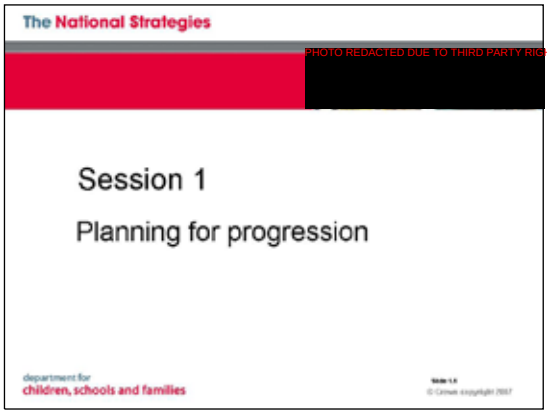
Session 1 The Framework for secondary science - planning

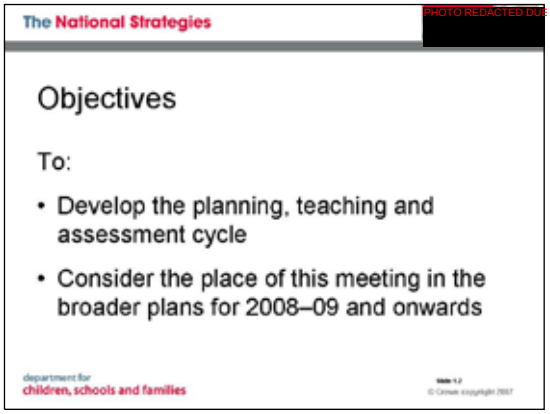


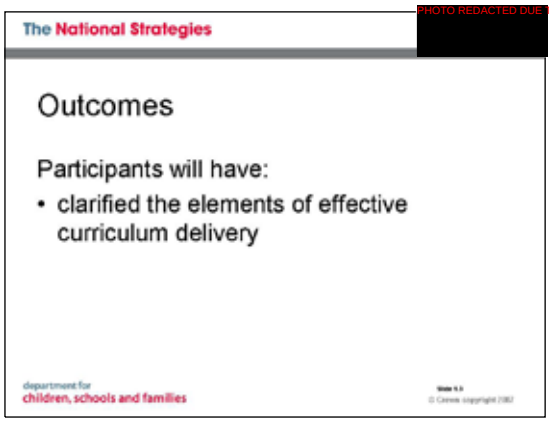


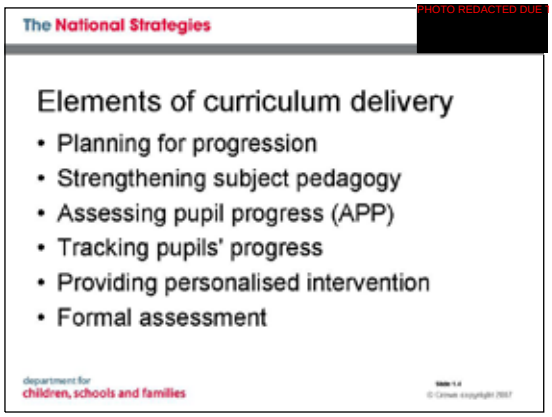


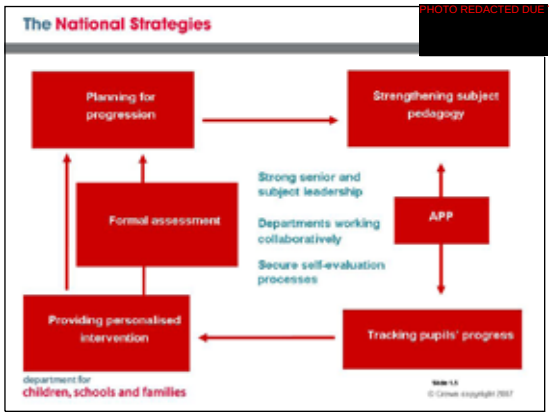


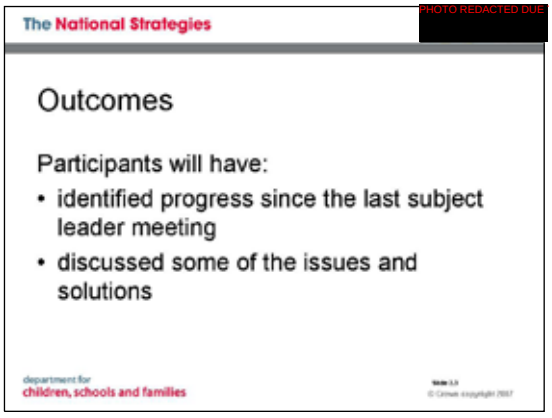


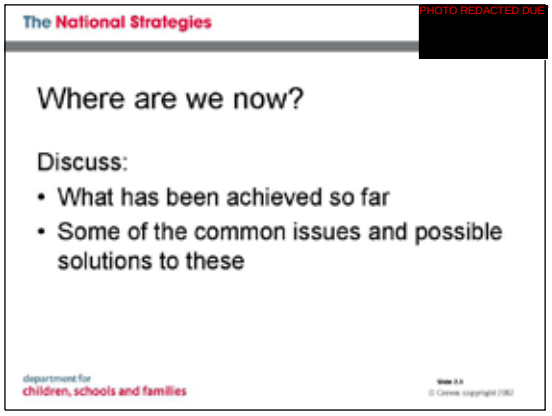


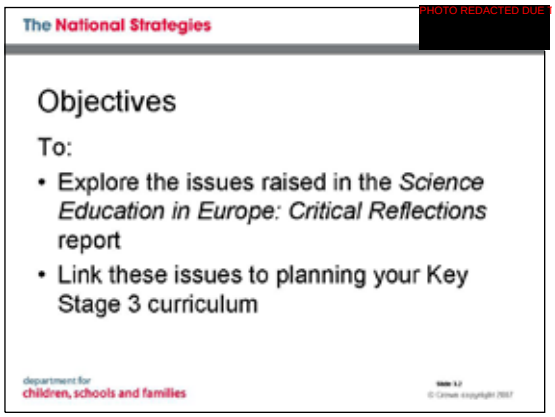


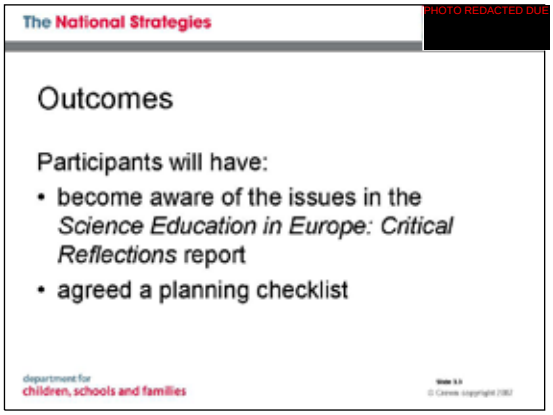


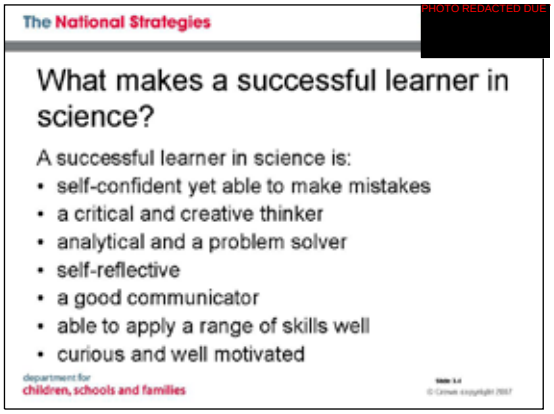


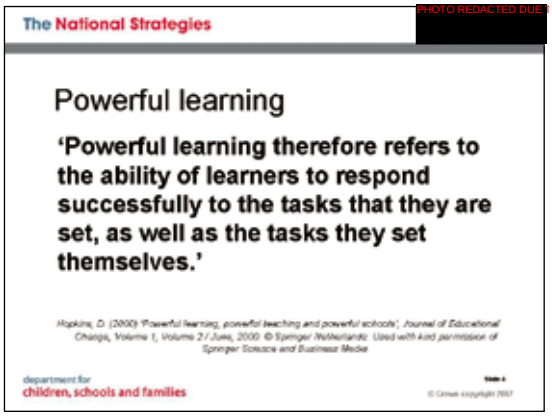


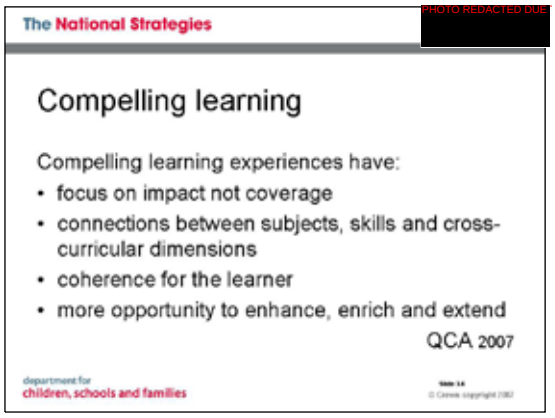


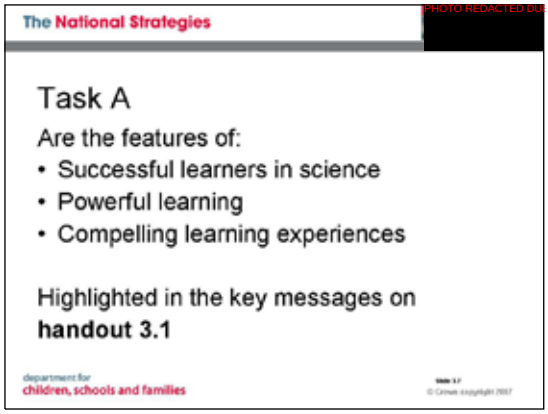


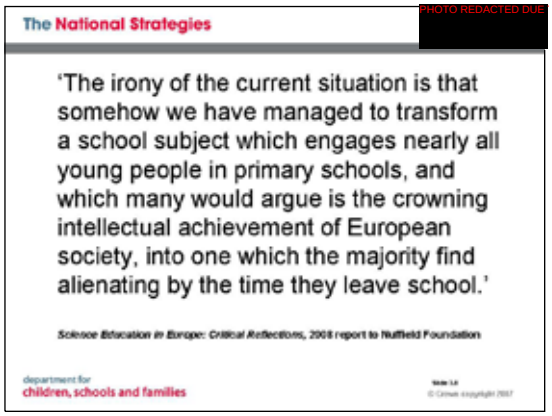


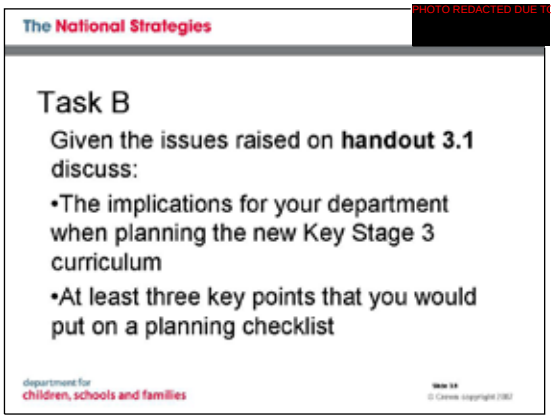


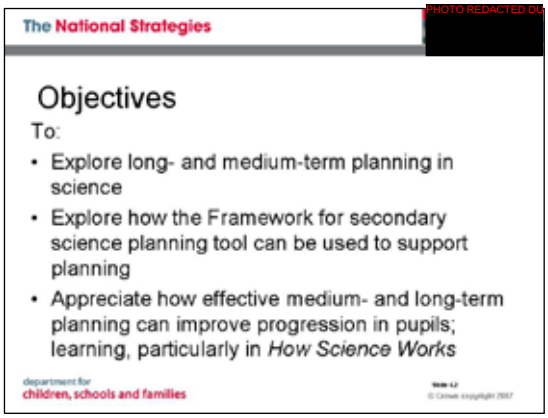


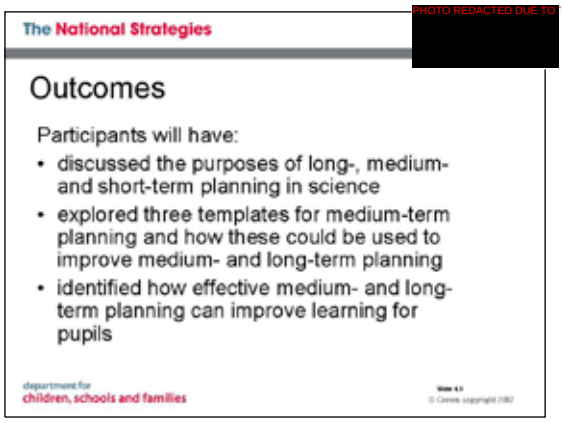


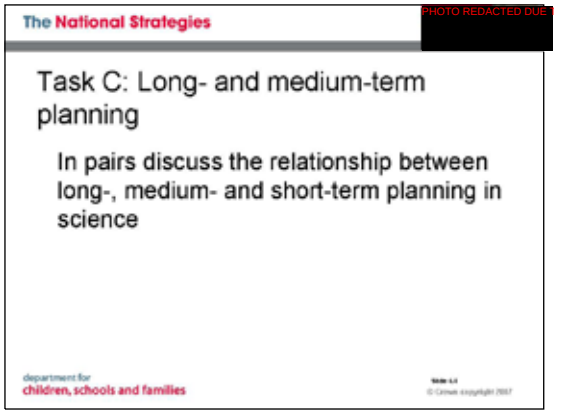


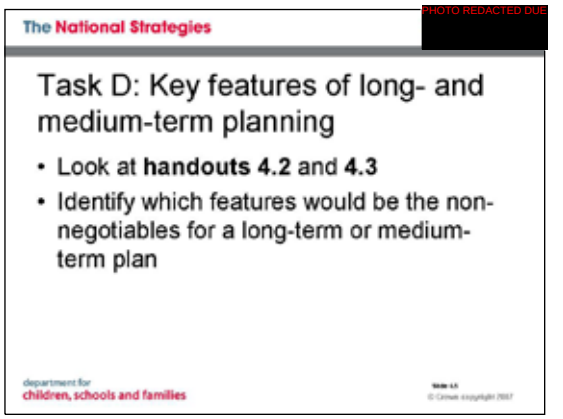


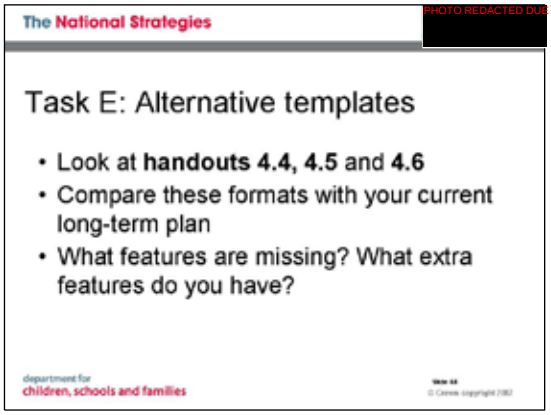


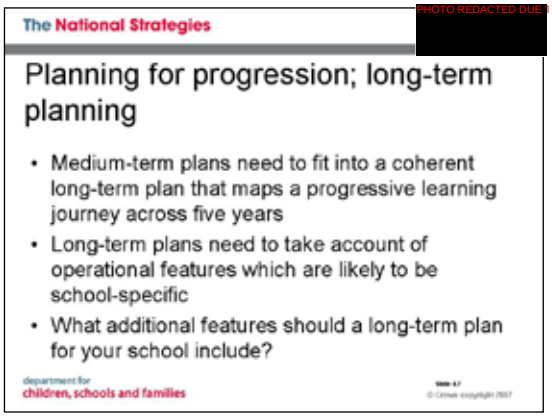


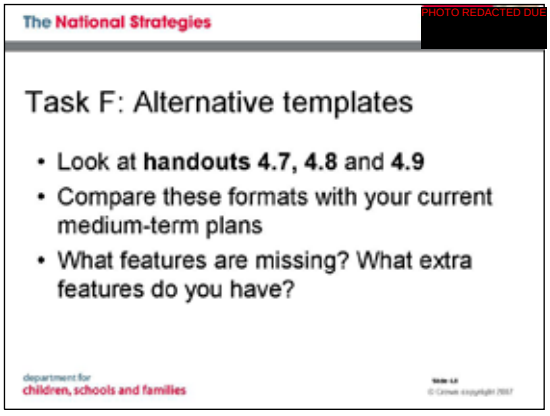


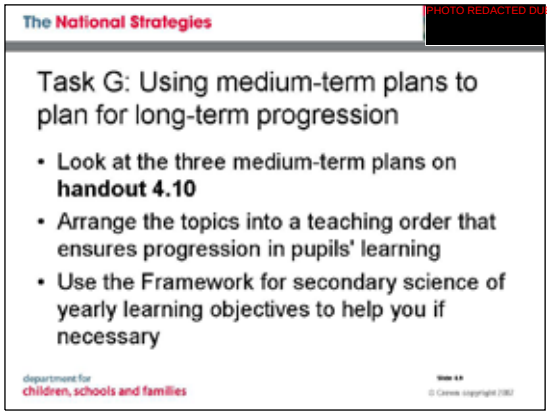


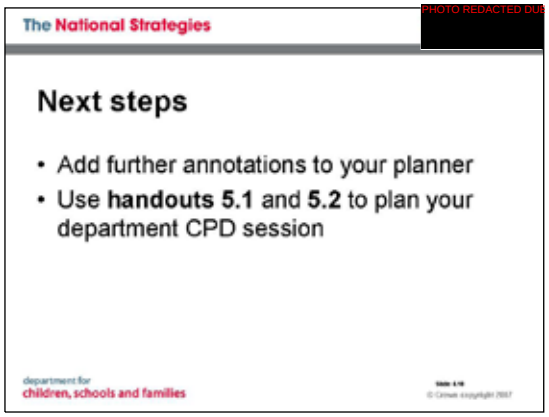




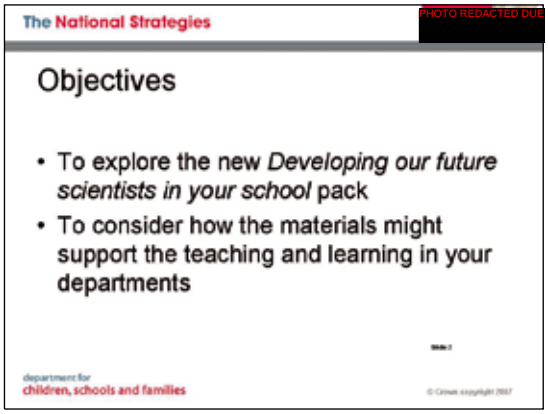


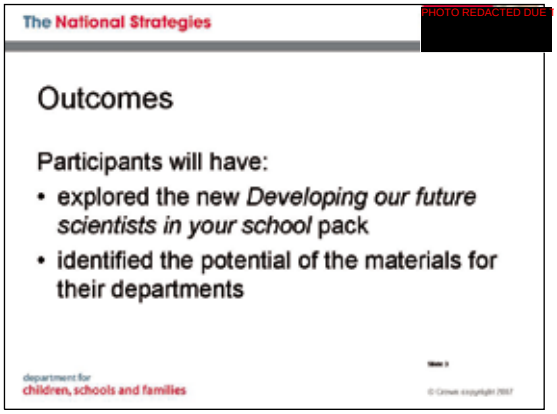


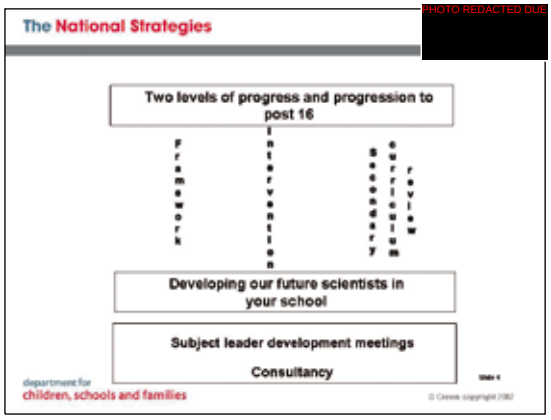


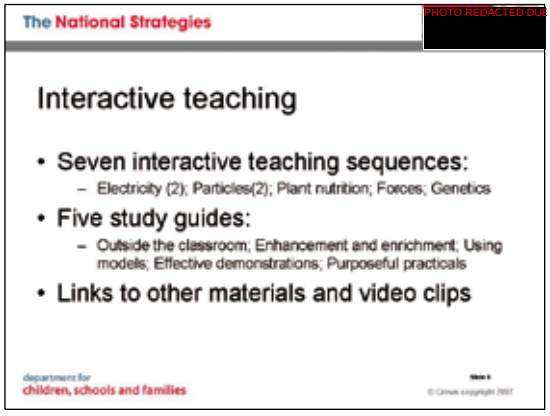


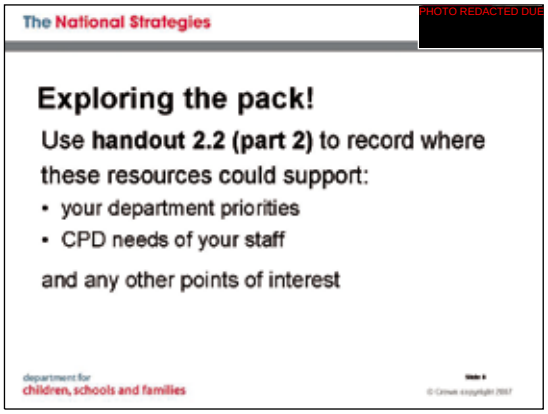
Session 2 Developing our future scientists in your school



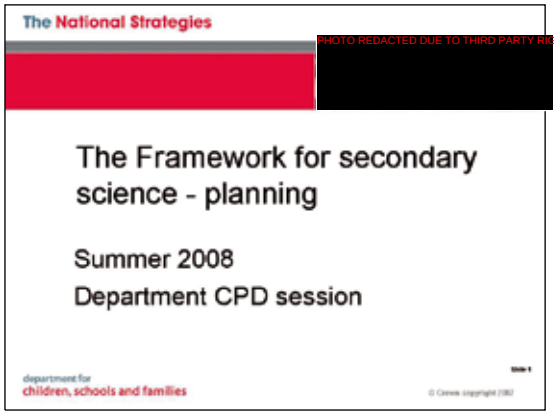


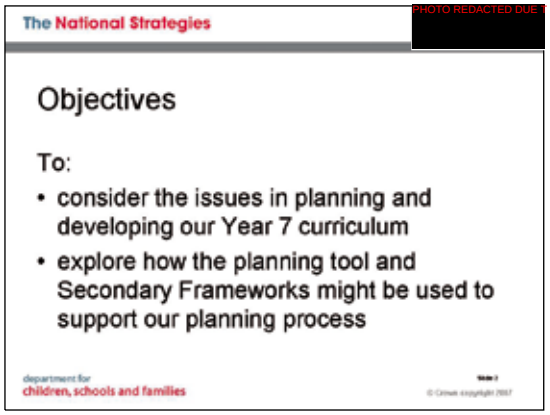


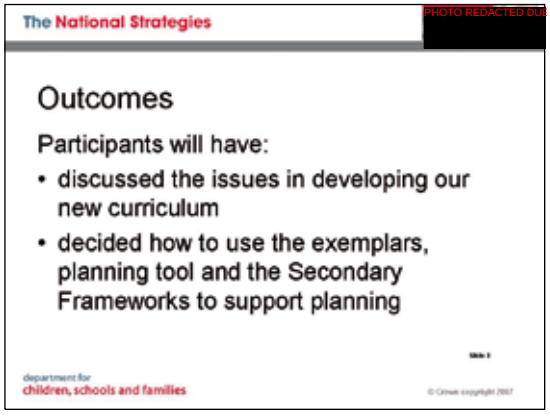


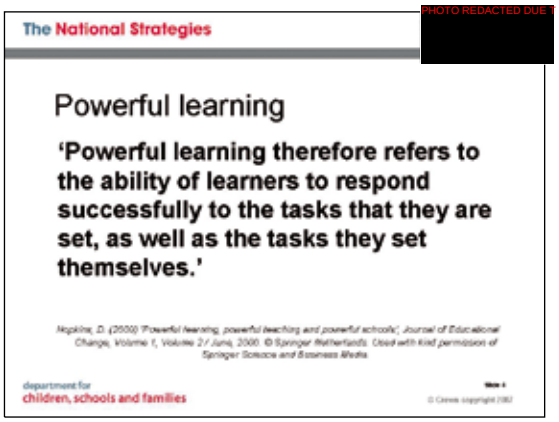


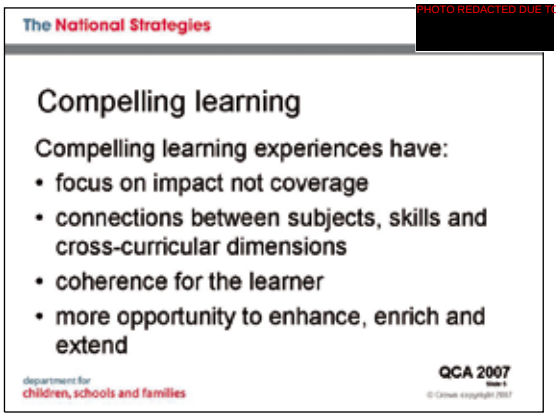
Session 3 Department CPD session

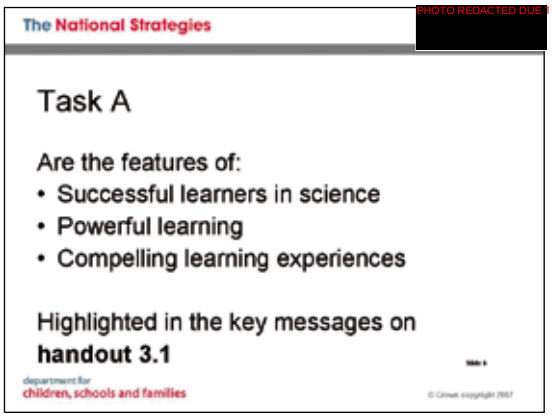


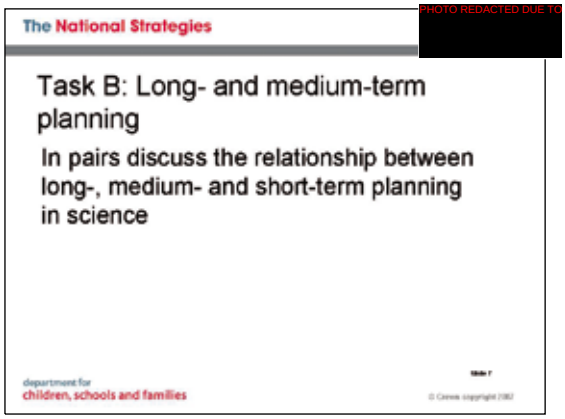


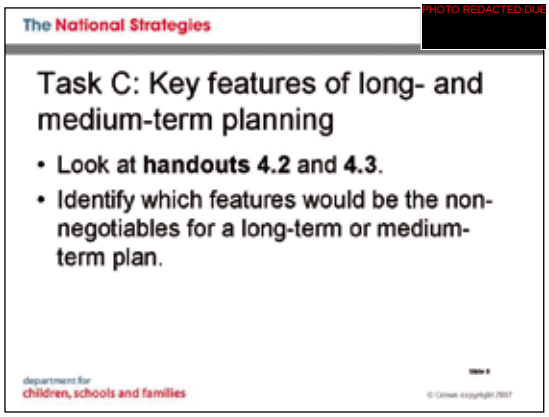


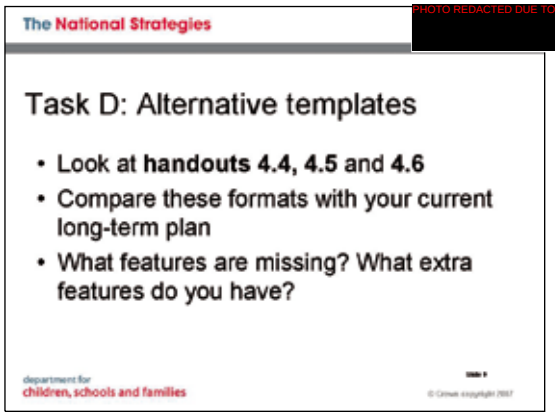


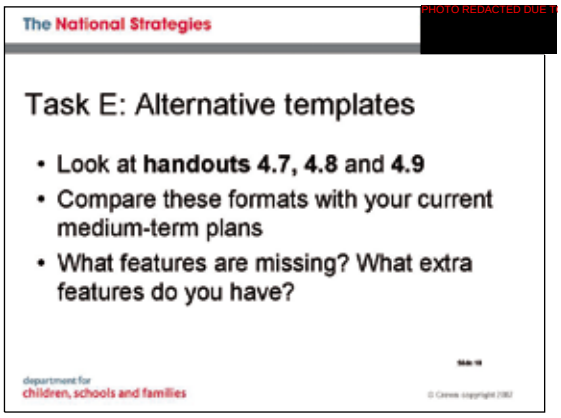


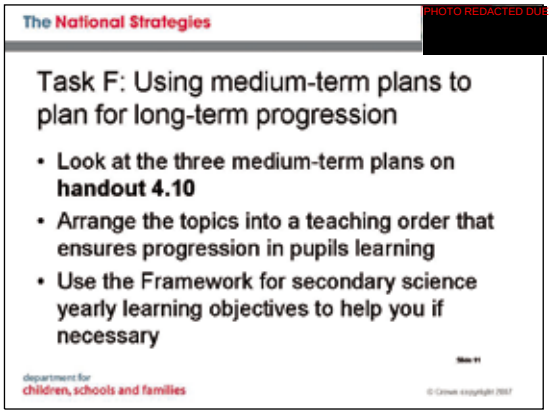


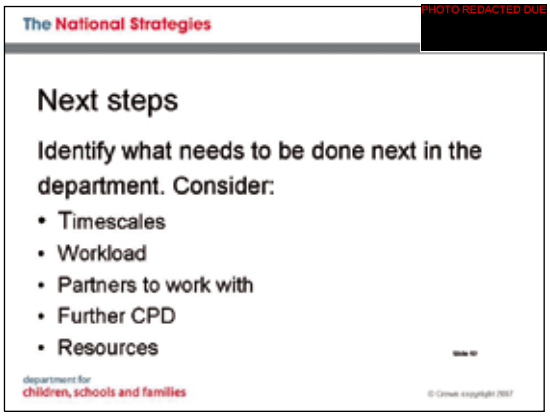












Handout 1.1 Progression plan

Handout 1.1a Progression plan for reading images

Planning for progression

Strengthening subject pedagogy

Formal assessment

Assessing pupils' progress

Providing personalised intervention

Tracking pupils' progress

Handout 1.2

Subject leader development meetings 2008–09

This document summarises the proposed content of the Secondary National Strategy SLDMs from 2008 to the end of the summer term 2009. The purpose is to provide local authority strategy managers, consultants, and school strategy managers with an overview of the priorities the Secondary National Strategy has identified and the work that subject leaders will cover during these meetings. It will enable local authorities and schools to have an overview of priorities and to see where there is overlap between subjects, where there are subject-specific issues, and to monitor and evaluate the progress departments are making.

While there will be opportunities for individual programmes to offer subject-specific materials and support through 2008–09, the SLDMs for all four core subjects have been planned in a coordinated way in order to provide a coherent suite of support through from spring 2008 until summer 2009. At the heart of this support will be the use of the Secondary Frameworks to increase the progress made by all pupils at both Key Stage 3 and Key Stage 4.

Subject leaders will be provided with resources to use with departments in order to ensure that the key messages are provided and discussed by department teams. Please note that, from the autumn term 2008, local authorities will be able to programme SLDMs in the first half of each term. This change has been made following feedback from local authorities and schools, in order to provide schools with materials and support that can be put into action in the same term as the meetings.

Spring 2008 SLDM 9

Common focus and content for all four core subjects:

This SLDM is the first of a series of connected termly subject leader meetings that each support the use of the Secondary Frameworks in the core subjects. This SLDM is the main vehicle through which core subject teams will be able to connect the development of the subject with the changes and innovations that are occurring as part of the wider curriculum reform. It introduces subject leaders to the overall aims of the new secondary curriculum, to the changes in the subject programmes of study and then to the Secondary Frameworks and how they will support planning for increased rates of pupil progress.

The Secondary National Strategy will provide sufficient materials for a **whole days workshop** for this set of events.

Summer 2008 SLDM 10

Common focus for all four core subjects:

- Introduction to and use of the Secondary Frameworks website and use of the planning tool.
- Reviewing and developing the scheme of work for Year 7.
- Establishing priorities for improved teaching and learning as part of the new Key Stage 3 scheme of work.

Science:

- *Developing our future scientists in your school* pack.

The Secondary National Strategy will provide sufficient materials for a **whole days workshop** for this set of events.

Strategy materials for local authority consultants to use at SLDMs will be available from 2 June 2008.

Autumn 2008 SLDM 11

Common focus for all four core subjects:

- Pedagogy for personalisation, including Functional Skills in English, mathematics and ICT.
- Exemplification via case studies of effective planning of units of work that lead to increased rates of progress for all pupils.

Science:

- Developing and retaining your staff.
- Developing strategies for progression to post 16 science.
- Making two levels of progress; addressing underperformance.

The Secondary National Strategy will provide sufficient materials for a **whole days workshop** for this set of events. Local authority teams will use the rest of the time for local contributions, case studies and sharing effective practice linked to the agreed focus for the meeting.

Strategy materials for local authority consultants to use at SLDMs will be available from September 2008.

00314-2008DOM-EN

Spring 2009 SLDM 12

Common focus for all four core subjects:

- Strengthening assessment for learning; securing periodic assessment and pupil tracking using APP.
- Examples of ways schools can work to strengthen periodic assessment using the planning toolkit and building a trajectory towards two levels of progress in Key Stage 3.

Science:

- Wave 1 to 3 intervention.
- *Developing our future scientists in your school* – part 2.

The Secondary National Strategy will provide sufficient materials for a **whole days workshop** for this set of events. Local authority teams will use the rest of the time for local contributions, case studies and sharing effective practice linked to the agreed focus for the meeting.

Strategy materials for local authority consultants to use at SLDMs will be available from January 2009

Summer 2009 SLDM 13

Common focus for all four core subjects:

- Strengthening assessment for learning: using day-to-day and periodic assessment to improve teaching and learning.

Science:

- Targeted intervention to address underperformance.

The Secondary National Strategy will provide sufficient materials for a **whole days workshop** for this set of events. Local authority teams will use the rest of the time for local contributions, case studies and sharing effective practice linked to the agreed focus for the meeting.

Strategy materials for local authority consultants to use at SLDMs will be available from April 2009.

Handout 3.1 Key messages from *Science Education in Europe: Critical Reflections*

Some key messages

- Transforming young people's attitudes to science is a long-term project.
- Our view is that a science education for all can only be justified if it offers something of universal value for all rather than the minority who will become future scientists. For these reasons, the goal of science education must be, first and foremost, to offer an education that develops students' understanding both of the canon of scientific knowledge and of how science functions.
- Many of the political and moral dilemmas confronting society are posed by the advance of science and technology and require a solution which, while rooted in science and technology, involve a combination of the assessment of risk and uncertainty, a consideration of the economic benefits and values, and some understanding of both the strengths and limits of science. To understand the role of science in such deliberations, all students, including future scientists, need to be educated to be critical consumers of scientific knowledge. Improving the public's ability to engage with such socio-scientific *How Science Works* issues requires, therefore, not only a knowledge of the content of science but also a knowledge of *How Science Works* – an element which should be an essential component of any school science curriculum.
- Traditional curricula in school science suffer from a number of difficulties. Knowledge is usually presented in fragmented concepts where the overarching coherence is not even glimpsed let alone grasped – an experience which has been described as akin to being on a train with blacked-out windows – you know you are going somewhere but only the train driver knows where. In addition, there is a growing gulf between the focus of school science – commonly the achievements of the 19th and early 20th centuries – and the science that is reported in the media, such as astrophysics, neuroscience and molecular genetics.
- The issue of why school science is not as engaging for young people as other subjects is complex. Nevertheless, two factors would seem important.

    1) Students now live in a culture which is increasingly reflexive and one, in addition, in which they are confronted with a much wider range of subject choice than was the case in the past. Adolescence is a period of identity formation and there is good evidence that a critical issue for young people is how their subject choice frames their sense of self-identity – in particular, how it reflects their personal values. School science has done little to consider how it might appeal to the values and ideals of contemporary youth and their culture. Hence, our view is that what school science requires is a new vision of why an education in science matters that is widely shared by teachers, schools and society. In particular, it needs to offer a better idea of what kinds of careers science affords – both *in* science and *from* science – and why these careers are valuable, worthwhile and rewarding.

    2) A growing body of recent research has shown that most students develop their interest in and attitudes towards school science before the age of 14. Therefore, much greater effort should be invested in ensuring that the quality of science education before this age is of the highest standard and that the opportunities to engage with science, both in and out of school, are varied and stimulating. Within schools, research has shown that the major determinant of student interest is the quality of the teaching. An accumulating body of research shows that the pedagogy in school science is one that is dominated by a conduit metaphor, where knowledge is seen as a commodity to be transmitted. For instance, teachers will speak of

trying to 'get across' ideas or that students 'didn't get it.' In this mode, writing in school science rarely transcends the copying of information from the board to the students' notebook. It is rare, for instance, to see any collaborative writing or work that involves the construction of an argument. Even experiments are written up formulaically. Little opportunity is provided for students to use the language of science even though there is good evidence that such opportunities lead to enhanced conceptual understanding. Research would suggest that this limited range of pedagogy is one reason why students disengage with science – particularly girls.

- Research would also suggest that deep, as opposed to superficial understanding, comes through knowing not only why the right answer is right but also through knowing why the wrong answer is wrong. Such learning requires space to discuss, to think critically and to consider others' views. Contemporary school science education offers little opportunity for such an approach.
- Nevertheless, what was apparent is that, with the exception of the new English curriculum *Twenty First Century Science*, all curricula are essentially similar in their nature commencing by introducing basic concepts that are then revisited in later years in more depth. Presented in this form, the experience for students is often one where:
  - The science curriculum can appear as a 'catalogue' of discrete ideas, lacking coherence or relevance, with an over-emphasis on content that is often taught in isolation from the kinds of contexts that might provide essential relevance and meaning.
  - The goals and purpose of science education are neither transparent nor evident to students.
  - Assessment is based on exercises and tasks that rely heavily on rote memorisation and recall, and are quite unlike those contexts in which learners might wish to use science knowledge or skills in later life (such as understanding media reports or understanding the basis of personal decisions about health, diet, etc.).
  - The relationship between science and technology is neither well-developed nor sufficiently explored.
  - There is relatively little emphasis, within the science curriculum, on discussion or analysis of any of the scientific or environmental issues that permeate contemporary life.
  - There is an over-reliance on transmission as a form of pedagogy with excessive use of copying.
- The content of the science curriculum has largely been framed by scientists who see school science as a preparation for entry into university rather than as an education for all. No other curriculum subject serves such a strong dual mandate. The result for teachers is that they must work with the tension that exists between these twin goals – the needs of future scientists and the need of the future non-scientists.

Extracted from: *Science Education in Europe: Critical Reflections*
A report to the Nuffield Foundation by Jonathan Osborne and Justin Dillon; King's College London

Handout 4.1 Extracts from the Framework for secondary science section 'Developing a scheme of work'

The curriculum map

The curriculum map shows how the science Key Stage 3 and 4 programmes of study (PoS) have been planned to ensure appropriate progression in scientific learning with both the science curriculum and the whole-school structure. A key part of any science curriculum map is also how it fits together with the structure of the school year, including holidays and school events, any whole-school activities, and experiences for pupils such as activity weeks or work experience, as well as curriculum enrichment experiences which a science department can offer. In planning the curriculum map, a science department needs to take account of:

- structures showing progression in the key concepts: key processes; curriculum opportunities; range and content and where these link to other curriculum ideas;
- the school year and holidays;
- the school diary of events and curriculum experiences;
- the external assessment timetable, including key stage tests and GCSE modular tests;
- the timetable of delivery of units and assessments throughout of the year for all courses;
- any internal and external, enriching and enhancing, science curriculum activities that are offered.

All these experiences for pupils can be built into the pupils' learning experiences as part of the science curriculum.

Organisation of teaching units

Many existing long-term plans in science departments are based on units or modules. These are often delivered in fixed blocks of time, even when some modules are more demanding than others. Departments need to re-examine the organisation of the teaching units to evaluate whether the arrangements they adopt meet the learning needs of pupils and enhance good progression.

Often organisation of the learning experience of pupils is based on the available resources, so, for example, pupils have six, six-week units each year because that suits the organisation of the practical resources. This does not always take account of the learning experience of pupils and promote good development of progression. When reviewing the curriculum, it is important to explore different routes through the curriculum to minimise disjointed or poor progression for pupils.

QCA definition of long-term planning

There are different ways of describing long-term plans. For the purpose of these materials, a long-term plan is the planned programme of work for a subject across the school, covering one or more key stages.

Long-term planning for a subject happens in the context of a school's overall curriculum plan (the long-term planned programme of work in all subjects covering every year group in a school). Schools develop their own individual curriculum plans to reflect their context and characteristics, as well as their values, aims and priorities.

A long-term plan shows how units of work in a subject are sequenced and distributed across years and key stages. Schools make decisions about the order and timing of units in a subject, focusing on curriculum continuity and progression in pupils' learning. These decisions might change from year to year to take into account new initiatives or other changes. Many schools also identify opportunities to highlight important links with work in other subjects in their long-term plans.

Use of staffing

There are variety of ways in which staffing can be deployed to deliver the science curriculum. A determining factor needs to be the experience it offers pupils to progress in their learning.

When pupils are mainly taught by one teacher throughout a year, this provides good continuity and progression in pupils' learning. However, when teachers cover the whole science curriculum there may be some areas of range and content in which they are less confident. There are ways in which this can be addressed. A good scheme of work will give those with less expertise support in teaching unfamiliar areas. Teachers can be 'buddied' to help each other in their preparation and planning. Alternatively 'subject experts' within a department can be used to deliver elements of the curriculum for those members of staff who are less familiar or secure in an area. This can also enhance pupils' interest and enthusiasm. Pairing up teachers so that they deliver aspects of the curriculum to each other's classes can help enthuse and interest pupils, for example, a geologist helping an inexperienced colleague teach earth science, or a physicist supporting a biologist. When the whole curriculum is delivered by one teacher, this offers continuity in the learning experience for pupils and makes it easier to ensure progression, particularly in *How Science Works*. This model also offers flexibility to spend more time on topics that pupils have found more challenging and to draw out links between different areas of science. It is a reasonable expectation that all teachers should be able to deliver all aspects of science at Key Stage 3.

If subject specialist teachers are used to deliver the entire Key Stage 3 curriculum, pupils can be taught by at least three teachers in one year. There are some strengths of this model, since the subject knowledge of the teachers should be secure and there is greater potential to challenge pupils more deeply. However, it can lead to fragmentation of the learning experience for pupils, and opportunities can be more easily missed for continuity and progression, particularly in *How Science Works*. If this staffing model is used, then these links should be made explicit in the scheme of work and in lessons so that pupils are aware of the continuity in *How Science Works* across the various range and content areas.

At Key Stage 4, some teachers may be secure in teaching the whole curriculum while others may only wish to teach part of the curriculum. Subject specialists can offer more depth of knowledge and expertise which can help enliven lessons and make them more interesting for pupils. However, the issue of the continuity of the learning experience for the pupils remains.

In reviewing the curriculum, the science department needs to listen to what the pupils say about their learning experience and reflect on this before they adjust their scheme of work, so that they can provide the best learning experience for the range of pupils. Remember that different arrangements may be needed for different groups of pupils.

Developing or revising a scheme of work

There are important principles involved in developing a science scheme of work. You should:

- make clear reference to the lines of progression in both the planning and the delivery;
- ensure appropriate coverage of the key processes and concepts as well as the content learning objectives;
- use effective blending of learning objectives so that the content is delivered through enquiry.

There needs to be a clear process for developing or revising the scheme of work as described overleaf.

Using the framework of learning objectives

The Framework for secondary science provides a set of learning objectives that gives a basis for progression in *How Science Works* across the range and content objectives. These should be used to review and develop the department's long- and medium-term plans to produce a scheme for learning appropriate for each academic year. The learning objectives can be used to support progression and coverage in the current scheme and to make amendments.

The learning objectives allow for flexibility in designing a long-term plan. For example:

- Some units can be led by a logical progression in the range and content objectives which draws on a range of different *How Science Works* objectives.
- Some units can be led by a logical progression in *How Science Works* objectives but draw on a range of different range and content objectives, even including content from different curriculum areas where appropriate.
- Some units can be led by a logical progression in both *How Science Works* and range and content objectives.

Making the most of flexibility

The new secondary curriculum offers greater flexibility and the opportunity to consider alternative models of delivery of the science curriculum. For example, some schools will build in cross-curricular modules or regular 'collapsed curriculum' days. This level of planning needs to be undertaken by the whole school and be built into the science schemes of work from the outset.

The Secondary Frameworks supports lessons based on ambitious learning objectives, which set challenging personal targets. They are a critical element in enabling a school or subject team to use rapid intervention to keep pupils on track, and to support vigorous assessment to monitor and maintain progress.

All pupils are entitled to our highest expectations and all will need to have access to learning through the objectives. Some will need additional support and others will need to be challenged and extended. The emphasis is on entitlement, inclusion and holding pupils into learning through high expectations, attention to prior learning, and effective scaffolding and differentiation.

In order that learners make best progress in reaching the objectives in the Secondary Frameworks, teaching must be planned taking account of learners' prior knowledge, where they are currently in their learning, and of their personal targets for learning, that is, where they need to be. The Secondary Frameworks actively and explicitly promotes teachers' professional judgement in developing sequences of lessons that respond flexibly to the needs of pupils, both in its structure and design and in its form as an online tool.

The Secondary Frameworks is a guide to good progression across Key Stages 3 and 4; most pupils should make two levels of progress during each key stage. The learning objectives in the Secondary Frameworks build a trajectory of progression from level 4 in Year 7 to level 6 at the end of Year 9 to grade B at the end of Year 11. Although the objectives are age-related, the strands allow teachers to move between the yearly objectives according to learners' attainment and progress, giving more flexibility in pitching objectives according to where different learners are and where they need to be, **within a common focus for learning**. For higher-attaining pupils, the scheme of work will need to use objectives across and beyond the suggested year groups and to include a greater breadth of experiences to build challenge.

For pupils who enter Key Stage 3 below level 4, or who have particular needs, the scheme of work will need to provide a variety of support so that these pupils can make good progress.

QCA definition of medium-term planning

There are different ways of describing medium-term plans. For the purpose of these materials, a medium-term plan is a planned sequence of work for a subject (or for more than one subject) for a period of weeks, such as a half-term or term, or for a number of lessons.

Medium-term planning focuses on organising coherent units of work. Medium-term plans identify learning objectives and outcomes and indicate the activities that will enable these to be achieved. They usually show a sequence of activities that will promote progression and some information about the amount of time needed to cover the objectives (whether in blocked periods or regular lessons over a period of weeks).

QCA definition of short-term planning

There are different ways of describing short-term plans. For the purpose of these materials, a short-term plan is a set of activities for a week, a day, or a lesson.

Short-term planning is based on the needs of individual schools and teachers. Teachers often use short-term plans to think through the structure and content of a lesson and to note information such as key questions, resources, differentiation and assessment opportunities, especially where this is not already included in the medium-term plan.

Many teachers use lesson plans selectively, for particular activities or subjects, rather than for every lesson. Experienced teachers often work direct from a medium-term plan and make notes as and when needed to support their teaching.

Handout 4.2 Features for planning templates

- Title.
- Year.
- *How Science Works* learning objectives.
- Range and content learning objectives.
- *How Science Works* learning outcomes.
- Range and content learning outcomes.
- Rich questions (joining *How Science Works* with range and content).
- Assessment opportunities.
- Barriers to learning, e.g. misconceptions.
- Key science terms (*How Science Works* and range and content).
- Prior learning and what follows (*How Science Works* and range and content).
- Links across the curriculum.
- Links across science (*How Science Works* and range and content).
- Literacy.
- Key scientific vocabulary.
- Numeracy.
- Personal learning and thinking skills including Social and Emotional Aspects of Learning (SEAL).
- Contemporary and/or relevant contexts.
- Key resources.
- ICT.
- Other local dimensions.
- Homework.
- Starters and plenaries.
- Evaluation.

Handout 4.3 Non-negotiables for long- and medium- term plans

Long	
Both	
Medium	

Handout 4.4 Exemplar long-term plan 1

One of these should be completed for each year group

	Yearly learning objectives ***How Science Works*** **target range =**	**Yearly learning objectives** **Range and content** **target range =**	**Assessment opportunities** **target range =**
Autumn term X weeks			
Spring term X weeks			
Summer term X weeks			

Page 2 of 5

Theme/unit	Autumn				Spring				Summer			
Yearly learning objectives *How Science Works*												
Yearly learning objectives Range and content												
Further details												

	Autumn				Spring			Summer			
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July
Units →											
Calendar events ↓											
Assessment opportunities											
Events											
Reporting											
Enrichment/ Enhancement											

Page 3 of 5

	Using models in science	Using models in science	Using models in science
Autumn term X weeks Yearly learning objectives for Year 7 arranged in terms	Pupils will be able to: • use an existing model or analogy to explain a phenomenon; • recognise and explain the value of using models and analogies to clarify explanations; • describe more than one model to explain the same phenomenon and discuss the strengths and weaknesses of each model; • describe how the use of a particular model or analogy supports an explanation.	Pupils will be able to: • describe matter using a simple model and use it to explain changes of state; • recognise the link between heating and cooling and changes of state; • use the simple particle model to explain the physical characteristics of solids, liquids and gases; • use a combination of food chains within a habitat to produce food webs; • explain energy transfer in food chains and webs and relate this to the abundance of organisms.	Teaching assistant open-ended task 6 Key Stage 3 test questions (from test base) pack 2 E.g. levels 5-6
Spring term X weeks			
Summer term X weeks			

Page 4 of 5

Theme	Autumn Using models in science				Spring				Summer			
Yearly learning objectives *How Science Works*	Yearly learning objectives	Yearly learning objectives	Yearly learning objectives									
Yearly learning objectives Range and content	Yearly learning objectives	Yearly learning objectives	Yearly learning objectives									
Further details												

Select yearly learning objectives and sequence for progression in unit

	Autumn				Spring			Summer			
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July
Units →	Using models in science										
Calendar events ↓											
Assessment opportunities	Teaching assistant open-ended task 6	Key Stage 3 test questions (from test base) Pack 2									
Events	Sponsored walk 15.09.09	Half-term 23-30 Oct									
Reporting		Interim target day 21 Oct									
Enrichment/ Enhancement	Visiting scientist 24 Sept										

Units sequenced taking into account progression in learning and operational issues specific to school and year

Handout 4.5 Exemplar long-term plan 2

	Year 7 Range =	Year 8 Range =	Year 9 Range =	Year 10 Range =	Year 11 Range =
Unit name					
No. of weeks					
YLO 1.1					
YLO 1.2					
YLO 2.1					
YLO 2.2					
YLO 2.3					
YLO 3.1					
YLO 3.2					
YLO 3.3					
YLO 4.1					
YLO 4.2					
YLO 5.1					
YLO 5.2					
YLO 5.3					

Note: Indicate which aspect of the Yearly learning objectives (YLO) and which year is covered.

00314-2008DOM-EN

Page 2 of 2

	Year 7 Range = level 4 – 6						Year 8	Year 9	Year 10	Year 11
Unit name	Using models	Forces are everywhere	What is behaviour?	Rocks and the environment	Organs for life	Bridging to Year 8				
No. of weeks	11	4	5	10	5	3				
YLO 1.1	1.1a1 Y7 and 8	1.1b Y8			1.1c Y7	1.1a3 Y7				
YLO 1.2			1.2f Y7	1.2a Y8						
YLO 2.1					Y7					
YLO 2.2	Y7 and 8									
YLO 2.3			Y7							
YLO 3.1	Y7 and 8									
YLO 3.2										
YLO 3.3										
YLO 4.1										
YLO 4.2		Y7 and 8								
YLO 5.1										
YLO 5.2				Y7 and 8						
YLO 5.3										

1.1a Scientific thinking! Developing explanations using ideas and models

1.2f Working critically with secondary evidence

Handout 4.6 Exemplar long-term plan 3

Unit title	Assessment task	Number of weeks	Yearly learning objectives							
			How Science Works				Range and content			
			Explanations, argument and decisions		Practical and enquiry skills		Organisms, behaviour and health	Chemical and materials behaviour	Energy, electricity and forces	The environment, Earth and the universe
			(Indicate which parts are being covered)				*(Indicate which parts are being covered)*			
Year 7										
Year 8										
Year 9										

Unit title	Assessment task	Number of weeks	Yearly learning objectives							
			How Science Works				Range and content			
			Explanations, argument and decisions		Practical and enquiry skills		Organisms, behaviour and health	Chemical and materials behaviour	Energy, electricity and forces	The environment, Earth and the universe
			(Indicate which parts are being covered)				*(Indicate which parts are being covered)*			
Year 10										
Year 11										

Handout 4.7 Exemplar medium-term plan 1

Title	Models in science	Year	7
***How Science Works* learning objectives**			
Range and content context(s)			
Learning outcomes			
Prior learning and what follows			
Common misconceptions			
Rich questions			
Key scientific vocabulary			

Title	Models in science	Year	7
Literacy focus			
Cross-curriculum links			
Personal, learning and training skills (PLTs)			
Social and Emotional Aspects of Learning (SEAL)			
ICT			
Assessment opportunities			
Local dimension			

Overview text. Insert a few lines to explain what the unit is about – focus on the 'story' of the unit, explaining the key scientific learning in broad terms and whether it has a focus on *How Science Works,* range and content or both and other skills developed such as literacy/SEAL/PLTs, etc.

Descriptive unit title - a descriptive title for the unit, for example, models in science.

Insert Key Stage 3 level or GCSE grade where appropriate.

List learning objectives for unit in these cells.

Title	Models in science	Year	7
***How Science Works* learning objectives**			
Range and content context(s)			
Learning outcomes			
Prior learning and what follows			
Common misconceptions			
Rich questions			
Key scientific vocabulary			
Literacy focus			
Cross-curriculum links			
Personal, learning and thinking skills (PLTs)			
Social and Emotional Aspects of Learning (SEAL)			
ICT			

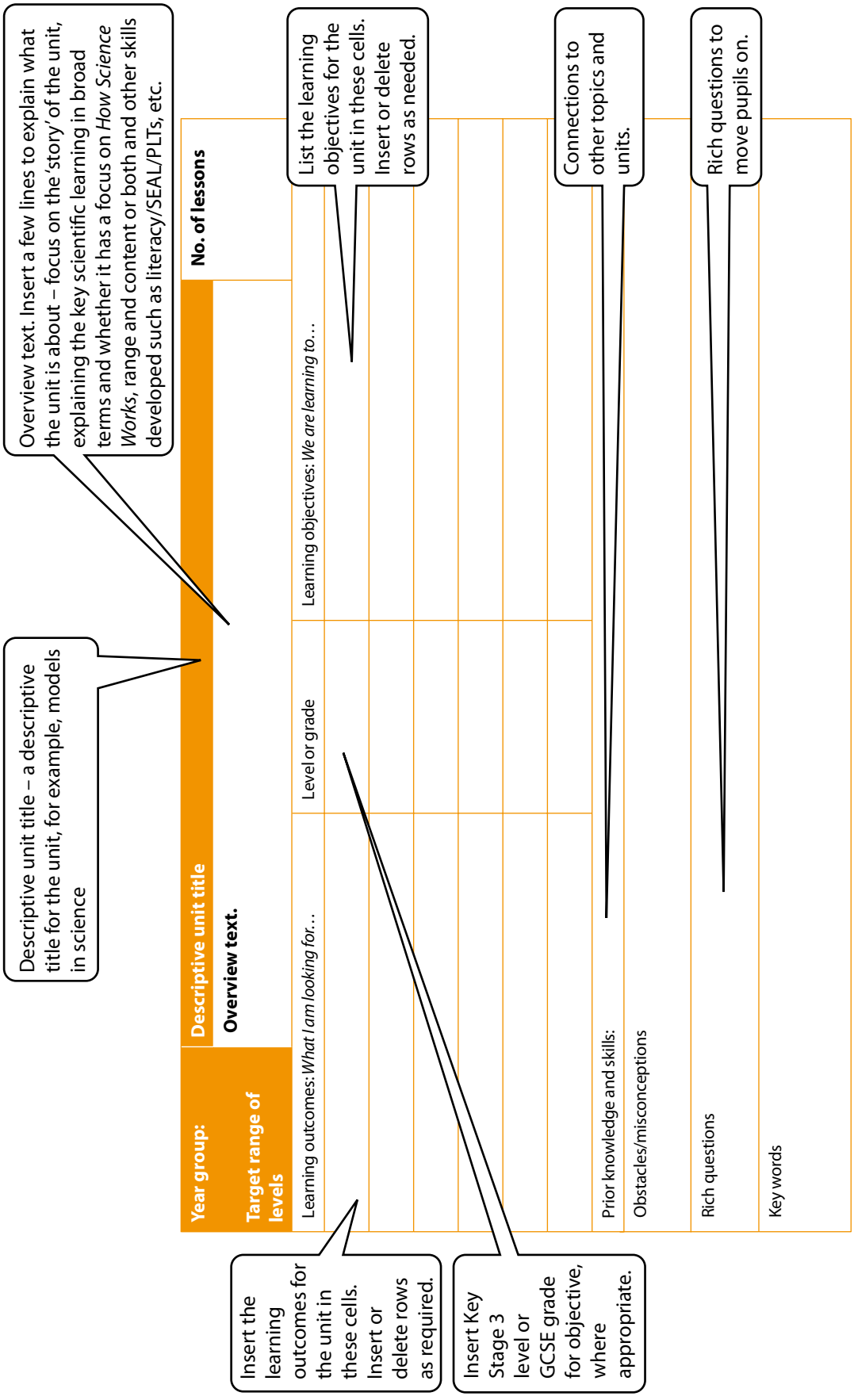
Connections to other topics and units.

Questions to prompt thinking.

Handout 4.8 Exemplar medium-term plan 2

Year group: **Target range of levels**	**Descriptive unit title** **Overview text**		**No. of lessons**
Learning outcomes: *What I am looking for…*	Level or grade	Learning objectives: *We are learning to…*	
Prior knowledge and skills:			
Obstacles/misconceptions			
Rich questions			
Key words			

Page 2 of 4



Year group: 7 Target range of levels Levels 5-6	**Descriptive unit title: Introducing the particle model in science** **Overview text** Having covered this unit pupils will be able to: • describe matter using a simple model and use it to explain changes of state; • recognise the link between heating and cooling and changes of state; • use the simple particle model to explain the physical characteristics of solids, liquids and gases.	**No. of lessons**

Learning outcomes: *What I am looking for…*	Level or grade	Learning objectives: *We are learning to…*
Pupils can: • Describe some of the strengths and weaknesses of the particle model.		• use an existing model or analogy to explain a phenomenon.
• Use a simple particle model explain the physical characteristics of solids, liquids and gases and the link between heating and cooling and changes of state.		• recognise and explain the value of using models and analogies to clarify explanations.
• Recognise that everything in the world around them is made of particles and many everyday materials are mixtures of solids, liquids and gases.		
• Rationalise the classification of some 'difficult' materials, e.g. *although you can pour soap powder, it's still a solid because you can leave it on a table and it won't spread out.*		

Prior knowledge and skills: Stating some simple properties of gases, e.g. that they can be squashed. Stating the properties of solids (as keeping shape and size) and liquids (keep size but not shape, flow). Are able to identify if substances are solids, liquids or gases. Confident use of appropriate scientific terminology, i.e. melting, dissolving, boiling, evaporating.
Obstacles/misconceptions Lack of clear distinction between the model and reality (e.g. atoms really are red spheres!). Dissolving is melting: heat and temperature mean the same thing: air fills the space between the particles.
Key words Particle, Vibrations. Solid, Liquid, Gas. Melting, Evaporation, Boiling.
Rich questions Can particles be different colours? Is everything made of particles? What in your model represents inter-particle forces? What is in the space between the particles?

Handout 4.9 Exemplar medium-term plan 3

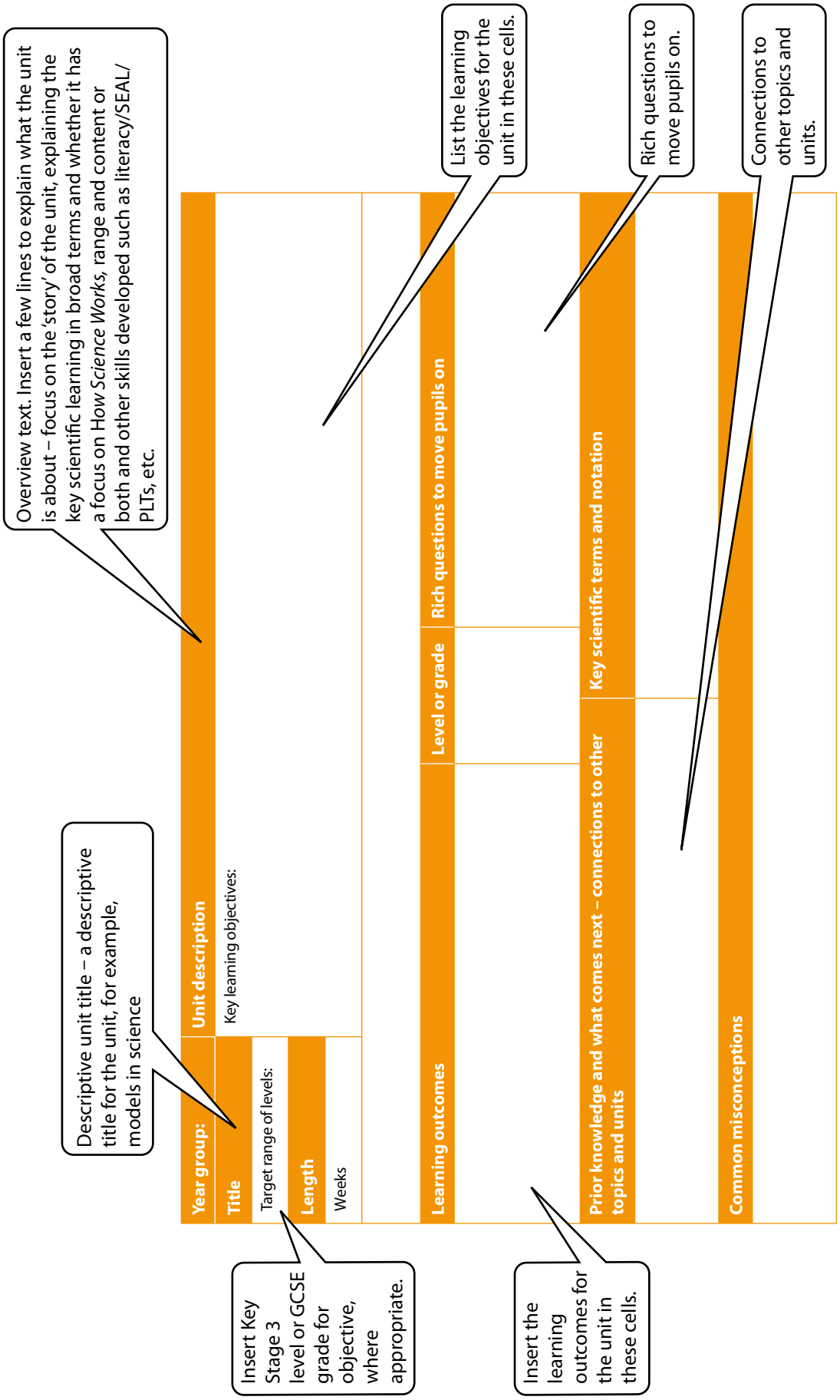
Year group:	Unit description
Title	Key learning objectives:
Target range of levels:	
Length	
Weeks	

Learning outcomes	Level or grade	Rich questions to move pupils on

Prior knowledge and what comes next – connections to other topics and units	Key scientific terms and notation

Common misconceptions

Page 2 of 4



Year group: 7	**Unit description: Introducing the particle model in science**
Title	Key learning objectives: Pupils will be able to: • use an existing model or analogy to explain a phenomenon; • recognise and explain the value of using models and analogies to clarify explanations; • describe matter using a simple model and use it to explain changes of state; • recognise the link between heating and cooling and changes of state; • use the simple particle model to explain the physical characteristics of solids, liquids and gases.
Target range of levels:	
Length	
Weeks	

Learning outcomes	**Level or grade**	**Rich questions to move pupils on**
Pupils can: • describe some of the strengths and weaknesses of the particle model; • use a simple particle model to explain the physical characteristics of solids, liquids and gases and the link between heating and cooling and changes of state; • recognise that everything in the world around them is made of particles and many everyday materials are mixtures of solids, liquids and gases; • rationalise the classification of some 'difficult' materials, e.g. *although you can pour soap powder, it's still a solid because you can leave it on a table and it won't spread out.*		Can particles be different colours? Is everything made of particles? What in your model represents... inter-particle forces? What is in the space between the particles?

Page 4 of 4

Prior knowledge and what comes next – connections to other topics and units	Key scientific terms and notation
Stating some simple properties of gases, e.g. that they can be squashed. Stating the properties of solids (as keeping shape and size) and liquids (keep size but not shape, flow). Are able to identify if substances are solids, liquids or gases. Confident use of appropriate scientific terminology, i.e. melting, dissolving, boiling, evaporating.	Particle, Vibrations. Solid, Liquid, Gas. Melting, Evaporation, Boiling.

Common misconceptions
Lack of clear distinction between the model and reality (e.g. atoms really are red spheres!). Dissolving is melting: heat and temperature mean the same thing: air fills the space between the particles.

Handout 4.10 Progression in medium-term plans

Title	Introducing the particle model in science	Year	7

How Science Works learning objectives

Pupils will be able to:

- use an existing model or analogy to explain a phenomenon;
- recognise and explain the value of using models and analogies to clarify explanations.

Range and content context(s)

Pupils will be able to:

- describe matter using a simple model and use it to explain changes of state;
- recognise the link between heating and cooling and changes of state;
- use the simple particle model to explain the physical characteristics of solids, liquids and gases.

Learning outcomes

Pupils can:

- describe some of the strengths and weaknesses of the particle model;
- use a simple particle model to explain the physical characteristics of solids, liquids and gases and the link between heating and cooling and changes of state.
- recognise that everything in the world around them is made of particles and many everyday materials are mixtures of solids, liquids and gases.
- rationalise the classification of some 'difficult' materials, e.g. although you can pour soap powder, it's still a solid because you can leave it on a table and it won't spread out.

Prior learning and what follows

Prior Stating some simple properties of gases, for example, that they can be squashed.
stating the properties of solids (as keeping shape and size) and liquids (keep size but not shape, flow). Are able to identify if substances are solids, liquids or gases.

Next Confident use of appropriate scientific terminology i.e. melting, dissolving, boiling, evaporating.

Common misconceptions

Lack of clear distinction between the model and reality (for example, atoms really are red spheres!).

Dissolving is melting: heat and temperature mean the same thing: air fills the space between the particles.

Rich questions

Can particles be different colours? Is everything made of particles?

What in your model represents... inter-particle forces?

What is in the space between the particles?

Page 2 of 6

Title	Introducing the particle model in science	Year	7
Key scientific vocabulary			
Particle, Vibrations. Solid, Liquid, Gas. Melting, Evaporation, Boiling.			
Literacy focus			
Writing explanations. Imaginative writing (the journey of a water particle).			
Cross-curriculum links			
Geography. Food technology.			
Personal, learning and thinking skills (PLTs)			
Abstract thinking			
Social and Emotional Aspects of Learning (SEAL)			
Group work/role-play (of particles)			
ICT			
Use of simulations			
Assessment opportunities			
Teaching assistant open-ended task 6. Key Stage 3 test questions (from test base) Pack 2.			
Local dimension			
STEM – water supply – link to Ten Valleys Water – Grange Hurst pumping station visit.			

Title	Using the particle model to explain chemical reactions	Year	7

How Science Works learning objectives

Pupils will be able to:

- use an existing model or analogy to explain a phenomenon;
- recognise and explain the value of using models and analogies to clarify explanations;
- describe how the use of a particular model or analogy supports an explanation.

Range and content context(s)

Pupils will be able to:

- use a particle model to construct predictions for simple chemical reactions and to produce word equations.

Learning outcomes

Pupils can:

- identify that new substances are made during chemical reactions;
- describe a range of simple chemical reactions;
- identify the reactants and the products;
- draw particle diagrams to represent simple chemical reactions;
- write word equations for simple chemical reactions;
- recognise that particles are conserved in a reaction;
- use the idea of conservation of particles to predict possible product or identify reactants.

Prior learning and what follows

Prior Recognise that materials can be made up of one or more kinds of particles and describe the type and arrangement of atoms in elements, compounds and mixtures. Describe and develop a particle model to explain the differences between the terms atoms, elements, compounds and mixtures.

Next Use a particle model to construct predictions for chemical reactions and to produce symbol equations.

Common misconceptions

Products can contain particles that are not present in the reactants.

Reactants can 'disappear' in chemical reactions.

Rich questions

Is melting a chemical reaction?

Is dissolving a chemical reaction?

Key scientific vocabulary

Particle, element, mixture, compound, reaction, reactant, product, atom, molecule.

Title	Using the particle model to explain chemical reactions	Year	7
Literacy focus			
Writing explanations.			
Cross-curriculum links			
Personal, learning and thinking skills (PLTs)			
Abstract thinking. Modelling.			
Social and Emotional Aspects of Learning (SEAL)			
Group work. Role-play (of particles in chemical reactions).			
ICT			
Use of simulations.			
Assessment opportunities			
Teaching assistant open-ended task 14. Key Stage 3 test questions (from test base) Pack 16.			
Local dimension			
STEM – pharmacy visit.			

Title	Using models in electric circuits	Year	7

How Science Works learning objectives

Pupils will be able to:

- describe more than one model to explain the same phenomenon and discuss the strengths and weaknesses of each model;
- describe how the use of a particular model or analogy supports an explanation;
- explain why the manipulation of a model or analogy might be needed to clarify an explanation.

Range and content context(s)

Pupils will be able to:

- describe how energy can be stored, e.g. electrical cells;
- describe how energy is transferred in simple contexts such as… simple circuits;
- use a simple model of energy transfer to describe common observations.

Learning outcomes

Pupils can:

- identify what feature of each model corresponds to which feature in the real-life circuits;
- identify some of the strengths and weaknesses of different models for energy transfer in an electric circuits.

Prior learning and what follows

Prior A complete circuit is needed for a bulb to light. Electric cells are a store of energy. Bulbs in series circuits get dimmer as more bulbs are added. More cells in a circuit make the bulbs glow brighter.

Next Develop more complex models of energy transfer mechanisms (incorporating ideas about particles or waves). Use energy accounting systems, including Sankey diagrams, to track energy transfers.

Common misconceptions

Only one wire is needed from the cell to the bulb to get the bulb to light. Electric current is used up in an electric circuit.

The current coming out of a bulb is less than that going in. Electric current comes out of both ends of a cell and 'collides' in the bulb making it light.

Identifying the model as actually being reality – that is, electrons really are small balls or electric current is a flow of liquid in the wire.

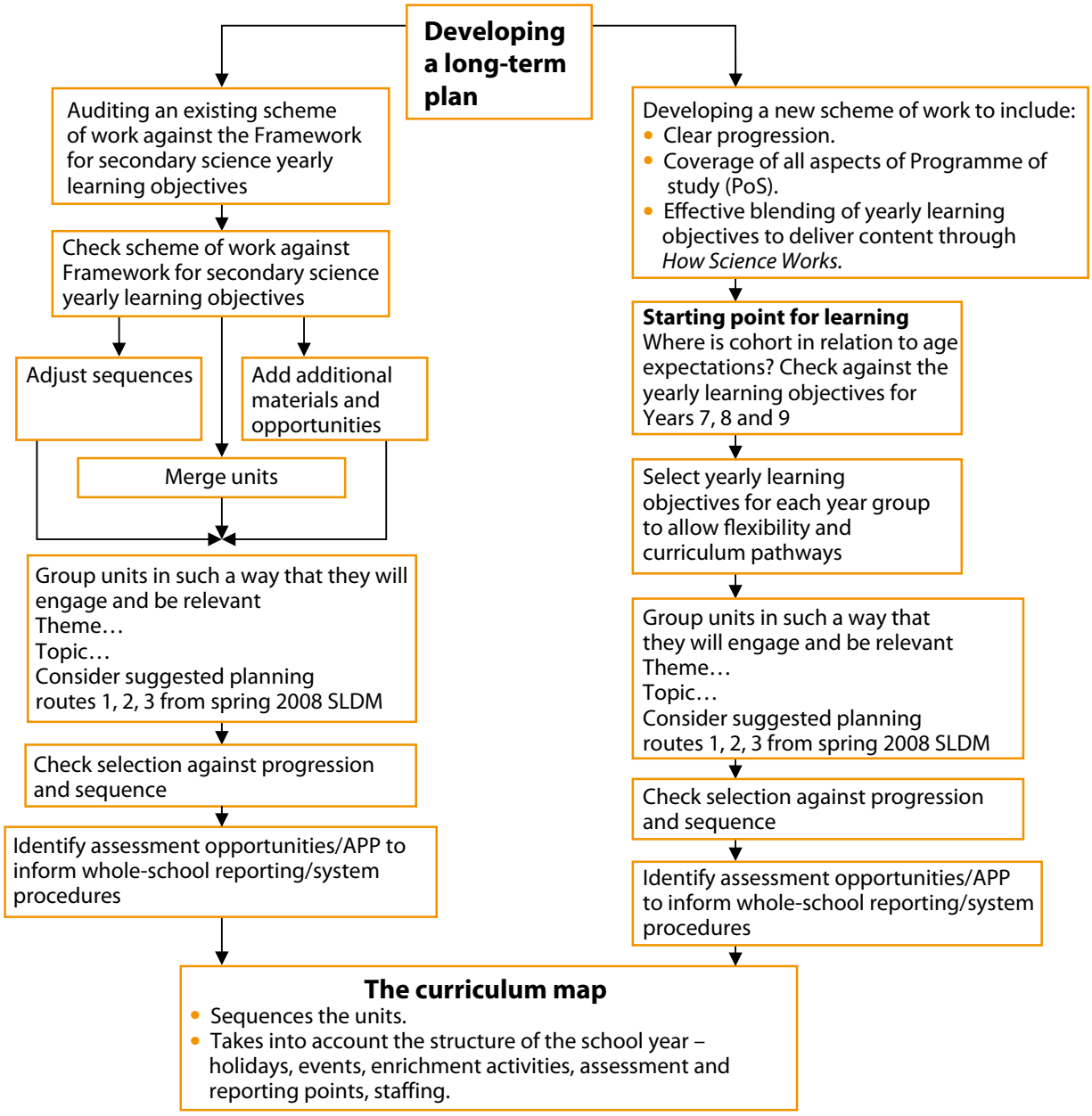
Rich questions

Why do batteries go flat?

How does the energy get from the cell to the bulb?

Title	Using models in electric circuits	Year	7
Key scientific vocabulary			
Energy, particle, electron, conductor, circuit, current, flow, transfer, scientific model.			
Literacy focus			
Writing explanations. Expressing comparisons.			
Cross-curriculum links			
Technology.			
Personal, learning and thinking skills (PLTs)			
Abstract thinking.			
Social and Emotional Aspects of Learning (SEAL)			
Group work. Role-play (of energy transfer in a circuit).			
ICT			
Use of simulations.			
Assessment opportunities			
Teaching assistant open ended task 4. Key Stage 3 test questions (from test base) Pack 9.			
Local dimension			
STEM – electrician visit – safety demo (high voltage dangers video).			

Handout 5.1 Reviewing a long-term plan



Developing a medium-term plan

- Decide what the main focus of the unit will be: *How Science Works*, range and content, or both.
- Assign levels or grades to the unit.
- Identify other skill developments if appropriate, for example, literacy/PLTs, etc.
- Select yearly learning objectives from the Framework for secondary science (and elsewhere if appropriate) to ensure that there is sufficient challenge for your pupils.
- Define the learning outcomes (not only science ones, for example PLTs/literacy) and match the appropriate outcomes to the target range of levels of the pupils.
- Define the prior knowledge, key terms, barriers/misconceptions and so forth to inform short-term planning.
- Decide how long the unit needs to be.

00314-2008DOM-EN

Handout 5.2 Department CPD session

Objectives

- To consider the issues in planning and developing our Year 7 curriculum.
- To explore how the planning tool and the Framework for secondary science might be used to support our planning process.

Outcomes

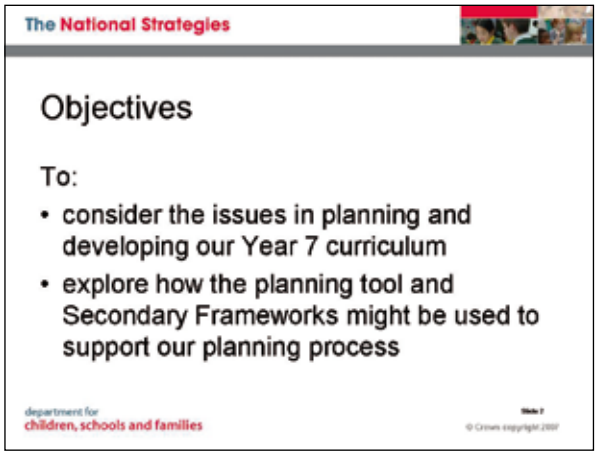
Participants will have:

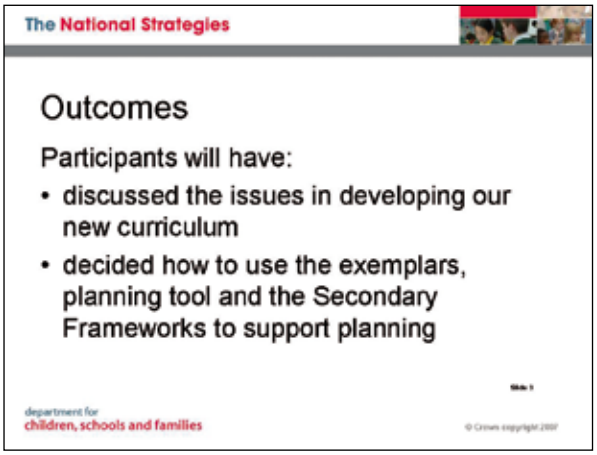
- discussed the issues in developing our new curriculum;
- decided how to use the exemplars, planning tool and the Secondary Frameworks to support our planning.

Resources

- **Handouts 3.1**, **4.1**, **4.2**, **4.3**, **4.4**, **4.5**, **4.6**, **4.7**, **4.8**, **4.9** and **4.10**.
- Appendix 1 QCA vision of assessment.
- Flipchart paper and pens.

Show **slides 2** and **3** and explain the objectives and outcomes for the session.





Starter

Give your department a few minutes to discuss progress to date. You may choose to have an open discussion and take some key points as feedback or you may choose to identify a few common issues and focus the discussion on possible solutions.

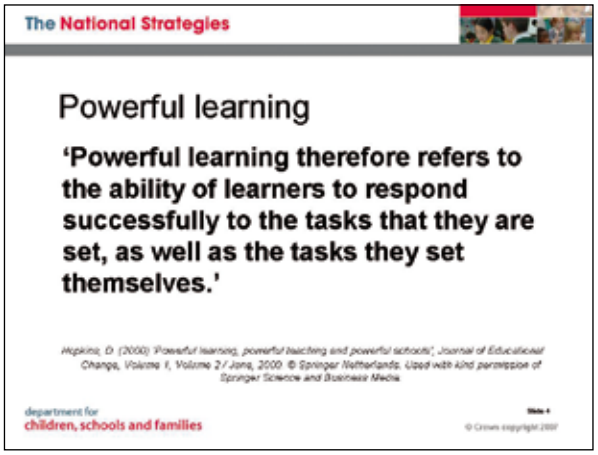
Revisit the task from the beginning of the previous department session where your department identified the features of a successful learner in science. If you have not done this task it would be a good idea to do it at this point.

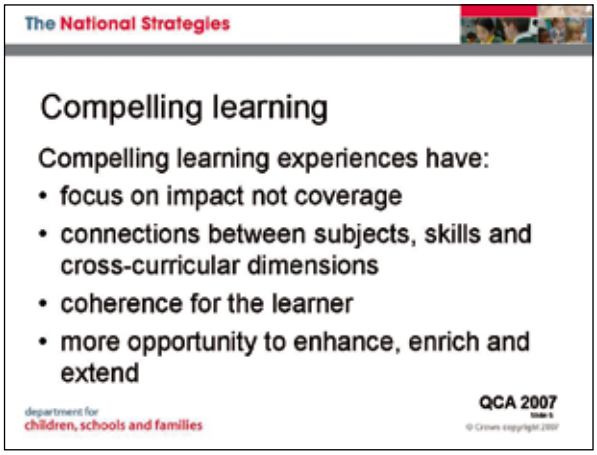
Optional task

Draw a picture of a pupil on a large piece of flip chart paper. Identify the skills, knowledge, attitudes and attributes that you would expect to see in a successful learner in science.

Page 2 of 7

Link these features to Powerful learning and Compelling learning experiences outlined on **slides 4** and **5**.





Additional guidance on powerful learning: from '*Powerful Learning, Powerful Teaching, Powerful Schools*', by David Hopkins (2000).

It is the integration of 'content, process and social climate' that explains how the learning experience can be organised to make a positive difference to students. The impact is not just on test scores and examination results, but also on the students' capacity to learn. This is the heart of the matter. If the teacher can teach the student how to learn at the same time as assisting them to acquire curriculum content then the twin goals of learning and achievement can be met at the same time.

Powerful learning therefore refers to the ability of learners to respond successfully to the tasks that they are set, as well as the tasks they set themselves – in particular to:

- *integrate prior and new knowledge;*
- *acquire and use a range of learning skills;*
- *solve problems individually and in groups;*
- *think carefully about their successes and failures;*
- *evaluate conflicting evidence and to think critically;*
- *accept that learning involves uncertainty and difficulty.*

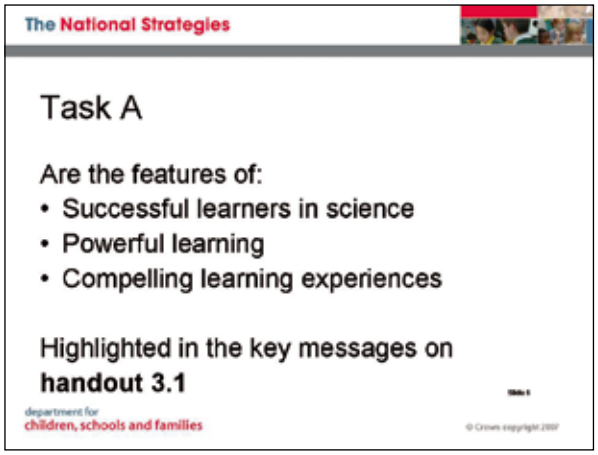
The important point is that powerful learning in the way that I have defined it does not occur by accident. It is usually the result of an effective learning situation created by a skilful teacher. As Bruce Joyce and Beverly Showers (1991: 12) put it:

> *Knowing this is the core of effective teaching, because effective teachers are confident that they can make a difference and that the difference is made by increasing their own teaching repertoires and the learning repertories of their students.*

Put simply, powerful teachers believe that all children can learn and that they can teach all children. More pertinently, they convey this message to their students.

Task A

This is detailed on **slide 6**.



Ask your department to look at **handout 3.1,** Key messages from *Science Education in Europe: Critical Reflections* and give them a few minutes to read this before they undertake the task. Ask them to highlight or annotate the handout where they feel it reinforces or highlights the need for the features of a successful learner, Powerful learning or Compelling learning experience.

Make the following points.

- There is a very real danger of delivering what we always have because:

a) this is perceived as the way science should be taught;

b) it is easier to deliver what we are familiar with;

c) published schemes and resources can reinforce the familiar.

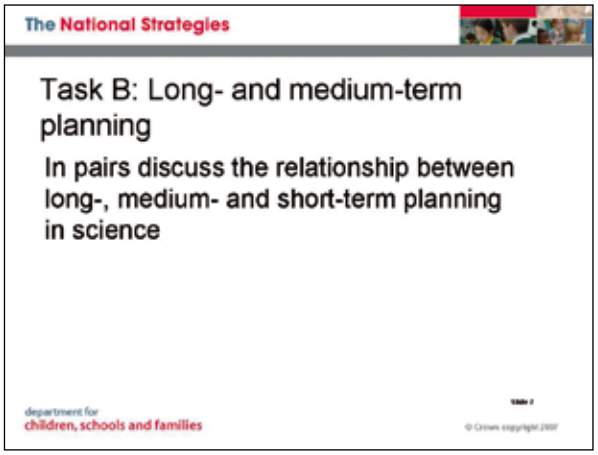
- School and department organisation can drive the curriculum rather than the other way round.
- Although some changes have been made to the level descriptions in the revised programme of study, these have not affected the standards being applied. The tests are developed and designed in ways that allow standards to be maintained from year to year. Additional guidance is provided in Appendix 1.

Make it clear that the main focus for the rest of the session will be long- and medium- term planning. Concentrating on long- and medium- term planning with your department will ensure progression in pupil learning from Year 7 to 11, especially in *How Science Works* skills. Short-term planning will be a focus for the next SLDM. Clarify what is meant by long-, medium- and short-term planning using **handout 4.1** which contains some extracts from the Secondary Frameworks. Your school may use different terminology, for example, topic map, curriculum map, so it is important to have a common shared understanding. Give your department a few minutes to read through the handout.

Task B

10 minutes

This task is detailed on **slide 7**.

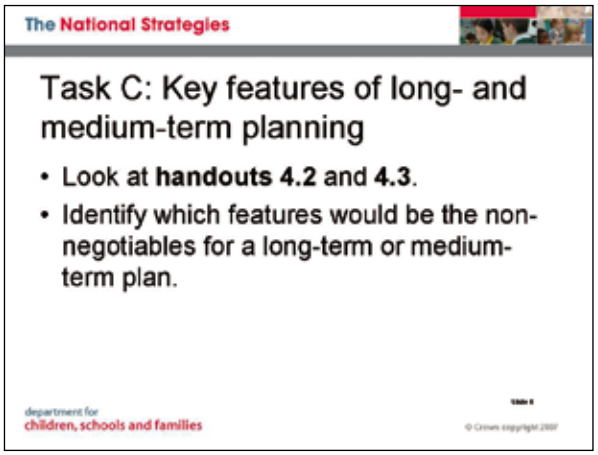


Ask your department to work in pairs to discuss the relationship between long-, medium- and short-term planning in science. Take some feedback.

Ensure there is a clear understanding.

Task C

This task is detailed on **slide 8** and uses **handout 4.2** and **4.3**.

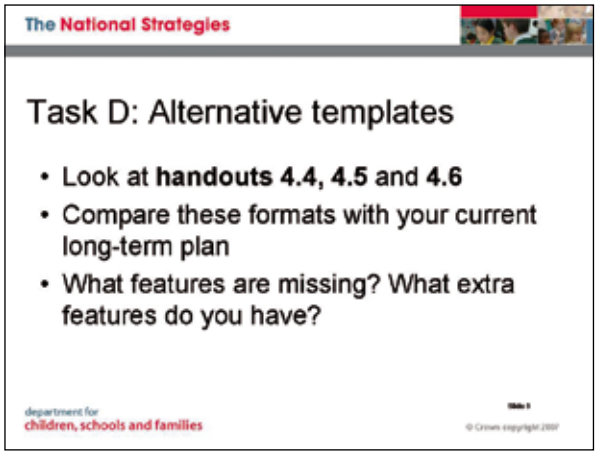


Your department can use this task to decide what the non-negotiables should be for long- and medium- term planning which they record on **handout 4.3**. It will be interesting to see how these match with your ideas from the training and with each other. Agree the list for your department to inform future planning.

Task D

15 minutes

This task is detailed on **slide 9** and uses **handouts 4.4, 4.5** and **4.6**.



Participants compare **handouts 4.4** to **4.6**, which are three possible exemplar templates for long-term planning, with your long-term plan. Explore:

- Which model is closest?
- Are any of the non-negotiables missing?
- Are any extra features included on your plans necessary?

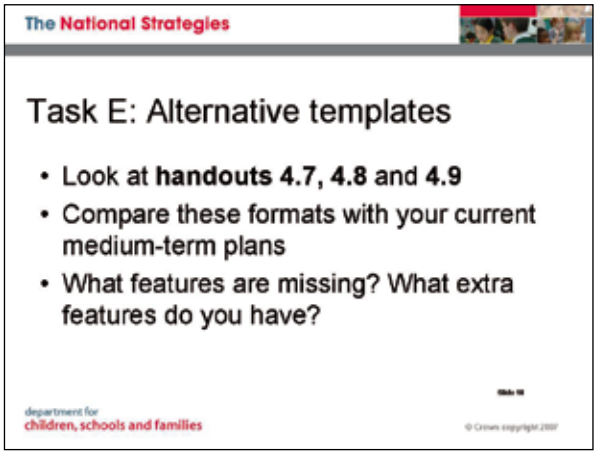
Make the following points:

- Long-term plans are often just topic rotas with each year produced in isolation from the rest. A long-term plan should plot how the skills, knowledge, attitudes and experiences build up progressively over a number of years so that pupils can achieve four levels of progress over the two key stages.
- The first step is to decide the units across all five years (for an 11 to 16 school).
- Units do not have to be the same length. Indeed they should take account of the different learning demand of different contexts.
- The sequence of the units needs to be considered so that there is progression in the development of pupils' understanding through the different contexts. For example, pupils need to have a basic understanding of energy transfer before they learn about some aspects of biology.
- Longer-term operational planning will include fitting the five year learning plan into the school calendar taking account of significant events such as term dates, exam deadlines, coursework deadlines, etc. These will vary.
- The exemplars are just three different possible examples of long-term planning used for illustration only and to support the training.

Page 6 of 7

Task E

This task is detailed on **slide 10** and uses **handouts 4.7, 4.8** and **4.9**.



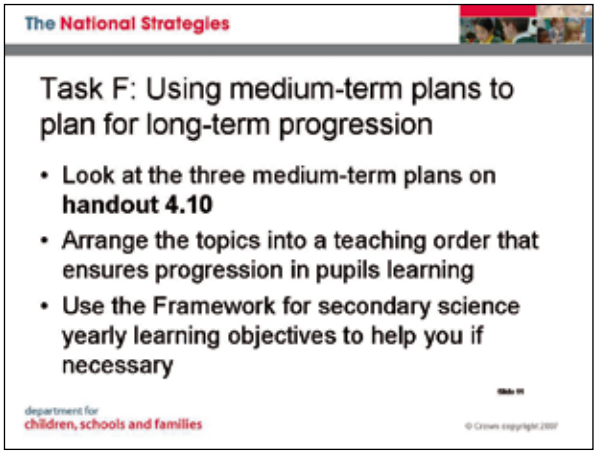
Participants compare **handouts 4.7** to **4.9**, which are three possible exemplar templates for medium-term planning, with your own medium-term plans. Explore:

- Which model is closest?
- Are any of the non-negotiables missing?
- Are any extra features included on your plans necessary?

Each of the handouts contains a blank template together with a version giving extra guidance. **Handouts 4.8** and **4.9** have completed examples. The completed example for **handout 4.7** will be used in the next task.

Task F

This task is detailed on **slide 11** and uses **handout 4.10** which contains three different medium-term plans using the template from **handout 4.7**.



Participants look at the three plans and place them in order to ensure progression in learning. The learning objectives in the handouts cover range and content on electricity, separation techniques and particles, BUT there are in addition *How Science Works* learning objectives about using models and analogies which do have progression included. Be careful not to give the game away and let them discover the *How Science Works* progression for themselves. The yearly learning objectives should be made available to help if needed.

This task models a process that could be used to build up an overall long-term plan for progression in learning.

Check progress against the actions on your planner from the previous meeting. Decide what your next steps will be as a department. Share the planning checklist from the SLDM and how you would like the department to use this.

Appendix 1: What is QCA's vision for assessment in schools?

Assessment is one of the fundamentals of teaching and learning. It:

- enables teachers to focus on learners' needs;
- is essential to a well-planned curriculum;
- helps learners to understand their achievements and priorities for future learning.

QCA's work to develop assessment is based on these principles. QCA recognises that national standards are an entitlement for learners, teachers and schools, and integral to national expectations of education.

Teachers' judgements about pupils' achievements are the most fruitful source of information when identifying targets for improvement and providing feedback for pupils and their parents/carers. With an increasing focus on personalised learning and monitoring pupil progress, raising the status and profile of periodic teacher assessment, and linking it closely to national standards, is crucial in helping assessment inform and improve learning and teaching.

QCA is working with schools, the National Strategies, and other partners to establish manageable and effective approaches to assessment to support these aims and develop teachers' confidence and expertise. This includes:

- providing guidance and materials to support effective strategies for day-to-day assessment, such as building knowledge of pupils' strengths and areas for development into planning and teaching;
- ensuring that assessment judgements are based on a wide range of evidence;
- training in national standards to ensure that colleagues within and across schools share the same expectations of progress and achievements;
- exploring ways to support schools' and teachers' judgements and guarantee standards through working with experts;
- ensuring that expertise in assessment is recognised in professional development;
- helping schools develop coherent assessment policies that support teachers and help learners make faster progress;
- developing banks of tests and tasks and mark schemes that support schools in assessing pupils' progress.

What is QCA doing to support effective teacher assessment?

Developing effective and manageable methods of teacher assessment clearly linked to national standards is essential to raising achievement and helping learners progress. QCA is building on the approach in the Assessing Pupils' Progress (APP) materials, which have been successfully rolled out by the Secondary National Strategy to help teachers get the most out of assessment. They are already available in English and mathematics at key Stage 3 and will be available for science in 2008.

QCA is working with schools to develop examples of effective ways of collecting evidence and providing feedback through assessment for learning and periodic assessments for subjects. The materials produced will show how assessment practice within and between subjects can support learning, embed standards and be part of effective teaching of the revised programmes of study.

They will:

- demonstrate ways to collect evidence of pupils' knowledge, skills and understanding that can be seen in their talk, actions and outcomes;
- provide examples of manageable ways of collecting evidence;
- include exemplification of subject standards.

These will be available in the assessment section of the website from 2009.

In addition, to supplement the APP materials in English, mathematics and science, assessment tasks for foundation subjects are being developed to provide examples of evidence related to the level descriptions. These can be used to support periodic assessment by offering confirmation of teachers' evaluation of the level their pupils are working at or to provide supplementary information on aspects of learners' performance. These tasks will be downloadable from the assessment guidance section on the foundation subject's homepages and will be rolled out from 2009.

Will there be any changes to end of key stage testing?

Pupils will continue to sit externally assessed national curriculum tests in English, mathematics and science at the end of Key Stage 3. QCA is working with NAA to review the format and focus of the tests in light of the revisions to the Key Stage 3 programmes of study and level descriptions. The first tests to reflect the revisions will be in May 2011. Sample materials to illustrate any new-style questions or tasks will be available from September 2010.

Where does the Making Good Progress pilot fit in?

From September 2007, about 50 secondary schools and 450 primary schools in 10 local authorities will be involved in a two-year pilot established by the Department for Children, Schools and Families (DCSF), where pupils from Year 3 to Year 9 can be entered for 'single level' tests in reading, writing or mathematics on two occasions each year. Teachers will be able to enter pupils for a test if they are judged to be operating securely at that level. Pilot schools will use the APP assessment criteria to support them in making accurate and consistent judgements about pupils' achievement and progress.

What has happened to the level descriptions?

The level descriptions for levels 4 to 8 and exceptional performance have been modified. The aim of the modifications is to complement the revisions to the programmes of study and maintain standards.

When will the amended level descriptions come into effect?

The first Key Stage 3 national curriculum tests to be keyed to the amended level descriptions will be in May 2011. For teacher assessment judgements made during the key stage, the new level descriptions should be used with Year 7 pupils from September 2008.

00314-2008DOM-EN

Handout 2.1 (part 2) Starter

Two levels of progress and progression to post 16

Framework

Intervention

Secondary Curriculum Review

Developing our future scientists in your school

Subject leader development meetings
Consultancy

Handout 2.2 (part 2) Recording grid

Name of DVD	Links to department priorities	CPD development opportunity for individual teachers or whole department	Interesting aspects Points to note
Progression to post 16 sciences			
Interactive teaching			
Progressing to level 6 and beyond			

Acknowledgements

Pages 8 & 18, Extract from Hopkins, D. (2000) 'Powerful learning, powerful teaching and powerful schools', *Journal of Educational Change*, Volume 1, Volume 2 / June, 2000. © Springer Netherlands. Used with kind permission of Springer Science and Business Media.

Page 10, Extract from Hopkins, D. (2000) 'Powerful learning, Powerful Teaching and Powerful Schools', *Journal of Educational Change*, Volume 1, Volume 2 / June, 2000. © Springer Netherlands. Used with kind permission of Springer Science and Business Media

Pages 29 & 30, Extract from Osborne, J. and Dillon, J. (2008) *Science Education in Europe: Critical Reflections,* A report to the Nuffield Foundation, King's College London.

Copies of this publication may be available from:
www.teachernet.gov.uk/publications

You can download this publication and obtain further information at:
www.standards.dcsf.gov.uk

Copies of this publication may be available from:

DCSF Publications
PO Box 5050
Sherwood Park
Annesley
Nottingham NG15 ODJ
Tel 0845 60 222 60
Fax 0845 60 333 60
Textphone 0845 60 555 60
email: dcsf@prolog.uk.com

Audience: Science subject leaders

Date of issue: 06-2008

Please quote ref: **00314-2008DOM-EN**

department for
children, schools and families