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Study Plus
handbook

LA secondary strategy managers, English and mathematics consultants, school senior leaders, Study Plus teachers

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Creating Opportunity
Releasing Potential
Achieving Excellence

Study Plus handbook

Study Plus is an intervention programme for Key Stage 4 pupils that is designed to raise standards at GCSE, principally in English and mathematics, but also in other GCSE subjects by improving literacy, numeracy and learning in general. As an approach, Study Plus helps schools to move towards more personalised learning for pupils and is entirely consistent with the recommendations of the report of the Teaching and Learning in 2020 Review Group (*2020 Vision*, DfES, January 2007).

This handbook is a general guide to Study Plus for:

- school leaders who have a leadership and management role in the Key Stage 4 curriculum;
- English and mathematics subject leaders;
- teachers of the Study Plus classes.

Section 1 is essential reading for all. Sections 2 and 3 contain examples of sample planning for English and mathematics that will be of particular interest to subject leaders and Study Plus teachers. The two CD-ROMs contain all the sample planning together with a number of classroom resources and are designed to be of direct use to the teachers.

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Section 1 – General introduction to the Study Plus approach

To the senior leader responsible for Study Plus

You have a key role in making Study Plus work for pupils. The planning decisions you make will have a significant impact on the degree of success of the approach. The aim of Study Plus is to raise GCSE standards for a target group of pupils, particularly in English and/or mathematics. For this reason, it is crucial that:

- Study Plus is given an appropriate amount of time within the Key Stage 4 curriculum;
- an appropriate target group of pupils is identified;
- the right staff are deployed.

You will find clear guidance on this in the section on planning (see page 13).

It is important to remember from the outset that Study Plus has not been designed as a curriculum solution for groups of pupils who are:

- very low attainers;
- poor attenders;
- very disaffected learners with poor behaviour.

To the Study Plus teacher

You are now part of an innovative approach to improving the progress of pupils in Key Stage 4. There is nothing in Study Plus that is not already part of good teaching, but this approach puts a number of features of good practice together in a package, and it is the package that is new. Over one hundred schools began Study Plus with pupils in September 2006 and lessons learned from this pilot project have already been fed into this handbook. The pilot project will continue to contribute to our understanding of what works, and this knowledge will be disseminated for all Study Plus teachers as part of the advice and support available to you. Your own contribution will be vital too, not just to your pupils as you develop the course that matches their particular needs but also to the further development of Study Plus as you share your ideas with other teachers.

If from September you will be teaching a group of pupils using the Study Plus approach, you will find this handbook essential as:

- an introduction to the principles and ideas behind Study Plus;
- a source of practical advice on planning the teaching and learning.

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To the English/mathematics subject leader

You will want to refer to this handbook so that you are informed about the Study Plus approach and so that you can be assured that there are appropriate links between the pupils' learning in Study Plus and the learning in the pupils' main English/mathematics lessons. The aim of Study Plus is to support pupils' learning in English and/or mathematics by complementing the curriculum. Study Plus is not simply more English or more mathematics, so it will be important to coordinate the two schemes of work. As a subject leader you can help to ensure that:

- all English and mathematics teachers understand the Study Plus curriculum;
- pupils are not engaged in very similar work in both sets of lessons at the same time;
- opportunities are taken to link work in Study Plus with the main English/mathematics lessons;
- other subject leaders see the connection between Study Plus and learning in their subject;
- opportunities to consolidate learning from the other subjects are taken.

What is Study Plus?

Study Plus is an approach that has been developed by the Secondary National Strategy for pupils at Key Stage 4 who are achieving below national expectations in English and/or mathematics but who have the potential to make better progress with some additional support. There may be a range of pupils in your school context who are under-attaining, possibly including some pupils from particular ethnic minority groups, some pupils learning English as an additional language, mobile pupils, or those with gaps in their learning. Study Plus does not have its own accreditation because it is designed to help pupils achieve more highly in their GCSE examinations, not only in English and mathematics but also in other subjects that depend to some extent on literacy and numeracy skills. Many teachers in the pilot project have found it refreshing to be freed from the inevitable constraints of providing a course that leads to an accredited qualification. It has allowed them to make Study Plus feel different to the pupils – something the pupils have welcomed.

> 'When I found out I was in the extra group I thought, "Oh, oh!" and I thought that I was thick. I didn't always behave in class, especially in Year 9 and I thought that was another reason why I was in the group even though it was explained to me. Now I think it's great and it feels good to be doing well in both English and maths. I think it's helped me to grow up because I now know I can do things.'
>
> Year 10 Study Plus Pilot pupil

A key feature of any Study Plus course is that it does not follow a set syllabus or specification but is designed specifically for a particular group of pupils whose learning needs have been identified. In this respect Study Plus might be better described as an *approach* rather than a course. This section of the handbook will describe the main features of this approach. Sections 2 and 3 contain samples of planning for English and mathematics which are designed to exemplify Study Plus. Further sample planning and resources are available on the CD-ROMs.

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Structure of the Study Plus support materials

Handbook	**Section 1** Introduction Planning the Study Plus course Using the progression maps Teaching the units The role of the teaching assistant
	Section 2 Introduction to Study Plus English Sample English planning
	Section 3 Introduction to Study Plus mathematics Sample mathematics planning
CD-ROM 1	Further sample planning for English A selection of resources
CD-ROM 2	Further sample planning for mathematics A selection of resources

The background to Study Plus

The main measure of national and school performance at Key Stage 4 is the 5+ A*–C GCSE grade indicator, which from 2006 became 5+ A*–C including English and mathematics. Pupils entering Key Stage 4 with level 4 or low level 5 in English and/or mathematics are unlikely to achieve this threshold. In 2006, only 46% of pupils gained grade C or better in both English and mathematics.

Many pupils may find the literacy and numeracy demands of some GCSE courses challenging and, although they may have good understanding of content, ideas and issues, find it hard to express and explain these adequately in both coursework and examinations. For example, this is particularly true for many more able bilingual learners, well beyond the early stages of acquiring English, whose written work often shows weaknesses. Teaching at Key Stage 4 can often be focused on covering syllabus content rather than developing understanding and ensuring progression. Study Plus aims to fill this gap and give schools an approach that will help raise the attainment of a specific target group of pupils.

Study Plus also supports recent school developments in improving learning and teaching, most notably Assessment for Learning (AfL), and the growing importance of tailoring teaching to meet the individual needs of pupils.

The aims of Study Plus

The Study Plus approach is designed for:

- pupils who end Key Stage 3 on level 4 or with a low level 5 in mathematics and/or English;
- pupils who, when in Year 9, are predicted by teachers to attain D or E grades at GCSE but have the potential to do better (as indicated for example by predictive data based on prior attainment).

The aims are to:

- accelerate the progress of these pupils in English and/or mathematics so that they have a better chance of achieving a grade C;
- strengthen key areas of weakness in literacy and numeracy;
- support pupils' learning and motivation in relation to English, mathematics and other subjects;
- have a positive impact on attainment in a further two or three GCSE subjects through the application of literacy, numeracy and general learning skills in context.

Study Plus: essential features

The Study Plus approach is flexible so that provision can be designed by teachers to meet the needs of particular groups of pupils in their own school context. However, a Study Plus course will have six essential features.

Six essential features of Study Plus	
1	Study Plus is a five-to six-term programme that is timetabled during the school day for at least two lessons a week. Typically pupils opt for it as part of the school's option programme.
2	Study Plus is planned as a sequence of around 20 English or mathematics units or a mixture of the two, with each unit lasting three to four weeks.
3	Teaching in each unit is focused by a cluster of curricular targets that have been identified as relevant to the group and individuals by using the English and mathematics progression maps.
4	There is support for the Study Plus teacher through training and materials.
5	Pupils' learning is supported by another adult*: for example, a teaching assistant or learning mentor who is attached to the group.
6	There are close links to the main learning in English and mathematics lessons.

*referred to as the TA (teaching assistant) from this point on

It is these essential features that define the Study Plus approach, not a specified content.

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The relationship between Study Plus and GCSE courses

Study Plus pupils' academic achievement at the end of Key Stage 4 will be demonstrated through their GCSE results in a range of subjects. By strengthening crucial skills in English and/or mathematics, Study Plus aims to help pupils learn better in their GCSE subject lessons and gain better results at the end of the course. This connection will be particularly strong in the case of English and mathematics, but it is also expected that improving literacy and numeracy, together with improved learning skills, will have an impact on the wider curriculum. In order to secure this wider impact, Study Plus will actively encourage pupils to apply new skills in the context of their work for their GCSE subjects. To be effective, this process should go beyond showing pupils the wider relevance of their Study Plus learning and include a requirement for pupils to bring work from other subjects into the Study Plus context so they can demonstrate the transfer of learning. For instance, one pupil might be given time in a Study Plus lesson to review with the TA to what extent they have used paragraphs effectively in a piece of history coursework.

In some pilot schools, the TA has been able to support Study Plus pupils in GCSE lessons to help secure the transfer of learning. In other schools the planning of the Study Plus unit itself has taken account of what is planned in certain GCSE courses. In the most effective examples, the GCSE subject teachers are involved in the planning and are very well placed to help with assessment of pupils' progress towards their Study Plus targets.

Linking with English and mathematics GCSE

A key role of the Study Plus teacher and TA is, therefore, to create for individual pupils active links between their Study Plus learning and their GCSE work. In the case of English and mathematics the links are clear. In English GCSE, for instance, it is often the case that the demands of following both the English and English literature syllabuses mean that the teacher has little time to follow up individual weaknesses in pupils' underlying reading and writing skills. These weaknesses are often identified and commented upon in marking but there is rarely an opportunity to pursue these aspects of the subject as a main objective in lessons. Study Plus can fill this gap with a programme of interesting work that is worth doing for its own sake as well being suited to developing targeted skills.

Effective cross-curricular links can be made in mathematics where, for example, pupils will be using data in their science course. If the teacher is able to use these data within a Study Plus unit it will add considerably to the pupils' work on reasoning with data.

Another powerful approach in mathematics for the pupils in Study Plus will be to use case studies on, for example, the environment or natural disasters such as a tsunami, to support their number work and their application of proportional reasoning. From the pupils' responses it will be possible to tailor extra support and address some of the issues raised by GCSE examiners when describing how pupils struggle to use and apply their mathematical knowledge and understanding.

What's in it for the pupils?

Many pupils moving into Key Stage 4 with weaknesses in literacy and numeracy will have experienced difficulty, if not failure, in these areas over a number of years. They may already have experienced additional programmes intended to help them 'catch up'. So, importantly, Study Plus must not be seen as just more of the same: more English, more mathematics, more catching up.

Pupils opting into Study Plus should experience a sequence of units that are built around topics or themes that are interesting to them in their own right and, within that context, they should also receive:

- first-class teaching that helps them with the essential areas of English and/or mathematics that they find difficult;
- support with learning that can be used in other GCSE subjects to improve their work and chances of getting a good grade;
- quality time from a TA who works with them and will help them to review their progress and plan future success.

Study Plus Pilot pupils say:

'Our teachers are great. They have loads of patience and are good at what they are doing with us. That makes us feel good and want to do well. We can get loads of attention from the teachers and support teachers. The group of us work well together. We like the atmosphere in the classroom.'

'Study Plus lessons are different because':

- 'it is small and personal and easier to work in';
- 'we do different kinds of work which helps us more';
- 'we can go at a nice steady pace rather than rushing';
- 'we have more help when needed';
- 'we have teaching assistants to help us more with our work'.

'Study Plus has helped me to':

- 'calm down and think calmly';
- 'contribute to lessons and feel confident in writing';
- 'become more confident, answer questions in front of everyone, ask for help if needed';
- 'understand algebra!';
- 'structure my sentences better and get better grades'.

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Planning the Study Plus course

Five steps to planning for Study Plus

It is helpful to break the process of planning for Study Plus into five steps. These are:

Step	Planning activity	Outcomes
1	Strategic planning with senior leader (SL)	■ Decision on the nature of the course: English/mathematics, English only, mathematics only ■ Confirmation of staffing deployment: teacher(s), TA(s) ■ Identification of the pupils: a group of 15–25 who have opted into the course ■ Timetable considerations
2	Gathering information on the pupils	An initial profile of the group that identifies common areas that need strengthening
3	Planning the course in outline	Long-term overview unit plan
4	Planning Year 1 of the course	Ten units planned in outline
5	Planning three or four units for Term 1	Lessons planned for three or four units

Planning – step 1

You can plan Study Plus as an English course, a mathematics course or a mixture of the two. The factors that would decide this are:

- the needs of the pupil group;
- the capacity of the staff available to teach and support the group in the two subject areas.

Below are a number of examples illustrating how this might work out in different school situations.

School A
This school has a shortage of specialist teachers of mathematics but has some spare capacity in the English team and a teaching assistant who already has some experience teaching literacy progress units to pupils in Year 7. The school has also identified a group of pupils, predominantly boys, who show good understanding and ability orally, but whose attainment is limited by weakness in reading and written expression. School A decides to offer Study Plus English to this group of pupils.

School B

This school has an experienced teacher who is confident in teaching both English and mathematics. Study Plus is offered to pupils as a course that will support both their English and their mathematics. The precise mixture of units is decided following an analysis of the needs of the pupils that have opted in. As it turns out, the pupils are weaker in mathematics than in English so the course is made up of a greater number of mathematics units together with four units of English designed to strengthen writing.

School C

This school wants to strengthen both English and mathematics. Because of timetabling and staffing constraints, the Study Plus course will focus on mathematics units in Year 10 with a specialist teacher, and on English units in Year 11 with a different specialist teacher. The same teaching assistant will support the group over the two years.

School D

This school achieves very good English results at the end of Key Stage 4 and consequently has decided that the priority is to strengthen mathematics and numeracy. Study Plus is designed as mathematics-only with a target group of pupils who are predicted to achieve grade C or better in most subjects, but not in mathematics.

School E

This school has a number of able pupils who are EAL (English as an additional language) learners and for whom reading and writing across the curriculum presents specific challenges, particularly planning, organising and expressing their learning in more 'academic' English. These pupils have a mathematics teacher who will do four units but have prioritised English units. The school has a talented EMA (ethnic minority achievement) teacher, who will focus on the language demands of the curriculum with a particular emphasis on writing, underpinned by the development of thinking skills and extended purposeful talk.

In practice, some schools will be constrained in their choice of staff for teaching Study Plus. Subject-specialist staff are obviously preferable but in some schools there can be a shortage of specialist teachers of both mathematics and English. The training and support material available to Study Plus teachers will mean that an experienced teacher who can motivate and build a good relationship with Key Stage 4 pupils, and who is confidently literate and numerate, could teach the course effectively.

It is essential that the Study Plus group also has the support of another adult who is able to provide in-class support to groups of pupils as well as individuals. Nowadays all schools have a range of personnel, whether they are known as learning support assistants, teaching assistants, or academic mentors, who would be able to fulfil this role, and in this document they are referred to generically as TAs.

Study Plus is not designed to be taught to pupils outside normal school time or to pupils who are extracted from their normal lessons. Schools need to find the curriculum time either out of existing non-GCSE-curriculum time or by making Study Plus an option group. There are advantages and disadvantages to both solutions. If Study Plus is an option, pupils will gain one fewer GCSE certificate. This will require careful explanation to parents, who need to understand that the aim is to achieve better grades in the GCSE subjects that the pupil will take. Many pilot schools held a meeting for the parents of pupils targeted for Study Plus for this purpose. The approach generated considerable interest and parents generally welcomed the scheme.

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'In September, the school organised a "cheese and wine" evening for parents of pupils selected for Study Plus. Background information was given to the parents in the form of a presentation by the Study Plus coordinator and parents were given the opportunity to raise any concerns or ask questions. The Study Plus coordinator, teachers, Assistant Principal, Head of Year and English and mathematics consultants were all present, giving real weight to the event.'

Lessons from the pilot – curriculum planning

In the pilot, around two thirds of schools placed Study Plus into their option blocks. The other third found the time from elsewhere in the curriculum. For instance, some schools timetabled extra English and mathematics lessons and, for the appropriate sets, these lessons were used for Study Plus.

Pilot schools have found the advantages of making Study Plus an option are that:

- it ensures that pupils identified as likely to benefit from Study Plus are engaged actively in the decision to participate in the course and do not feel constrained;
- parents are also involved in the decision to opt in and are therefore more likely to give active support;
- Study Plus is independent of the provision for the core subjects of English and mathematics;
- two to three lessons a week will be available – enough time to make a significant impact.

A possible disadvantage is where:

- schools do not have the capacity to offer Study Plus in more than one option block which means that a number of potential Study Plus pupils might be unable to choose it, and the intervention programme is then not available to all who might benefit.

The advantages of locating Study Plus within existing curriculum time for English and mathematics are that:

- it is easier to deploy specialist English and mathematics staff;
- the teacher can easily build effective links between Study Plus and the core subject lessons;
- more pupils can benefit from Study Plus because it is outside the constraints of options.

The disadvantages are that:

- it is harder to make the lessons seem special and not just more English, or more mathematics;
- with this model, pupils normally have only one lesson of Study Plus English and one of Study Plus mathematics a week, which can lead to a lack of continuity.

Putting together the right group of pupils

Pupils taking Study Plus are likely to achieve a secure level 4 or a low level 5 at the end of Key Stage 3. It is not designed for pupils of very low attainment. Also, Study Plus is unlikely to be effective in raising standards if it is seen as a solution for pupils with behaviour problems. There may be some pupils in the Study Plus group whose behaviour is an issue but, on the whole, pupils taking Study Plus will be those who have underachieved because they have gaps in their learning, lack motivation or have been unable to overcome

certain barriers to progress in the course of usual lessons. It is important to consider the gender balance in Study Plus groups as well. Groups where the balance is very uneven (18 boys and 2 girls, for example) may risk disadvantaging the minority group. On the other hand, it would be quite possible to put together a single-sex Study Plus group to meet a specific need (such as a group of girls whose overall GCSE performance may be let down by their relative lack of confidence in mathematics, or a group of boys whose writing is weak).

Lessons from the pilot – identifying and targeting pupils

Pilot schools have found the following two-step approach helpful in identifying pupils who are well suited for Study Plus.

Firstly, schools use information such as Fischer Family Trust or CATs (Cognitive Ability Test) evaluations to identify a group of pupils who are predicted to achieve GCSE grade C but who, according to teacher assessment in Year 9, are not on track for this and indeed may be at risk of failing to achieve a level 5 in the end-of-Key-Stage test.

Next, from the group identified by the first step, schools consider the individual pupils according to their characteristics as learners and identify those most likely to benefit from an intervention such as Study Plus.

The ideal Study Plus pupil fits the following profile.

- They may have the potential to achieve GCSE grade C.
- They are at present not making sufficient progress to do so.
- They have attitudes to school and learning that may not be good, but are still sufficiently positive to benefit from intervention.

Planning – step 2

A fundamental principle of Study Plus is that the course is tailored to meet the needs of the pupils as a group and as individuals. For this reason, it is important to build up a profile of the group of pupils as soon as possible so that the long-term planning for the course can be completed in a timely way.

It is unlikely that results from the English and mathematics end-of-Key-Stage-3 tests will be available in time, so the best source of information will be teacher assessments. If teachers of English are using the Assessing Pupils' Progress in English (APP) guidelines, this information would be ideal. Another good source of information would be to sample pupils' English and mathematics books to identify key strengths and weaknesses.

At this stage, the aim is to build up a picture of the group in order to see which units would best make up the Study Plus course. You should seek information to answer the following key questions.

- What should be the balance of English and mathematics teaching?
- Within English, what are the main areas that need extra support?
- Within mathematics, what are the main areas that need extra support?

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Below is an example illustrating how this might work out in a school after a review of the pupils' attainment. The ticks indicate the areas identified as needing improvement.

Main target areas for Study Plus group			
English		**Mathematics**	
Planning and structuring a piece of writing (Writing AF3, AF4)	✔	Place value, ordering and rounding	
Matching writing to purpose and intended reader (Writing AF2)	✔	Integers, powers and roots	
Sentence structure (Writing AF5, AF6)	✔	Fractions, decimals, percentages, ratio and proportion	✔
Vocabulary (Writing AF7)		Calculations – mental methods and written methods	✔
Spelling (Writing AF8)		Equations, formulae and identities	✔
Accuracy (Writing AF6)		Sequences, functions and graphs	
Responding to the overall meaning of a text (Reading AF6)	✔	Shape and space	✔
Making inferences (Reading AF3)	✔	Measures	
Finding and using information (Reading AF2)	✔	Handling data	✔
Understanding how texts work (Reading AF4)		Probability	
Understanding writers' use of language (Reading AF5)	✔	Using and applying mathematics	

With this information it will be possible to produce an outline plan of Study Plus units relevant for your course based on the sample long-term plans (see pages 33 to 83) and other sample materials. When producing this plan, it is essential that you take account of the schemes of work for English and mathematics that will be in operation at the time because the Study Plus unit should not unnecessarily repeat work that is in progress there. The relationship between Study Plus and GCSE English and mathematics courses should be that Study Plus complements this work and consolidates skills, but is something different.

A number of schools that selected the English unit Postcards (Better Sentences 1) as a good match to their pupils' curricular targets took the pupils out of school to visit an art gallery as part of the work. One LA coordinated a visit such as this one for all three of their pilot schools.

‘Pupils were given special leaflets which contained a map of the gallery and a selection of paintings, each with a space underneath. Pupils had to locate the paintings, discuss them with peers and then write a sentence about the painting before moving on to the next. Pupils were obviously moved by the paintings and wrote sentences way beyond their usual standard.’ It was commented that: ‘Students enjoyed seeing the links between what they had been doing in school and the “real world of art”, and this was also a great opportunity to encourage networking between the students from the different schools. There was a palpable sense that the group were ”special” and felt they were part of an innovative and creative project.’

‘The pupils became particularly engaged with the mathematics unit “Boxes”. The teacher had brought a number of boxes to the lessons including cereal boxes, which led to comparisons of volume with contents. When discussion involved other commercial packaging the teacher decided to take the group to the nearest supermarket.

‘They went just before Christmas and purchased a number of products in boxes that were interesting 3D shapes. Over lunch they explored the boxes (and later ate some of the contents!). In the next lesson they worked on the unit using the purchased boxes.’

Planning – step 3

The objective of step 3 is to produce an outline plan of the units that will be taught, not to plan the units in detail. When planning the Study Plus course in outline, you can use the Study Plus planning model and sample units as a guide. This material can be found on pages 33 to 57 for English and 58 to 100 for mathematics. The planning model shows a collection of units that could be delivered over six terms if the course were to be focused on just one subject. If the course is to cover both English and mathematics, then you can select the units from English and mathematics that are the best match to the pupils’ needs, using the information gathered in step 2. Below are some points to note at this stage.

- It is possible to include two units on the same aspect in order to consolidate learning and take pupils forward to a higher level with the second unit.
- In the example material, the units are designed to last three to four weeks. If, however, you plan most units to last four weeks then it will not be possible to teach 20 units in the time available and the course will need to be planned with fewer.
- The sample plans are not meant to constrain your planning. It is essential that you plan to meet the specific needs of your Study Plus group, so you may want to include your own units based on other targets.

Your outline plan should show for each unit:

- the title of the unit;
- a brief summary of the topic or theme;
- the cluster of curricular targets that will be addressed;
- when the unit will be taught.

Teachers can use a template such as that shown on the following page to create their plan. This can be found on the CD-ROMs that accompany this handbook.

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Study Plus unit outline plan

Unit number	Title of unit	English/mathematics	Half term when taught

Content:

Curricular targets/curriculum area:

Unit number	Title of unit	English/mathematics	Half term when taught

Content:

Curricular targets/curriculum area:

Unit number	Title of unit	English/mathematics	Half term when taught

Content:

Curricular targets/curriculum area:

Unit number	Title of unit	English/mathematics	Half term when taught

Content:

Curricular targets/curriculum area:

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Planning – step 4

Before the start of the first term, it is recommended that you plan the first year of the Study Plus course, approximately ten units, at the level of detail usually associated with medium-term plans. This means planning the content of the unit but not the individual lessons. Looking at the sample unit in section 2 of this handbook, you can see that all the material shown, apart from the lesson plans themselves, can be considered to be medium-term planning. Below is what therefore needs to be planned in this step:

Curricular target cluster/ curriculum area	A group of related curricular targets or a curriculum area matched to the needs of the group, that underpins the unit and relates to the objectives for the individual lessons (Already identified in previous step)
Unit topic	The content of the unit. The subject matter that will engage the pupils and provide the context for teaching the curricular targets (Expanded from the outline in the previous step)
Unit overview	A summary of how this topic will be developed over six to eight lessons
Unit assessment questions	The key criteria that will be used when assessing the pupils' progress in this unit. These are linked to the unit topic's learning outcome and the curricular targets.

Teachers can use a template such as that shown on the following page to create their plan. This can be found on the CD-ROMs that accompany this handbook.

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Example planning template for medium-term plans

Unit title		
Curricular target cluster/ curriculum area		
Unit topic		
Unit overview	Lesson 1	
	Lesson 2	
	Lesson 3	
	Lesson 4	
	Lesson 5	
	Lesson 6	
	Lesson 7	
	Lesson 8	
Unit assessment questions		

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Planning – step 5

The final step is to plan the lessons themselves. Apart from the sample plans in sections 2 and 3, there is useful material in the rest of this section of the handbook to help with this planning. Given the pressures of term time, it would be wise for you to plan a small number of units from the outset. This sounds demanding but you can expect to receive support for this process of planning as part of your initial training for Study Plus, together with some ongoing support from your consultant or through a local network. It is at this stage of planning that you will find the progression maps for English and mathematics of use. These are introduced next.

Using the progression maps

The progression maps are web-based materials that are designed to be a tool for teachers seeking to improve the progress of pupils who are attaining below the level expected for their age. To use them, you identify the point where a pupil or a group of pupils is situated on the map and from there, by navigating the website, you can access a range of material designed to focus teaching and help pupils secure critical aspects of learning. They can be used to set curricular targets and suggest ways of bridging gaps in learning.

The progression maps are available at: www.standards.dfes.gov.uk/progressionmaps/

English

For English, there are two maps; one for reading and one for writing. Each map identifies ten points in a sequence of progression. In order to make the map more user-friendly each of the ten points has been labelled with a name that characterises the pupils who are in that area of attainment. These names are useful 'handles' and the ten points can be seen as a helpful route through the complex progression of skills in reading and writing. For each point on the map there is a 'pen portrait' that describes the typical attainment profile together with advice on what the pupil needs to learn next (curricular targets) and examples of how this might be taught.

Reading progression map		Writing progression map	
Point 1	'Developing reader'	Point 1	'Developing writer'
Point 2	'Secure developing reader'	Point 2	'Secure developing writer'
Point 3	'Competent reader'	Point 3	'Competent writer'
Point 4	'Secure competent reader'	Point 4	'Secure competent writer'
Point 5	'Active reader'	Point 5	'Active writer'
Point 6	'Secure active reader'	Point 6	'Secure active writer'
Point 7	'Reflective reader'	Point 7	'Reflective writer'
Point 8	'Secure reflective reader'	Point 8	'Secure reflective writer'
Point 9	'Versatile reader'	Point 9	'Versatile writer'
Point 10	'Secure versatile reader'	Point 10	'Secure versatile writer'

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The progression maps are based on what the Strategy has learnt about progression in English, particularly through the Monitoring Pupils' Progress (MPP) project.

Mathematics

The progression maps for mathematics comprise a set of objectives that describe ten points in a sequence of progression in each strand of mathematics. These ten points span the range from around level 3 to a C grade at GCSE, but are not cross-referenced directly to levels. The objectives are drawn from the *Framework for teaching mathematics*. Alongside the objectives are examples of what pupils should know and be able to do, probing questions to support teachers with their assessment and suggestions for when pupils are having difficulties. The progression maps expand on the Monitoring Pupils' Progress key indicators and probing questions, and provide links to existing materials.

The progression maps have been developed for each of the following strands of mathematics.

Using and applying mathematics	**1.**	Problem solving
	2.	Communicating
	3.	Reasoning
Numbers and the number system	**1.**	Place value, ordering and rounding
	2.	Integers, powers and roots
	3.	Fractions, decimals, percentages, ratio and proportion
	4.	Calculations – mental methods and written methods
Algebra	**1.**	Equations, formulae and identities
	2.	Sequences, functions and graphs
Shape, space and measures	**1.**	Shape and space
	2.	Measures
Handling data	**1.**	Handling data
	2.	Probability

Using the progression maps to tailor teaching

The progression maps are useful at any stage in the planning process but are particularly useful when you are planning the lessons for the Study Plus group. Study Plus units are designed around a cluster of curricular targets that is appropriate for the pupils as a group. In order to tailor teaching within lessons, however, you will want to identify curricular targets for individual pupils using the progression maps. Once pupils have agreed individual targets, the necessary learning and the teaching that will help them progress can be found on the map and you can take account of this as you run the lessons, particularly in:

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- your questioning;
- guided group work;
- work with the TA;
- task setting;
- marking.

In other words, the progression maps are a significant tool to help you tailor teaching to meet the needs of your individual pupils.

Teaching the units

Each unit should be planned to take three to four weeks (six to twelve lessons) and is designed to develop the teaching and learning through four phases:

Phase 1

Orientation to the group curricular target and a topic through which it may be taught

Phase 2

Focused teaching towards the curricular target

Phase 3

Guided/independent application in the context of the topic plus cross-curricular links

Phase 4

Review of progress and focus on personal targets

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Finding the right topic

In phase 1, the most important aim is for you to engage your pupils with a topic, idea or theme which will be the focus of work through the unit. You will have chosen this topic because it:

- is likely to interest the group as it is relevant/topical for young people like them;
- provides an appropriate context for teaching towards the identified targets;
- allows an element of choice for pupils in the main task(s) associated with the unit.

Pupils taking Study Plus will not respond well to a course that looks just like more English, more mathematics and more of what they have done before in order to catch up. In creating your own course, you have an opportunity to focus on topics that are worth pursuing for their own sake, topics on which pupils themselves can contribute from their own experience. It is the topic as well as good, interactive teaching that will help to motivate the pupils.

What does it mean to say that a topic must be 'an appropriate context for teaching towards the identified targets'? It means quite simply that the tasks related to the topic must really require the skills you want to improve. For example, if the group curricular targets were related to adding detail and interest to sentences through expanding noun phrases and making apt vocabulary choices, that would match well to a topic based around documentary material from the DVD *City of God* with an outcome that was a descriptive writing task such as 'Describe a walk through one of the favelas of Rio de Janiero'. On the other hand, a topic requiring concise, informative writing as an outcome would not be such a good match. In mathematics, if the curricular targets included algebraic areas such as generating terms of a sequence, using linear expressions to describe those terms and also adding fractions, then the unit on fractals and the von Koch snowflake would be an ideal vehicle for developing pupils' understanding.

Improving skills and understanding

Phase 2 of the unit is your opportunity to help pupils develop the skills and understanding they need for their work on the topic. This works best when pupils:

- can see the link between an activity designed to promote skills and understanding and their ultimate goal;
- know they will apply these skills very soon;
- know that part of their assessment will depend on how well they have applied the skills and understanding when working independently.

In phase 3, you give pupils the opportunity to apply their targeted skills and understanding. This will involve:

- some appropriately scaffolded but independent work on the Study Plus topic;
- pupils demonstrating how they have applied the skills/understanding elsewhere in the curriculum.

Securing the learning

Phase 4 is definitely an opportunity for your pupils to share what they have done and celebrate what they have achieved. It will include activities that allow:

- the pupils to reflect together on the outcomes of the topic and on the progress they have made towards their targets;
- you to assess progress and revise the targets of individual pupils as appropriate.

In sections 2 and 3 of this handbook, there are sample English and mathematics units that exemplify this structure. As you will see from the examples, phases 2 and 3 are often closely connected and are not as separate as the model suggests. All the sample units for both subjects can be found on the CD-ROMs.

Teaching the lessons

All the example lesson plans in sections 2 and 3 and on the CD-ROMs are set out in a particular way. This has been done for clarity and consistency in the sample material, not because it is essential to use this planning format. **The design of lessons will always need to vary so that they are fit for purpose: planning must facilitate teaching, not put it into a straitjacket**. Nevertheless, the lesson plans do exemplify certain principles.

- Starter activities, where used, should be a pacy introduction to the lesson in which all pupils are actively involved. The subject matter has a link to the focus of the unit and preferably to what follows in the lesson.
- Guided group work allows you or the TA to provide a focused session linked to the work of the whole class but designed to meet the specific needs of a selected group.
- The TA has a good knowledge of all the pupils and is able to support the progress of individual pupils through planned one-to-one tutoring.
- Final plenary sessions are used for pupils to reflect on their learning and progress and themselves as learners.

Important features of Study Plus teaching

Certain features of any effective teaching are of particular importance in the context of Study Plus:

- matching your teaching to the needs of the whole group and the individuals within it;
- motivating the learners;
- linking the learning to other lessons.

The three factors are clearly linked as pupils will be more motivated if teaching meets their needs and they can see its wider usefulness.

Study Plus places a strong emphasis on using the progression maps to help tailor teaching to individual pupils because pupils taking Study Plus have already demonstrated that nine years of compulsory schooling have not equipped them with some essential skills in English and/or mathematics. This is not to suggest that they have been subjected to bad teaching, just teaching that has, for a range of reasons, not enabled them to progress fast enough. Study Plus must be an opportunity for them to experience something different: a feeling that the two adults working with the class know them, what they need to learn and how they can apply this more widely. Your pupils should feel confident that what they are asked to do makes sense for them and that they will receive support that really hits the spot.

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‘Our teachers are great. They have loads of patience and are good at what they are doing with us. That makes us feel good and want to do well. We can get lots of attention from the teachers and support teachers. The group of us together work well. We like the atmosphere in the classroom.’

Year 10 Study Plus Pilot pupil

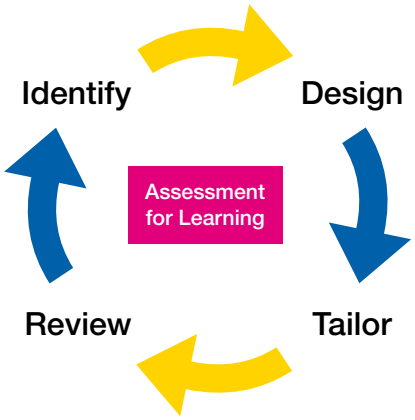
Planning for ways to motivate the learners is particularly important in Study Plus as there is no accreditation directly linked to the course that can act as additional motivation. The aim is, of course, for them to achieve more highly in their GCSE examinations, but this is not a direct incentive. Reward systems, however, do work for Key Stage 4 pupils when they are implemented systematically and fairly. Schools and teachers have devised many effective ways of providing short-term incentives for reluctant learners and these should definitely be considered for Study Plus. However, the bigger prize is intrinsic motivation. One aim of Study Plus is that pupils agree their own personal goals with you and that they know how they can make progress towards them. In addition, they should find working on the Study Plus topics rewarding in itself.

Transfer of learning

Any intervention work, no matter how carefully planned, targeted and taught, can ultimately fail because pupils do not apply what they learn outside the context of the intervention tuition. This lack of transfer means that the learning is not consolidated or reinforced and is very quickly lost. The reason for lack of transfer is generally that, in the context of a busy school with a hectic timetable, teachers do not know enough about what their pupils are learning elsewhere, and so are not in a position to build on this systematically. Study Plus seeks to overcome this problem by reversing the direction of travel. Firstly, the idea is not just that pupils export their new learning into other areas but that they bring their experience from other areas into the Study Plus context and reflect on how they are progressing towards their targets and how well they are applying new learning in other subjects. Secondly, you, and more specifically the TA, are well informed about what the pupils are doing elsewhere and actively encourage transfer in a relevant way. Liaison with other staff (for example, the sharing of curricular targets) is still important, but transfer no longer depends entirely on the success of this process.

‘At the beginning of each unit the teacher and TA plan with a particular group of pupils in mind. For example, four pupils within the group are studying history so a cross-curricular planning session was held with the history teacher, Study Plus teacher and TA. Curricular targets were shared for all pupils and the history teacher discussed the writing demands of GCSE history. The Study Plus teacher outlined the Trailers (Better Sentences 2) unit and the group agreed ways in which they could reinforce learning in both history and Study Plus lessons. The TA then started a process of mentoring each of the four pupils, that involved looking at their history work and setting individual curricular targets based on their work in Study Plus. Finally, the TA supported pupils in some history lessons ensuring that pupils transferred skills from one lesson to another.’

Study Plus and assessment



Much teaching in Key Stage 4 is strongly influenced by the process of summative assessment at the end of the Key Stage. In Study Plus, on the other hand, teachers are not working to cover the content specified by an examination syllabus but are encouraged to:

- **identify** the learning needs of the pupils (curricular targets);
- **design** a course that is the best match for their class;
- **tailor** their teaching by taking account of individual pupils' identified next steps for learning in every lesson;
- **review** pupil progress by making the assessment of progress towards the curricular targets an ongoing process that involves the pupils actively.

For this reason, each Study Plus sample unit has a number of clear 'assessment questions' which can be used to focus teachers and pupils on the extent to which they are making progress towards the learning goals of the unit.

Study Plus pilot schools have developed a range of practice to manage the process of reviewing pupils' progress.

'The teacher and TA used a spreadsheet to analyse the Year 9 end-of-Key-Stage test data. From this, areas of strengths and weaknesses were identified and modules were chosen/developed that addressed pupils' needs. Pupils record the curricular targets that they are working on in their learning logs and these are then referred to during the module. At the end of the unit of work pupils look back through their work and find examples that demonstrate that they have met their targets. They then work on other mathematics questions in a different context to see if they can apply their skills to a different situation.'

'Pupils interviewed each other in September before starting the course, using a set of questions written by the teacher and the LA consultant which raised issues about attitude towards mathematics and self esteem. These were recorded and stored digitally so that the process could be repeated later in the year for comparison.'

'Students were given questions at the start of the "Disaster Relief" unit that required them to consider their understanding of the curricular targets for that unit. They were also given a set of exam questions testing these areas and asked to read them and identify where and why these questions were causing them difficulties. In the final lesson of the unit, the students return to the exam questions and attempt to solve them using the skills they have learnt during the unit, reflecting on the new learning that has helped them to do this.'

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‘In this school, group and individual curricular targets have formed the basis of assessment for learning. Lessons are structured around opportunities for students to review their curricular targets and peer and self-assess in the light of them. The teacher and TA discuss these targets with identified students during each lesson, and use the terminology “learning conversation” to frame this discussion.’

‘Progress is measured according to whether students have met their targets. The school is further developing this approach by collecting evidence from other subjects to ascertain if students have met their targets in lessons other than Study Plus.’

‘One school has developed a Study Plus students’ learning log target sheet which offers a system for tracking and monitoring of targets. This is used by the teacher, TA, pupil and teachers across the curriculum.’

The role of the TA

The important role of the TA has been referred to in the previous paragraphs. This section sets out clearly how an additional adult, whether they are designated as higher-level teaching assistant (HTLA), learning support assistant (LSA), TA, learning mentor, or academic mentor, can make an invaluable contribution to Study Plus.

‘At the very start of the autumn term, the Study Plus group were taken out of school to Sale Water Park. The aim of the exercise was to establish a sense of identity for the group, and to reinforce the idea that Study Plus is “different”, and not just about English and maths, but also about them as learners. The designated teachers for English and maths and the TA accompanied the group, and were keen to be seen as all part of a team, with a supportive role for the pupils.

‘During the visit the group were divided into teams and took part in an orienteering exercise. The activity was followed by an analysis of strategies used and an evaluation of their success.

‘The visit was judged to have been successful in a number of ways: staff and students felt that it developed cohesion, and established relationships more quickly than might otherwise have been the case. Staff also felt that the special treatment afforded the group contributed to the self-esteem of most of the students, and countered the idea that they were in the group because they were, to use their term, “thick”!’

The importance of good teamwork between you and the TA cannot be overemphasised. It is clear from the pilot project that many teachers are unused to planning a specific role for the TA into their lesson, but this is essential as it is at the heart of the Study Plus approach. The success of Study Plus depends on TAs taking up a role that goes well beyond simply attending the lessons and helping pupils in a general way. The TA must have access to all the information on the pupils, and their curricular targets in particular. The TA’s role working with groups or individuals must be planned into every lesson and he or she should be party to these plans in advance. If the TA has the capacity to work with any of the pupils outside the Study Plus lessons, then you must be kept in touch with the outcomes of this.

‘The TA supports learning in Study Plus lessons. She has also made herself available to pairs/small groups of Study Plus students at lunch time and break times if they want to talk to her about coursework/ check a skill they have been developing as part of the Study Plus lessons. A number of students have independently asked for her support in this way.’

'Since January the TA has been given a number of lessons each week to support a group of Study Plus students in other lessons. For example, where students had been looking at using better words in their Study Plus lesson, the TA was on hand in Technology to support the application of these skills when the pupils were writing a description of the materials they were using as part of coursework. The TA is also supporting the students with using their learning logs across the curriculum – reminding them about their targets and where they might ask teachers across the curriculum to sign to say students have met their target in another subject.'

General TA support for pupils' learning

Part of the profile of each Study Plus pupil will be a characterisation of them as a learner. All will have their strengths but some pupils will lack confidence, some will lack motivation, some will be disorganised and so on. The TA should provide individual support to the pupil as a learner as and when appropriate. It is recommended that the TA become familiar with the Learning Challenge materials (*The Learning Challenge: Handbook for school organisers*, DfES 0393-2003, and *The Key Stage 4 Learning Challenge*, DfES 0088-2004G), as these could prove very useful in this context.

Facilitating links between Study Plus and other subjects

The TA should know which other subjects the pupil is taking for GCSE and the names of the relevant teachers. He or she should keep a note of the demands relating to literacy and numeracy that are currently arising in these subjects. This can be done by talking to both the teachers and the pupils. There will be opportunities within the lessons and possibly outside for the TA to review with pupils the way they are able to apply the skills learned in Study Plus elsewhere, and also perhaps to identify gaps in literacy and numeracy that are emerging.

Guided group work

In the context of guided work, the TA can take the role of tutor for the guided group. In this case, you will have planned the guided session with the TA so that the objectives, outcomes and activities are clear and the TA is confident that he or she can run the group session successfully. While the TA runs the group session, the teacher takes responsibility for the rest of the group. Alternatively, you may tutor the guided group, leaving the TA to monitor the independent work of the rest of the group and support individuals as appropriate.

'The TA has worked in the school for a number of years mainly supporting the mathematics department. She is both confident and competent in the classroom demonstrating good relationships with the students. The school provides for one hour of joint planning time every week for the TA to meet with the teacher so that roles and responsibilities for the following week's lessons can be determined and planned. Typically the TA is involved in guided group work, although she often shares the teaching and has taken a lead role in lessons.

'In a recent lesson her role was illustrated as follows. She supported pupil engagement in the activities in a general way, recording student responses on the whiteboard during feedback, then, working with one group, identified beforehand, guided their learning during the written task.'

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One-to-one coaching

It is important that TAs do not fall into a position whereby they often have a general support role in which they respond to demands from various individual pupils in an ad hoc way. They will be more effective and gain greater job satisfaction where they have a planned role. There are a number of planned roles working with individuals, for example:

- updating a pupil who has missed work;
- working on filling a specific individual knowledge/understanding gap (for example, by using a mini-lesson from Writing Challenge);
- reviewing with an individual pupil how their work (possibly from another subject) matches up to their Study Plus targets;
- supporting an individual pupil who is struggling with an aspect of the work (for example, reading a piece of challenging text independently).

The learning conversation

The learning conversation is an optional element of the Study Plus pilot. The initiative is supported by a separate online training module (www.nationalstrategiescpd.org.uk/mod/resource/view.php?id=464), which contains many short video extracts exploring the structure, techniques and issues involved. It is framed by leadership and management guidance and linked to other relevant National Strategy materials. The process provides an explicit focus on learning skills, strategies and attitudes, and pays attention to the personal learning needs and characteristics of the individual pupils involved.

Learning conversations are periodic, cyclical small-group discussions involving an adult coach and two to four individuals, with the aim of developing an ongoing dialogue with learners about their progress and preferences in learning. Conversations have a specific structure that is described on the website below.

The group provides social interaction, which is central to an individual's self-concept, which in turn underpins learning, development and achievement. Through the group, pupils engage with prior assumptions in order to change and develop them, raising their confidence, motivation and engagement. These conversations discourage dependency and develop responsibility. They are a supportive forum for reviewing how, as well as what, learners learn, with pupils identifying the issue, owning the analysis and identifying the ways forward. In this way they have the potential to enhance the impact of Study Plus by supporting learners in:

- the negotiation of targets and choices in learning;
- planning, organising and reflecting on their learning more effectively;
- overcoming self-limiting beliefs and obstacles to learning;
- transferring and applying their learning, so improving rates of progress;
- making the best use of opportunities for learning in a range of settings and at home.

Learning conversations can help learners to make informed choices prior to involvement in Study Plus, to monitor and evaluate their progress as it continues and to develop greater independence prior to completion of the programme.

> 'The TA meets groups of pupils for mentoring sessions on a fortnightly basis. She uses the time to discuss any concerns with the pupils and really develop a dialogue with the pupils, thus enhancing the learning environment in the classroom. The school has asked the LA for additional support in developing the TA's skills in mentoring, and in response to this, some training on the learning conversation is planned for the summer term.'

General support for the Study Plus lesson

While you are engaged in a whole-class teaching activity, the TA can usefully undertake some general back-up work. Obviously this might include helping to keep everyone involved in the whole-class activity, but could also be:

- taking the attendance register;
- recording reward points;
- updating pupil information regarding cross-curricular links;
- tracking overdue work;
- preparing for a guided group session;
- preparing a resource for a future lesson (such as true/false cards for a starter activity).

> 'The school has made arrangements for the teacher and TA to have an hour a week dedicated time to plan and evaluate together. The TA is an HLTA with expertise in speech and language development, and the mainstream teacher is a humanities specialist so they are able to support each other in delivering an English-based Study Plus programme.
>
> 'The TA is regarded as part of the teaching partnership by the students, and both colleagues have worked hard to forge a strong working relationship. The TA will lead on certain aspects during whole-class work and is often assigned to target students during independent or group work.'

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Section 2 – Study Plus sample English units

Introduction

An effective way of planning the work for Study Plus is in units that last from six to eight lessons. Each unit is based around an idea that will engage the interest of the group and will provide an appropriate context for learning focused on an aspect of English that is important for the pupils' progress. The learning focus is always defined by a cluster of curricular targets from the English progression map.

The eight sample units (one printed here and a further seven on the CD-ROM) seek to exemplify this. They are not, however, designed to be 'off-the-peg' teaching plans because a very important principle that underpins Study Plus is that work should be planned around a specific group of pupils.

The purpose of the materials in this section is, therefore, to provide you with ideas that you can adapt to your own class and context; ideas that may also help to inspire you to come up with your own units based on local material of special interest to your pupils. All the planning on the CD-ROM is available in a form that allows teachers to adapt it easily.

Study Plus planning model: English

On pages 35 to 39, you will find a model that could underpin 20 units of Study Plus English. It is based on aspects of English that are important pathways for progression and is linked to the English progression map via the curricular targets. Some topics are covered by two units ('1' and '2'). Part 2 units are at a higher level than their part 1 counterparts and can be used after part 1 in order to take pupils further on this area, or can be used without part 1 if pupils are already at the higher level and the targets are more appropriate.

Teachers can use this planning model to select units that best match the needs of their group as a whole. On pages 40 to 45 is an example of how the 20 units in the planning model might be turned into actual units based on topics designed to engage the interest of the pupils. The eight units with shading are the ones that are fully exemplified, one on pages 46 to 57 and the remaining seven on the CD-ROM.

Features of the Study Plus unit planning

The sample teaching plans are set out in a consistent way. This has been done for clarity, not to suggest that this planning format must be used. Most lessons follow the well-known four-part lesson model and include a starter and plenary. **While this is a good lesson design, it must be used flexibly and it is expected that teachers will adapt these plans to maximise learning in their own context**.

Other features of the lessons are:

- lesson objectives that are relevant to the unit's curricular targets;
- interactive teaching approaches;
- use of modelling by the teacher where appropriate;
- use of guided group work;

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- planned deployment of the TA in a range of roles;
- use of the **remember**, **model**, **try**, **apply** sequence where the focus is on introducing or consolidating a particular skill.

All these features have been promoted through the Key Stage 3 Strategy, but National Strategy English consultants will be able to advise if you are uncertain about any of them.

The units encourage the use of AfL (assessment for learning) approaches. Each unit has a set of key **assessment questions**. These questions are shared with the pupils at the outset and can be used during and at the end of the unit to underpin self-assessment, peer assessment and teacher assessment. The questions relate to the curricular targets and are a stimulus for reflection on what progress has been made towards these targets by individual pupils.

The lessons generally have some resource material to accompany them. This is so that you can more easily see how these sample lessons might work. We have not attempted to provide all the resources that would be needed for the lessons because we do not recommend that they are used 'off the peg'. We think teachers will provide best for their classes by planning lessons around material that they have selected themselves and which is readily available in school. Nevertheless, all the units do have some useful resources and, where appropriate, these have been provided on the CD-ROM both as text and as slide presentations that could be used directly in the classroom.

Golden rules for planning Study Plus units

- In school, units are planned to meet the needs of the specific Study Plus group and the individuals within it.
- In every unit there is a blend of learning through talk, learning from text and learning through writing.
- In every unit, there is a blend of shared, guided and independent work.
- Apart from brief interactive starter sessions, all work designed to boost skills must take place in the context of relevant, purposeful and motivating reading and writing.
- Where possible, all work should emphasise cross-curricular links and applications.
- There is an emphasis on leading pupils towards independent work, producing quality outcomes that can be shared and celebrated.

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Study Plus planning model: English

Writing

GCSE English assessment objectives

AO3 Writing
Candidates are required to demonstrate their ability to:
(i) communicate clearly and imaginatively, using and adapting forms for different readers and purposes;
(ii) organise ideas into sentences, paragraphs and whole texts using a variety of linguistic and structural features;
(iii) use a range of sentence structures effectively with accurate punctuation and spelling.

Units with writing targets

Planning and paragraphs 1

Curricular target cluster:

- Show my reader how I have organised my ideas by using paragraphs.
- Plan my writing so that I know how it will develop all the way through.

GCSE AO3 **(i)**, **(ii)**

Planning and paragraphs 2

Curricular target cluster:

- Always use paragraphs and try to link them together clearly.
- Link paragraphs together so that my reader can see clearly how my piece of writing is developing.

GCSE AO3 **(i)**, **(ii)**

Style 1

Curricular target cluster:

- Add more detail to my writing to make it clearer and more interesting.
- Plan my writing so that I am using an appropriate style.

GCSE AO3 **(i)**, **(ii)**

Style 2

Curricular target cluster:

- Sustain an appropriate style right through my writing and adapt the conventions of the text type where this will add originality and interest.

GCSE AO3 **(i)**, **(ii)**

Better sentences 1

Curricular target cluster:

- Vary my sentences in length and structure.
- Use a wider range of connectives to show the links between my ideas.
- Use commas correctly in long sentences.

GCSE AO3 **(iii)**

Better sentences 2

Curricular target cluster:

- Choose to write the kinds of sentences that will give the effect I want.
- Use commas and other punctuation correctly in longer sentences to help the reader follow my meaning.
- Connect the sentences within paragraphs so that my meaning and purpose are clear.

GCSE AO3 **(iii)**

Better words 1

Curricular target cluster:

- Choose more words that will have an impact on my reader.
- Use adjectives and adverbial words and phrases to add detail, interest and variety to my writing.

GCSE AO3 **(i)**, **(ii)**

Better words 2

Curricular target cluster:

- Always choose the best words to match the subject of my writing.
- Choose my words carefully and ambitiously so that my writing is precise and has an impact on the reader.

GCSE AO3 **(i)**, **(ii)**

Better spelling

Curricular target cluster:

- Identify my most common spelling mistakes and find my own way to reduce their number.
- Check my writing for the mistakes I commonly make.

GCSE AO3 **(iii)**

Improving accuracy

Curricular target cluster:

- Check my writing for the mistakes I commonly make.
- Use commas and other punctuation correctly in longer sentences to help the reader follow my meaning.

GCSE AO3 **(iii)**

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Reading

GCSE English assessment objectives

AO2 Reading

Candidates are required to demonstrate their ability to:

(i) read with insight and engagement, making appropriate references to texts and developing and sustaining interpretations of them;

(ii) distinguish between fact and opinion and evaluate how information is presented;

(iii) follow an argument, identifying implications and recognising inconsistencies;

(iv) select material appropriate to their purpose, collate material from different sources, and make cross-references;

(v) understand and evaluate how writers use linguistic, structural and presentational devices to achieve their effects, and comment on ways language varies and changes.

Units with reading targets

Finding and using information 1

Curricular target cluster:

- Find the main ideas in a text and support them with evidence.
- Find quotations that could support my ideas.
- Skim and scan to find information quickly.

GCSE A02 **(i)**, **(iv)**

Finding and using information 2

Curricular target cluster:

- Pull together information from a range of non-fiction texts and decide which parts might be relevant for my purpose.

GCSE A02 **(i)**, **(iv)**

Responding to whole texts 1

Curricular target cluster:

- Explain why I like or dislike a text.
- Use a range of imaginative reading strategies when I read.

GCSE A02 **(i)**

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Responding to whole texts 2

Curricular target cluster:

- Understand the writer's point of view in a text I am reading.
- Comment on the way a writer puts across a point of view in a text.
- Follow some themes and ideas throughout a whole text that I am reading.
- Understand that a text may have more than one meaning.

GCSE A02 **(i)**

Reading between the lines 1

Curricular target cluster:

- Read between the lines to infer the writer's meaning.

GCSE A02 **(i)**, **(ii)**, **(iii)**

Reading between the lines 2

Curricular target cluster:

- Make sure I can find evidence in the text to support my inferences.
- Use a short quotation within a sentence to show that I can refer closely to a text.

GCSE A02 **(i)**, **(ii)**, **(iii)**

Understanding how texts work 1

Curricular target cluster:

- Understand the connection between the purpose of a text and its layout and organisation.

GCSE A02 **(i)**, **(v)**

Understanding how texts work 2

Curricular target cluster:

- Explain why I think a text has been organised in a particular way.
- Understand that a writer can create different types of narrators in fiction texts.

GCSE A02 **(i)**, **(v)**

Understanding how writers use language 1

Curricular target cluster:

- Pick out and comment on some of the words chosen by the writer.
- Explain why a writer has chosen certain words or phrases.

GCSE A02 **(i)**, **(v)**

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Understanding how writers use language 2

Curricular target cluster:

- Comment on the way writers' choices affect the reader's response.
- Understand how the small decisions a writer makes can contribute to the bigger picture.

GCSE A02 **(i)**, **(v)**

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Study Plus sample units overview

Here is an example showing 20 possible units of work for Study Plus English, based on the long-term planning model. Full sample plans for all the units shown with a shaded background are included on the CD-ROM, and one full sample plan is presented on pages 46 to 57.

Units focused on writing targets

Curfew (Planning and paragraphs 1) Pupils write a persuasive letter and magazine article.	Pupils learn that a 9 pm curfew is to be put in place in their town by the police because of recent bad behaviour by groups of teenagers. Pupils write a formal letter to the headteacher to persuade her/him to intervene with the police on their behalf. They also write an article for a magazine with a youth audience in which views on the curfew are expressed more forcefully and emotively. **Targets** ■ Show my reader how I have organised my ideas by using paragraphs. ■ Plan my writing so that I know how it will develop all the way through. GCSE AO3 **(i)**, **(ii)**
Ask the expert (Planning and paragraphs 2) Pupils design a sequence of presentation slides or website pages.	Pupils design a sequence of presentation slides or website pages that inform and explain about an area of interest to an unfamiliar audience. For example, pupils could inform a given audience about a topic from one of their GCSE subjects, or could choose a subject of personal interest outside the school curriculum. The emphasis is on creating clear links between the texts that appear on different slides or web pages. **Targets** ■ Always use paragraphs and try to link them together clearly. ■ Link paragraphs together so that my reader can see clearly how my piece of writing is developing. GCSE AO3 **(i)**, **(ii)**
Pulp fiction (Style 1) Pupils write the start of a 'tough guy' detective story.	Pupils are asked to submit the first five paragraphs of a detective story to a magazine editor. There's a cash advance for those accepted for publication. The unit begins with a comparison of two extracts – one from a novel by Raymond Chandler and one from a contemporary text from the same genre. Pupils then revisit ways of adding detail to sentences and investigate a range of text extracts for style, focusing particularly on features that contribute to formal/informal styles before writing their own piece. **Targets** ■ Add more detail to my writing to make it clearer and more interesting. ■ Plan my writing so that I am using an appropriate style. GCSE AO3 **(i)**, **(ii)**

Review it! (Style 2) Pupils become critics and write reviews, experimenting with different writing styles.	Pupils become critics, write reviews and experiment with different writing styles. They explore a variety of reviews from different publications before writing their own reviews. The focus moves on to developing pupils' written style in a wider context and also to exploring where reviews might feature in other subject areas. This unit is relevant to writing in other curriculum areas where pupils are required to write in order to analyse, review and comment. It helps pupils understand the distinctive features of formal and informal writing styles. **Target** ■ Sustain an appropriate style right through my writing and adapt the conventions of the text type where this will add originality and interest. GCSE AO3 **(i)**, **(ii)**
Postcards (Better sentences 1) Pupils write in response to a postcard they have chosen (imagine, explore, entertain).	Pupils make a display of pictures, each with a piece of written text designed to add to the viewer's enjoyment and experience of the picture. If possible, the postcard texts should be word-processed, as they will be used for an exhibition. Pupils could be taught to use the 'track changes' feature to enable them to see the drafting process; this is helpful for peer- and self-assessment. It will be possible, depending on pupils' interests, to make links to writing with this purpose in other curriculum areas, such as history, geography, and art and design. **Targets** ■ Vary my sentences in length and structure. ■ Use a wider range of connectives to show the links between my ideas. ■ Use commas correctly in long sentences. GCSE AO3 **(iii)**
Trailers (Better sentences 2) Pupils will compose a voice-over and a synopsis in response to a film trailer they have chosen (inform, explain, describe).	Pupils broadcast a selection of film trailers, each with an adapted voice-over. They also write a synopsis designed to inform the viewer about the forthcoming film. It will be possible to make explicit links to other subjects through the teacher's choice of trailers and to relate the targets to more effective writing in other subjects. **Targets** ■ Choose to write the kinds of sentences that will give the effect I want. ■ Use commas and other punctuation correctly in longer sentences to help the reader follow my meaning. ■ Connect the sentences within paragraphs so that my meaning and purpose are clear. GCSE AO3 **(iii)**

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Carry no passengers (Better words 1) Pupils respond to some powerful visual images, and this focuses reflection on their use of words.	Pupils respond to some powerful visual images, and this focuses reflection on their use of words. Techniques to improve dull writing and expand word choices sit alongside games and emotive writing. Pupils learn to choose their words so that their writing 'carries no passengers' and vocabulary choice is precise. The unit produces a working display as a long-term resource and helps pupils to realise that 'mere words **can** express…' The unit has relevance to writing in many other curricular areas where the choice of appropriate and accurate vocabulary will improve the quality of writing for a wide range of purposes, but particularly writing designed to inform, explain or describe. **Targets** ■ Choose more words that will have an impact on my reader. ■ Use adjectives and adverbial words and phrases to add detail, interest and variety to my writing. GCSE AO3 **(i)**, **(ii)**
Doing it up! (Better words 2) Pupils write a specification for a 'makeover' of their room or vehicle.	Following a competition win, pupils can have their room or vehicle 'done up' by professionals. Pupils deliver an oral presentation describing either an ideal home or car, talking a friend through a 'guided tour' of the property or vehicle, before exploring the importance of precise, detailed and unambiguous language in writing. Pupils then write a precise contractual specification, outlining the required changes, for the team responsible for making improvements. **Targets** ■ Always choose the best words to match the subject of my writing. ■ Choose my words carefully and ambitiously so that my writing is precise and has an impact on the reader. GCSE AO3 **(i)**, **(ii)**
The sweet spell of success (Better spelling) Pupils prepare for and take part in a spelling-based game show in which teams compete.	Pupils prepare for the game show by studying common spelling mistakes, analysing their own writing to identify their own brand of spelling mistakes and understanding how their own learning style can help them overcome some of these spelling-pattern errors. Outcomes for pupils will include spelling-based peer- and self-assessment, through teamwork in the form of a game show. **Targets** ■ Identify my most common spelling mistakes and find my own way to reduce their nuimber. ■ Check my writing for the mistakes I commonly make. GCSE AO3 **(iii)**

Proofing to improve (Improving accuracy) Pupils will take the part of a team of reporters/ journalists contributing articles to a newspaper/ journal.	Pupils will take the part of a team of reporters/journalists contributing articles to a newspaper/journal. Having identified, with the help of their teacher and TA, which aspects of their own writing in English and in other subjects need improving in terms of accuracy, pupils will focus on writing and proofing their own work to deadlines in order to improve awareness of and control over the accuracy of their written work. This unit is relevant to writing in all curriculum areas as it focuses pupils on the need to maximise the accuracy of their writing so that they are communicating effectively to their intended reader. **Targets** ■ Check my writing for the mistakes I commonly make. ■ Use commas and other punctuation correctly in longer sentences to help the reader follow my meaning. GCSE AO3 **(iii)**

Units focused on reading targets

Information trail poster (Finding and using information 1) Pupils make a poster that shows how they have found and used information on a topic of their choice.	Pupils select a theme from a range of abstract nouns, such as 'friendship', 'love', 'terrorism' and 'homelessness'. They search for and read texts on their topic, selecting the most relevant. Extracts from these, annotated where appropriate, are pasted on a large sheet together with a short piece of text written by the pupil that summarises their ideas on the topic linked to their reading. **Targets** ■ Find the main ideas in a text and support them with evidence. ■ Find quotations that could support my ideas. ■ Skim and scan to find information quickly. GCSE A02 **(i)**, **(iv)**
Up, up and away (Finding and using information 2) Pupils research a character to prepare for a balloon debate.	Pupils research a character of their choice: they could be historical, contemporary, a sporting hero, a celebrity, or a scientist. They look at how to select evidence from a range of sources, drawing together information that will then be used to present a case for allowing their character to remain in the balloon. **Target** ■ Pull together information from a range of non-fiction texts and decide which parts might be relevant for my purpose. GCSE A02 **(i)**, **(iv)**

Reality reads (Responding to whole texts 1) Pupils read and review a range of texts in the context of a reality TV show.	Pupils nominate texts for inclusion in a reality TV show library. Pupils record their 'diary-room' extracts and evict unpopular texts. The unit includes a range of texts: fiction, non-fiction, magazines, poems, journals and newspapers. Short extracts of film, radio and TV programmes are used to engage pupils, and internet sites such as www.coolreads.com, www.boox.org.uk and www.kidsreview.org.uk are useful resources. **Targets** ■ Explain why I like or dislike a text. ■ Use a range of imaginative reading strategies when I read. GCSE A02 **(i)**
Mind reader: on the psychiatrist's couch (Responding to whole texts 2) Pupils express their response to texts through role play.	Pupils read a range of short texts both fiction and non-fiction, and, in pairs, produce dialogues taking on the roles of author and psychiatrist. Pupils bring out the writer's viewpoint, exposing any obsessions or bias. **Targets** ■ Understand the writer's point of view in a text I am reading. ■ Comment on the way a writer puts across a point of view in a text. ■ Follow some themes and ideas throughout a whole text that I am reading. ■ Understand that a text may have more than one meaning. GCSE A02 **(i)**
Text detective journal (Reading between the lines 1) Pupils read a range of texts and record their inferences in a journal.	Pupils read a range of texts and record their inferences in a journal. The detectives carry a heavy case-load – some of the evidence (fiction and non-fiction) from which they have to draw conclusions is about people, some is about places, and some is about events. **Target** ■ Read between the lines to infer the writer's meaning. GCSE A02 **(i)**, **(ii)**, **(iii)**
Fingerprints in the dust (Reading between the lines 2) A second outing for the text detectives, but the boss now requires better evidence and more formal paperwork.	A second outing for the text detectives, but the boss now requires better evidence and more formal paperwork. Pupils focus on using a range of fiction and non-fiction texts, searching for and documenting those traces of evidence that a writer leaves behind, those fingerprints in the dust from which we can infer what the writer's intentions are and the effects he/she wants to create. **Targets** ■ Make sure I can find evidence in the text to support my inferences. ■ Use a short quotation within a sentence to show that I can refer closely to a text. GCSE A02 **(i)**, **(ii)**, **(iii)**

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Computer game layout (Understanding how texts work 1) Pupils design a flier for a new computer game.	Pupils will read a range of non-fiction texts linked to computer games including instruction booklets, screens from games that include text, advertisements, magazine and newspaper articles. They annotate texts for layout and organisation and produce their own flier with annotation or commentary to explain the layout. **Target** ■ Understand the connection between the purpose of a text and its layout and organisation. GCSE A02 **(i)**, **(v)**
Murder and menace (Understanding how texts work 2) Pupils annotate texts to show understanding of layout and organisation.	Pupils read a range of fiction and non-fiction texts based around the theme of crime. They investigate the differences between the text layout and organisation of newspaper stories, crime prevention leaflets/posters, real-life crime stories, and web-based resources. In the role of editor they annotate texts, explaining how and why they are organised for an intended audience. **Targets** ■ Explain why I think a text has been organised in a particular way. ■ Understand that a writer can create different types of narrators in fiction texts. GCSE A02 **(i)**, **(v)**
Wish you were here (Understanding how writers use language 1) Pupils investigate the language of holiday marketing and demonstrate what they learn in a presentation.	Pupils prepare to make a presentation in the role of workers from an advertising agency who need to persuade a holiday company that their writing will be effective in marketing a range of holidays. Pupils study language as used in holiday and tourist attraction publicity. They build an understanding of certain language features and their effects and learn how to explain this orally and in writing. **Targets** ■ Pick out and comment on some of the words chosen by the writer. ■ Explain why a writer has chosen certain words or phrases. GCSE A02 **(i)**, **(v)**
Wish you weren't here (Understanding how writers use language 2) Pupils edit material for a 'Holiday horrors' website.	Pupils explore how writers use language to influence the reader, through reading and analysing a variety of fiction and non-fiction texts that deal with disasters, both real and imagined. They then take the role of the editor of a 'Holiday horrors' website who has the job of spicing up the accounts of holidaymakers who have had a terrible time but write about it in a dull way. **Targets** ■ Comment on the way writers' choices affect the reader's response. ■ Understand how the small decisions a writer makes can contribute to the bigger picture. GCSE A02 **(i)**, **(v)**

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Study Plus English sample unit of work

Postcards (Better sentences 1)

Curricular target cluster

- **Vary my sentences in length and structure.**
- **Use a wider range of connectives to show the links between my ideas.**
- **Use commas correctly in long sentences.**

GCSE English assessment objective

A03 Writing

(iii) use a range of sentence structures effectively with accurate punctuation and spelling

Unit assessment questions (to be shared with pupils in advance)

- Does my piece of writing add value to the picture for a potential visitor to the exhibition?
- Is the sentence structure varied?
- Is there an effective use of connectives?
- Did I use commas effectively to clarify meaning in longer sentences?

Unit topic

Pupils write in response to a postcard they have chosen (imagine, explore, entertain).

The aim is to make a display of pictures, each with a piece of written text designed to add to the viewer's enjoyment and experience of the picture. If possible, the postcard texts should be word-processed, as they will be used for an exhibition. Pupils could be taught to use the 'track changes' feature to enable them to see the drafting process; this is helpful for peer- and self-assessment.

It will be possible, depending on pupils' interests, to make links to writing with this purpose in other curriculum areas, such as history, geography and art and design.

Unit overview

Lesson	Lesson overview	Homework
1	Introduction to the topic Introducing the curricular targets	Select postcard
2	Quality sentences; personal targets	
3	Features of effective descriptive writing Sentence structure and use of connectives Notes on selected postcards	

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4	Descriptive writing modelled First-draft writing	First drafts completed
5	Commas in longer sentences Peer feedback on first-draft writing Final-draft writing	Complete final-draft writing
6	Peer assessment of final drafts against targets Sharing of writing; celebration; teacher feedback	

Note: Teachers could decide to add one or two additional lessons to this sequence. These could be fitted in after lesson 4 and/or after lesson 5. The two main purposes of these lessons would be to:

- strengthen cross-curricular links;
- allow pupils more time to complete written work independently and/or consolidate sentence-writing skills.

These additional lessons could have a 'workshop' format in which pupils work independently while the teacher and TA have planned conversations with individuals or small groups to review how pupils are applying new learning in their other subjects. This process could usefully include discussing writing recently undertaken in other subjects and/or writing tasks that will need to be completed shortly. These conversations are designed to complement work done with pupils by the TA, for example in lesson 3.

Lesson 1	
Objectives	To introduce the picture-postcard topic To introduce the unit's curricular targets
Starter 5 minutes	Play a sentences game with the class. Pupils take turns to complete the sentences orally to make up a continuous narrative. The teacher starts the narrative (e.g. *I was walking to the shop because…*) and then supplies the linking words/expressions: *Although…* *As I got there, I…* *In spite of…* *Running through my mind…* *I wondered if…* Finish by discussing what kind of words *because, although, as, if* etc. are.

<table>
<tr><td>Main
30–40 minutes</td><td colspan="2">Introduction

Begin by explaining the topic. The aim is to make a display of pictures, each with a piece of written text designed to add to the viewer's enjoyment and experience of the picture. The postcard texts should be word-processed if possible as they will be used for an exhibition (e.g. in the corridor or library).

Show class a large portrait picture: for example, 'Self-portrait with bandaged ear' by van Gogh (borrow from art department or use site such as Portrait Gallery, Imperial War Museum, etc.). Explain how it is possible to write descriptively about a picture so that you add interest to it. Ask the class some questions about the person shown in the picture saying they must invent the answers (e.g. 'What is he thinking?' and 'What is he going to do in the next few minutes?'). Say that you could use ideas like this when writing about the picture.

Using a word processor and the whiteboard, begin drafting a piece of writing about the picture (or show one you made earlier) using the ideas but expressing them in a series of simple sentences all beginning with the subject (see example resource 1.1).

Initiate discussion – pairs then whole class – on the way sentences have been used and the impact of this on the reader (e.g. dull and repetitive).

Show class the cluster of targets that this unit of work addresses (resource 1.2).</td></tr>
<tr><td></td><td>Development</td><td>Independent

Pupils write notes and questions showing what they do and don't understand about each curricular target. They begin working independently but can share their notes with a partner when complete. If there is time, they should review some of their previously completed written work in the light of these targets.</td></tr>
<tr><td></td><td></td><td>Guided

TA supports a selected group through the same work as the independent group.</td></tr>
<tr><td></td><td></td><td>Individual support

The teacher could work individually with one or two pupils helping them to relate the targets to their own previously completed written work.</td></tr>
<tr><td>Plenary
15 minutes</td><td colspan="2">Class discussion of the curricular targets and their relationship to the more effective writing required for GCSE grade C or better. Teacher lists key questions about the targets that pupils have raised. Some may be dealt with immediately or starred for further attention next time. Pupils should be clear about their own strengths and weaknesses as writers in relation to the three curricular targets.

Show the class a variety of websites where they can access art, or show a variety of postcards (as available from bookshops). Say they can each have one of these or they can select their own for next lesson. Suggest that it will be better if they all select one that interests them and that they must bring a card or a colour print to next lesson.</td></tr>
</table>

Lesson 2	
Objectives	To turn notes into sentences that are varied in length and structure and that do not always start with the subject To consider personal targets To introduce 'track changes' as a means of demonstrating improvement in writing (optional)
Starter 10 minutes	Pupils write quick notes about their chosen pictures in response to oral prompts from the teacher. ■ What is the most important object in the picture? ■ What is happening in the picture? ■ Why is it happening? ■ If there is a person/animal in the picture, what can they hear? ■ What are they thinking/feeling? ■ What are they going to do in a minute?
Main 40 minutes	**Remember** Remind pupils of the targets and turn to the notes pupils wrote on them last lesson. (Make a note of any remaining uncertainties to plan in additional skills teaching where necessary.)
	Model Model for pupils the redrafting of the unsatisfactory piece of writing they saw last lesson (e.g. **resource 1.1**). See **resource 2.1** for an example of the process. Using 'track changes', model the use of connectives, sentences that do not begin with the subject, and commas to mark clause/phrase boundaries.
	Try Ask pupils to redraft the rest of the passage (resource 1.1) in the same way.
	Apply Ask pupils to turn one of their notes/ideas on their picture from the start of the lesson into **two** high-quality sentences: a simple sentence starting with the subject and a longer, more interesting sentence, trying to use one or more connectives and using commas where necessary. Suggest they should **not** start with the subject for this one. Use **resource 2.2** as a prompt if required.
Plenary 10 minutes	Ask some pupils to read/display their high-quality sentences. Ask pupils to say when and why they used commas in the longer sentences. Discuss the effect on the reader when sentences have variety.

<table>
<tr><th>Lesson 3</th><th colspan="2"></th></tr>
<tr><td>Objectives</td><td colspan="2">To add interest by using sentences of different lengths in descriptive writing

To use different connectives to join my ideas

To be aware of the techniques effective writers use in description</td></tr>
<tr><td>Starter
10 minutes</td><td colspan="2">The ‘sentence game’. Show a simple sentence (e.g. resource 3.1). Pupils have to change it depending on the instruction given on the cards (resource 3.2): for example, change the main verb, change the connective, start with an adverb, or add a subordinate clause. Discuss throughout how the effect on the reader is influenced by the changes.</td></tr>
<tr><td rowspan="4">Main
40 minutes</td><td colspan="2">Introduction (20 minutes)

Show pupils an image with a written description (e.g. resource 3.3). The teacher shares the text with pupils by reading it aloud. Pair talk – is the description effective? Does the description help visualisation and add to the enjoyment of viewing the picture? How has the writer used connectives to link their ideas?

The teacher models identifying one or two effective features of the description in the sentences and begins to compose a class ‘checklist’. In pairs, pupils identify other effective features. As a group, decide on a checklist of effective features – display it in the room.</td></tr>
<tr><td rowspan="3">Development</td><td>Independent

Pupils write notes about their own postcards reminding themselves of what makes an effective description. For example: ‘To describe the man’s movement I could start my sentence with an adverb. I could start the next sentence with a connective…’</td></tr>
<tr><td>Guided

Teacher supports a selected group through the same work as the independent group. This should be closely linked to their own personal targets for improving their writing at sentence level.</td></tr>
<tr><td>Individual support

The TA could work individually with one or two pupils, helping them to relate the targets to their postcard/image and make links to writing that pupils are doing for other subjects.</td></tr>
<tr><td>Plenary
10 minutes</td><td colspan="2">Pupils respond orally to the prompt: Effective writers make sure that they...

In pairs, pupils discuss their own cards and prompts they have made to themselves in readiness for their first draft in the next lesson.</td></tr>
</table>

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Lesson 4	
Objectives	To interest my reader by using a variety of features of effective description To use a variety of sentences and a wider variety of connectives to join my ideas
Starter 10 minutes	Display the checklist of effective descriptive writing from the previous lesson. Pupils play 'pass the card' (have a selection of postcards available). In pairs pupils have to describe orally some features of the picture using features from the checklist, remembering to use connectives.
Main 40 minutes	**Remember** Take feedback on connectives that were used to link ideas, and list them. Share a few oral descriptions, agreeing on elements of effective descriptive writing.
	Model The teacher shows the class a new picture she/he is describing, then models the first few sentences orally before writing, referring explicitly to the key features of effective descriptive writing (e.g. **resource 4.1**).
	Try Pupils write the next sentence in the description as a complex sentence. A few sentences are shared and there is brief discussion about the different choices a writer can make.
	Apply Establish the length of the piece of writing you are expecting from pupils and reiterate its purpose, which is for display, to add enjoyment to the viewing of the postcards. Using word processors if possible, pupils draft their own description of their selected card. As they write they are clear about their own personal targets.
Plenary 10 minutes	Use one pupil's writing to discuss as a class. Use key questions to support the process. ■ Does the piece of writing add value to the picture for a potential visitor to the exhibition? ■ Is the sentence structure varied? ■ Is there an effective use of connectives? ■ Are commas used effectively to clarify meaning in longer sentences?
Homework	Pupils complete the draft of their writing piece for homework.

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<table>
<tr><th>Lesson 5</th><th colspan="2"></th></tr>
<tr><td>Objective</td><td colspan="2">To use commas correctly in longer sentences</td></tr>
<tr><td>Starter
5 minutes</td><td colspan="2">The ‘human sentence game’: groups of pupils holding cards move round to make sentences, moving again to make changes (examples of cards in resources 5.1–5.3). Working in groups, pupils make a complex sentence, putting commas in the correct place (e.g. when a sentence starts with a subordinate clause, use a comma to mark off the main clause). Discuss the correct use of the comma. (See prompts in resources 5.4 and 5.5.)</td></tr>
<tr><td rowspan="4">Main
30–40 minutes</td><td colspan="2">Introduction (20 minutes)

Using ‘track changes’ on a word processor, the teacher continues to model the writing process by redrafting the description for a postcard. Make explicit the changes that you are making, keeping the focus on audience and purpose. In pairs, pupils share their first draft, taking notes of feedback from peers.</td></tr>
<tr><td rowspan="3">Development</td><td>Independent

Using word processors if possible, pupils redraft work until they are satisfied that success criteria have been met. Pupils should be clear about their own individual targets as they write.</td></tr>
<tr><td>Guided

Teacher supports a group (selected for a focus on a common target) through the same process as the independent group</td></tr>
<tr><td>Individual support

During this lesson and the next, the TA takes the opportunity to talk with individual pupils about writing in other subjects, asking pupils to explain where they might usefully apply what they have learned about sentences.</td></tr>
<tr><td>Plenary
15 minutes</td><td colspan="2">The teacher shares his/her final draft with the class, talking through changes that have been made, comparing the first draft with the final one and making close reference to success criteria. The use of ‘track changes’ will be very helpful to discussion about improvements made to the writing, as all additions and deletions will be identified.</td></tr>
<tr><td>Homework</td><td colspan="2">Pupils complete their final drafts.</td></tr>
</table>

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Lesson 6	
Objectives	To assess work against curricular targets To identify strengths and know what to do to improve writing further
Starter 10 minutes	Pupils pass their piece of writing to a peer, who has to explain what they think the picture will be like (pictures are hidden) by just reading the description. Show the pictures. Pairs discuss. Is the writing informative, lively and descriptive? Does the writing add enjoyment to viewing the exhibition?
Main 35 minutes	**Remember** Ask pupils to remember the key curricular targets and their own individual targets for this unit. Which two sentences do you feel particularly pleased with? Are commas used correctly in complex sentences? In pairs, discuss whether pupils feel they have achieved their own targets.
	Model Look at one pupil's piece of writing. Identify strengths and weaknesses and talk about the next target for the pupil. Discuss the need for focusing on positives and being clear about what could be done to the writing to ensure that it meets the criteria for higher levels.
	Try In pairs, pupils peer-assess work against criteria.
	Apply Pupils make final adjustments to their writing using key questions as support: ■ Does the piece of writing add value to the picture for a potential visitor to the exhibition? ■ Is the sentence structure varied? ■ Is there an effective use of connectives? ■ Are commas used effectively to clarify meaning in longer sentences?
Plenary 15 minutes	Pupils traffic-light curricular and personal targets. Pupils display work and celebrate success.

Resources

Here is an overview of all the example resources mentioned in the lesson plans. Teachers are encouraged to find their own texts and images to match the interests of their pupils, but example resources can be used if appropriate.

All resources that could be used directly with pupils (e.g. as handouts) can be found in print-friendly form on the CD-ROM.

Where appropriate, resources are also available on the CD-ROM in an enhanced form as presentation slides.

Resource 1.1

'Self-portrait with bandaged ear' by Vincent van Gogh (1889)

The man is indoors. He is wearing a coat and a hat with black fur on the front. The side of his face has a bandage on it. He is thinking back to an accident he just had. He is probably in shock. He is staring out of the picture like a madman. His face is pale. He has lost a lot of blood. He will probably collapse in a minute.

Resource 1.2

Targets for this unit of work

Vary my sentences in length and structure.

Use a wider range of connectives to show the links between my ideas.

Use commas correctly in long sentences.

Teacher Resource 2.1

Redrafted sentences	Teacher commentary
Although the man is indoors, he is wearing a coat and a hat with black fur on the front.	*I can join these first two sentences together. I'm going to use a connective: 'although' would be good to start with. It shows that I think it is unusual for him to wear these clothes in the house. I could have started, 'Although he is wearing a coat…'. But I don't think that would be so good. What do you think? Notice that I'm putting a comma in after indoors. What does that do?…*
A bandage is on the side of his face.	*I'm going to write a short simple sentence next. I want to emphasise the bandage because it's the most unusual thing in the picture. In fact I'm going to start the sentence with the bandage to give even more emphasis.*
Thinking about the accident he just had, probably still in shock, he is staring out of the picture like a madman.	*Look at the way I'm writing this bit. Now what have I done here? Why did I do that?…*
Because he has lost a lot of blood, the man's face is pale and he will probably collapse in a minute.	*I want to make clear that I think there is a link between his pale face and the loss of blood, so I'm going to start with a connective…*

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Resource 2.2

To vary my sentences I can start with:

- **an 'ed'**
  Exhausted, the man slumped onto the chair.
- **an 'ing'**
  Looking through the window, the girl gazes out at the world.
- **a connective**
  Because he has been wounded, the soldier lies on the battlefield beneath the rearing horses.
- **a subordinate clause**
  As it was every day, the train was jam packed with commuters.
- **an adverb**
  Hurriedly turning away, the man shoves the money into his pocket.
- **a prepositional phrase**
  Underneath the tree, two men are deep in discussion.

Resource 3.1

The boy got into the car.

The girl walked out of the door.

Resource 3.2 Changing sentences

Change the main verb	**Change the connective**
Start with an adverb	**Add a subordinate clause**
Shorten the sentence	**Start with a subordinate clause**
Start with a prepositional phrase	**Move the subordinate clause**

Resource 3.3

See PowerPoint files on CD-ROM.

Resource 4.1
See PowerPoint files on CD-ROM.

Resource 5.1 Clauses (write each clause on a large sheet of paper)	
it was raining	the sun was shining
the sky was grey	it was midnight
the man walked along the street	the summer was hot
the girl got into the car	the street was deserted
the sand was wet	the nightclub was busy

Resource 5.2 Connectives (write each connective on a large sheet of paper)			
although	when	however	because
before	after	since	while

Resource 5.3 Punctuation (write each punctuation feature on a large sheet of paper – you will need several of each)		
Comma	Full stop	Capital letter

Resource 5.4 Using commas

We use commas:

- before 'but' in compound sentences
- to separate the subordinate clause from the main clause when it starts the sentence
- after a connective that links across or between sentences
- around additional information in a sentence that can be removed without affecting meaning
- to separate items in a list

Resource 5.5 Worked examples of the use of commas (exemplifying the list in resource 5.4)
The girl walked out of the door, but the boy got into the car.
As the boy got into the car, the girl walked out of the door.
The girl walked out of the door. Meanwhile, the boy got into the car.
The girl, throwing on her coat in a hurry, walked out of the door.
The girl finished her coffee, threw on her coat, grabbed her bag and walked out of the door.

Other useful strategy resources

- Sentences – revised Literacy Progress Unit (LPU)
- Y7 Sentence level bank
- Key objectives bank Year7, Year 8, Year 9
- Improving writing

These are available to view/download from www.dfes.standards.gov.uk/secondary/keystage3/respub

Section 3 – Study Plus sample mathematics units

Introduction

This section gives you, the class teacher, an overview of the Study Plus approach in mathematics and of the range of units, both those that we have developed and others that are described in less detail but that have the potential to be effective units.

Study Plus in mathematics gives teachers and learners the opportunity to explore an idea or a topic in great detail, with few time constraints. The topics that appear to work most successfully span a range of curriculum areas and a range of mathematical objectives. Working within topics allows learners to make connections and develop skills that are transferable. Learners are most involved when the topics are ones that they can relate to, for example a current issue in the media, or built around the impact of a tsunami.

To support your early planning ten Study Plus units are provided on the CD-ROM, with the outline for another eight units that teachers in Cornwall have been developing. One unit is provided in full in this handbook.

The ten sample units seek to exemplify the learning concepts mentioned above. They are not, however, designed to be 'off-the-peg' teaching plans because a very important principle that underpins Study Plus is that work should be planned around a specific group of pupils.

The purpose of the materials in this section is, therefore, to provide you with ideas that you can adapt to your own class and context, ideas that may also help to inspire you to come up with your own units based on local material of special interest to your pupils. All the planning on the CD-ROM is available in a form that allows teachers to adapt it easily.

> 'It is more fun than other maths lessons.'
> 'I learnt about the golden ratio and Fibonacci sequence.'

Structure and content of the sample mathematics units

All units are structured in four phases – an introductory phase hooking the learner, the main development phases exploring the topic and the mathematics, and a fourth, summary phase making the links, reflecting on the learning and allowing the learners to assess their progress. There is an indicative time allowance of six lessons or six hours but this must be adapted to suit your own planning and timetable arrangements. It is perfectly acceptable for the unit to run for longer if the learners are still engaged and learning mathematics. The units must be tailored to support the work in learners' GCSE mathematics courses and in their other subjects.

The units bring together ideas and issues from across the curriculum. For example, a unit on design uses shape and space objectives, using-and-applying objectives and experiences from design and technology. A unit on disaster relief provides the opportunity to use measure, scale and ratio and proportion, with very powerful links to Key Stage 4 work in geography.

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'It helps more than normal maths because we get to learn normal, everyday maths that we can actually use.'
'Way better than ordinary maths because it is not out of a textbook.'

Classroom approaches

The lessons allow you and the teaching assistant (TA) to spend more time in discussion with the learners. Feedback from pilot schools indicates that this is really appreciated by the learners. However, for many classes this is a major culture change and this different style of learning, with an emphasis on questioning and dialogue, needs to be developed over time. As you plan the units and approaches with the TA, consider the classroom management issues and approaches that are needed to develop this more open way of working, that is not driven by syllabus pressure and the need to impart a large body of knowledge.

In particular, quality time must be planned for developing learners' skills in self-assessment, reflecting on their own learning and generating their own examples. Group work is a powerful tool in helping to achieve this but the development of guided group work will take time.

'It is better than normal maths as you get 1-to-1 contact.'
'It learns me more than normal lessons, it is mint.'

Guided group work

Some of the benefits of guided group work are that the learners are more engaged, take more responsibility for their learning, and become more aware of their way of learning (meta-cognition). To change the classroom culture so that the learners are willing and able to work in groups will take time and will need a structured approach – possibly through working in pairs and then fours. Good examples to support you with this approach can be found on the DVD *Mathematics: developing dialogue and reasoning*, DfES 00243-2006CDO-EN, and in *Pedagogy and Practice: Teaching and Learning in Secondary Schools*. As learners working in groups become more responsible for their own learning, they ask their own questions, show their natural curiosity and generate their own examples. The exemplar units identify particular opportunities for group work and pair work and also activities where TAs can take a lead.

'Very different from normal lessons, interesting and the style is different.'

Unit planning

There is a selection of ready-prepared units that you can adapt to your class needs and enthusiasms, capitalising on the interests of adolescent learners, and there are thumbnail descriptions of other potential units. However, to provide a worthwhile set of experiences for your class for up to two years **you will need to plan units yourself**. The basic philosophy that should underpin the planning of your units has been described in the main introduction, but here is a summary.

1. Identify a topic that will engage the learner.
2. Identify the range of mathematical objectives that can be addressed within the unit, using the objectives from the progression maps website www.standards.dfes.gov.uk/progressionmaps and the departmental scheme of work.
3. Liaise with the other subject leaders to relate the work to their curriculum area and to draw support from them with appropriate resources.

4. Develop a plan based on the four-phase approach.
5. Use the probing questions from the progression map website to identify assessment questions that can be part of the learner's own self-assessment.

The role of the TA is crucial in the planning stage as well as during the lessons. TAs need to be fully involved with the topic so that they can engage in effective dialogue with learners and support them with assessment opportunities.

Assessment

The sample units have examples of assessment questions built the last phase of the unit. There are also pupil self-assessment sheets that can be adapted for any units that you develop; these use a scale to record successes and have space for learners to describe why they feel that they have been successful. This is a crucial aspect of the Study Plus approach, and will reaps the benefit of the quality time spent in developing activities and building the confidence of learners for genuine active self-assessment.

The results of the assessment must be fed into learners' class lessons in mathematics, and the planning has to be adapted to suit the particular curriculum needs of the groups.

Many departments have taken assessment for learning (AfL) as a key theme, and there is much good practice that will support the assessment process in Study Plus.

> 'I liked that unit. I learned how to add fractions, how to make fractals, also the nth-term formula.'
> 'I met my curricular targets.'

Materials available on CD-ROM/Folder

The following ten units have been developed in great detail for you to tailor to your class on the basis of their mathematical expertise and learning needs. Below are thumbnail descriptions of the units.

Fractals

Pupils explore the beauty of the patterns and sequences generated from the von Koch snowflake, constructing their own diagrams.

The unit looks at a number of areas of mathematics, particularly number and algebra and adding and multiplying fractions, leading to the use of multiplicative relationships with a single multiplier.

Explicit links are made to literacy issues, to support the writing of instructional text.

Line painting

Pupils are given opportunities to explore line painting through a practical approach, enabling them to appreciate the need to use algebraic reasoning in a visual setting.

The main themes are using and applying mathematics, and constructing functions arising from real life problems and plotting their corresponding graphs. There are opportunities to links with using ICT.

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MP3 players

In this unit pupils investigate buying and using an MP3 player. They consider best buys and compare different MP3 players, using proportional reasoning. The unit looks at scatter graphs, ratio and proportion, percentage changes, and simple functions arising from real-life problems. The pupils will need access to ICT and if possible the Internet to research prices and data about MP3 players. If the Internet is not available, a range of shopping catalogues will provide the same information.

Boxes

This unit develops an understanding of volume and surface area of 3D objects through exploring nets. There are opportunities for practical work in all of the lessons. The unit looks at perimeter, area and volume in context. In addition, there are opportunities to develop visualisation and problem-solving skills and to use ICT. Some preparation of resources will be required prior to teaching the unit.

Will it or won't it?

This topic aims to develop pupils' understanding of angle properties in shapes. It begins with the idea of tiling a floor and which shapes will tessellate. After an initial emphasis on discovering angle facts from regular polygons, the unit moves on to using angle facts to predict tessellations and tilings. Finally pupils use angle facts to support geometrical reasoning and make a presentation of their solutions and assess others' solutions. The curricular targets include knowing the angle sum at a point, on a straight line and in a triangle, and solving problems using properties of angles, parallel lines and a range of polygons. This unit will link with design and technology and art and design through topics such as quilting.

Disaster relief

This unit asks pupils to plan the relief aid for a fictitious tsunami along the South American Pacific coast. The project is centred on Concepción, Chile's second largest urban conurbation. This was the scene of an actual tsunami in 1960, after an earthquake off the Chilean coast.

A variety of facts will be considered, and then various strategies will be used to establish how many people may be affected by the disaster, what food, water and shelter are needed and how it could all be transported. The unit supports curricular targets in fractions, decimals, percentages, and ratio and proportion, and allows the pupils to solve problems.

There are clear cross-curricular links that could be made with geography in the introductory phase. The geography department may well have materials that could be used to engage the pupils. Internet access is particularly useful for this unit.

Towers

This is a mathematical investigation that starts with the idea of someone being locked up in a tower. The context needs to be adapted so that it will appeal to the pupils, for example built around spies, knights of old, or TV characters. The tower shape and number of windows is varied and patterns are explored.

The unit provides the opportunity to generate a range of sequences that can be described in words and symbols by the pupils. The unit enables pupils to develop an understanding of investigative mathematics and related algebraic skills. There is a strong emphasis on collaborative group work.

This unit is an exploration within mathematics itself but may be extendable to other curricular areas.

Stop the press

This topic takes a practical example of costing advertising space in a newspaper and involves the use of spreadsheets to assist in calculating and re-calculating costs. It aims to develop pupils' awareness of the need for algebraic formulae. Pupils need to understand why a formula might be used, to write such a formula and to apply it with various conditions. Pupils work collaboratively to solve the problems and then present their conclusions to the other groups. There are assessment opportunities built around presentational skills as well as those that relate to the mathematical learning objectives.

Drop dead gorgeous

This unit engages the learners in discussion about attractiveness, using photographs of the faces of famous people. The aim of this unit is for students to explore the golden ratio as a determinant of attractiveness. In particular the link to facial beauty is explored using the ideas of ratio and correlation. The Fibonacci sequence as well as the golden ratio itself is also investigated.

The unit involves the use of ratio and proportion, data handling, shape and space and measures.

There are links with citizenship and media studies through studying the celebrity culture, and with art and design through the study of facial form.

Here today, gone tomorrow

Using the subject of global warming, pupils look at and analyse data to answer the question: 'Is there global warming in the world?' The module uses appropriate data and charts, and students are expected to analyse the data through drawing charts and diagrams and then interpreting the charts that are drawn. Pupils work in small groups preparing a presentation, using the evidence they have found, to agree or disagree with the statement: 'Global warming is affecting the climate of the world.'

The unit involves forming hypotheses, analysing and representing and interpreting data.

There are opportunities for links with science (heat, properties of ice and water) and geography (climate, maps).

Further sample units

Also on the CD-ROM are single-page overviews of a further seven units developed by the Cornwall LA team and their teachers. We hope that these will act as a stimulus for your own thinking and as a good starting point for unit development. The progression maps provide a useful resource for identifying curricular targets that are pitched at the right level. The maps can be found at www.standards.dfes.gov.uk/progressionmaps.

Below are brief thumbnails of the units. The CD-ROM has details for all of them, which you can print off so that you can consider how to develop them for your pupils.

Crack the code

This unit could be built around exploration of a variety of codes, from simple substitution ciphers to the role of Enigma machines and modern computer encryption. Pupils can analyse the frequency of different letters in text and approaches to coding messages. Pupils can compare simple distributions, estimate probabilities from experimental data and use ICT to represent data.

Links with history (Second World War) and science are possible. There are good websites that explore the Enigma machine and its logic visually.

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Deal or No Deal

The TV programme *Deal or No Deal* could be used as the stimulus for this unit. The unit focuses on real-life game shows where probability can be used to help decide what decision to make at key points in a game.

The unit can involve the use of probability and the ability to reason and make decisions based on probability calculations. An understanding of fractions, decimals and percentages will be essential for the reasoning and decision making.

There are links with citizenship through discussion of gambling and personal responsibility and the effects that sudden wealth can have on individuals and families. Pupils hoping to study subjects such as media studies, sociology and psychology will find that the unit could provide useful background.

The Olympic Village 2012

Pupils could plan and design the Olympic Village for athletes in the London 2012 Olympics. They could produce a 3D scale model that satisfies the conditions for the uses, for example the number of people in a stadium. Transport and costs of construction could be included. Pupils would need to use ideas from measures, scale, money and number.

Let's go to Disneyland

Pupils are given a fixed budget and they have to plan a holiday for themselves considering a variety of constraints, such as temperature and exchange rates.

The unit involves a great deal of using and applying mathematics. There will be opportunities for using algebra in spreadsheets and pupils will need to perform some mental and written calculations.

There are links with geography (the leisure industry, maps and climate).

Let's go on holiday

Pupils are asked to imagine they work for a travel agent and have to research the best holiday for their clients' set criteria. Pupils can then sell a holiday destination or a choice of destinations to others in the group. Alternatively they can use a similar approach to that used for going to Disneyland, but for a destination of their choice.

Dragons' lair

This unit could be based on the TV programme *Dragons' Den*, with pupils having to do market research for their product, produced in design and technology, art, graphics or home economics. The unit could include share dealing and address the issues of how real businesses raise money.

Banker help, I'm in debt

There are two main ideas developed in this unit. First of all students consider debt situations and how much people will have to repay at different interest rates. Then students investigate the option of buying a house (or a car) and calculate percentages and so on through stamp duty.

Other sample unit ideas

The thumbnail descriptions below do not have associated materials on the CD-ROM but may give you ideas for your own units.

Escape from Mars

This unit could be built around the mathematical investigations that encourage group collaboration. Each member of the group has some of the information and together with the other 'players' has to produce an effective solution to the problem.

Pupils will need to use measurement, mass, velocity, distance, time, and problem-solving strategies, particularly communicating and mathematical reasoning.

Links with geography and science are possible.

How does it grow?

This unit could be built around population expansion and its social implications, the need for aid or the economic implications of a country such as Japan, which has a high population density and a very successful economy. Pupils will be involved in simple economic modelling: simple exploration of population growth, simulations of predators and prey or population explosions. An alternative context could be the exploration of plant growth, where some trees grow by enlargement and others do not (laurel leaves versus oak leaves). Pupils can explore ratio and proportion, enlargement, large numbers and standard form.

Links with science and geography are possible.

Reasoning with data

This unit uses Census at School data to explore pupils' responses to questions about, for example, mobile phone use in school, in Britain and other countries.

The unit emphasises the use of the data-handling cycle, in particular formulating hypotheses, analysing, and representing and interpreting data, with a strong emphasis on interpreting.

There are links with citizenship through moral and social discussions, and with science, technology and geography.

Downhill fast

This unit uses the context of children's playground slides to explore ideas of gradient. The context is widened to include exploration of skiing and theme park rides. The main focus of the unit is on the topics of sequences, functions and graphs, measures and shape and space strands.

The unit has links with science (gravity and velocity–time graphs) and geography (the leisure industry).

Festival maths

This unit allows the school to design work around a variety of religious and cultural events. Examples are Christmas, Diwali, Eid, Chinese New Year (Buddhist, Jewish, secular…) and will depend on the backgrounds of the pupils.

Since most festivals involve decorations of some kind it could involve shape and space. It could also involve using and applying mathematics in planning events.

There are links with RE and citizenship and possibly science (fireworks).

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Games

This unit requires pupils to design board games for themselves and/or younger pupils. As board games are largely games of chance, the main strand used is probability. The layout of the games will involve shape and space and measures.

There are links with technology, design, and marketing, as well as potential for developing links with local primary-school groups.

Simmering skills

The last unit is intended to be a resource that teachers can use in the run-up to GCSE, but would also be relevant at other times during Year 10 and Year 11 as pupils need extra support on mathematical knowledge and skills.

The strand codes used in the columns are as follows:

Using and applying mathematics	**1.** Problem solving **2.** Communicating **3.** Reasoning	**PS** **C** **R**
Numbers and the number system	**4.** Place value, ordering and rounding **5.** Integers, powers and roots **6.** Fractions, decimals, percentages, ratio and proportion **7.** Calculations – mental methods and written methods	**PVOR** **IPR** **FDPRP** **CMW**
Algebra	**1.** Equations, formulae and identities **2.** Sequences, functions and graphs	**EFI** **SFG**
Shape, space and measures	**1.** Shape and space **2.** Measures	**SS** **M**
Handling data	**1.** Handling data **2.** Probability	**HD** **Pr**

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Overview of the units

In total there are 24 sample units, ten of which are described in great detail. The areas of mathematics that they do or could address, depending on your decisions, are summarised in the table on pages 66 and 67.

Unit title	Strands												
	PS	C	R	PVOR	IPR	FDPRP	CMW	EFI	SFG	SS	M	HD	Pr
1. Line painting		X	X						X				
2. Disaster relief	X					X					X		
3. MP3 players	X					X		X				X	X
4. Towers	X	X	X					X	X				
5. Will it or won't it?			X							X			
6. Stop the press		X					X	X					
7. Boxes	X	X							X	X	X		
8. Fractals			X		X	X	X			X	X		
9. Drop dead gorgeous		X		X	X	X			X	X			
10. Here today, gone tomorrow			X	X	X	X	X			X			
11. Crack the code		X	X						X			X	X
12. Deal or No Deal	X		X	X									X
13. The Olympic Village 2012	X	X			X	X				X	X		
14. Let's go to Disneyland	X				X	X	X					X	

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Overview of the units (continued)

Unit title	Strands												
	PS	C	R	PVOR	IPR	FDPRP	CMW	EFI	SFG	SS	M	HD	Pr
15. Let's go on holiday	X	X			X	X						X	
16. Dragons' lair		X	X			X		X				X	
17. Banker help, I'm in debt	X	X				X		X					
18. Escape from Mars	X	X	X		X		X				X		
19. How does it grow?	X			X	X	X				X	X		
20. Reasoning with data	X	X	X									X	
21. Downhill fast	X	X							X				
22. Festival maths	X									X	X		
23. Games	X	X	X								X		X
24. Simmering skills						X	X	X	X	X			

Study Plus mathematics sample unit of work

Theme/strand	FDPRP, Measures and Using and Applying Mathematics (UAM)
Unit title	Disaster relief
Target group of pupils	Year 10
Timing of unit	Spring term

Curricular targets

- Use the equivalence of fractions, decimals and percentages to compare proportions; calculate percentages and find the outcome of a given percentage increase or decrease (FDPRP step 7).
- Use the unitary method to solve simple word problems involving ratio and direct proportion (FDPRP step 7).
- Use proportional reasoning to solve a problem, choosing the correct numbers to take as 100%, or as a whole (FDPRP step 8).
- Identify the necessary information to carry through tasks and solve mathematical problems. Check results and consider whether they are sensible (UAM step 6).
- Solve more complex problems by breaking them into smaller steps or tasks, choosing and using efficient techniques for calculation (UAM step 7).

Earlier curricular targets that will be revised

- Recognise the equivalence of percentages, fractions and decimals; calculate simple percentages and use percentages to compare simple proportions (FDPRP step 6).

Other objectives that will be covered

- Convert one metric unit to another (e.g. grams to kilograms) (Measures step 5).
- Understand and use measures of speed to solve problems (Measures step 10).

Unit description

This unit asks pupils to plan the relief aid for a fictitious tsunami along the South American Pacific coast.

The project will be centred on Concepción, Chile's second largest urban conurbation. This was the scene of an actual tsunami in 1960, after an earthquake off the Chilean coast.

A variety of facts will be considered, and then various FDPRP strategies will be used to establish how many people may be affected by the disaster, what food, water and shelter are needed, and how it could all be transported.

There are clear cross-curricular links that could be made with geography in the introduction phase. The geography department may well have materials that could be used to engage the pupils.

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Unit overview

Phase	Phase overview
1	**Introduction (1 lesson)** **Lesson 1 – Disaster relief scene setting** During this lesson pupils will be learning about the geography of the area and the population demographics. It would be advisable to link with the geography department for background information and any video resources that may be available.
2/3	**Main development phase (4 lessons)** **Lesson 2 – How many people have been affected by the disaster?** During this lesson pupils will be calculating the numerical figures relating to the population in Concepción at the present time (2007). This will involve percentage calculations. **Lesson 3 – How much water and food is needed for the displaced population?** In this lesson pupils will be writing equivalent ratios and using these to solve simple proportion problems. By the end of the lesson pupils will have calculated how much water and food is needed for the displaced population. The homework is to calculate the cost per day of this food and water. **Lesson 4 – Speed, distance and time** During this lesson the pupils will be using the formula relating speed, distance and time to work out how quickly each mode of transport can distribute aid. **Lesson 5 – Organising the distribution of aid** During this lesson pupils will be using a variety of information from the unit to calculate the weight of the required aid, and will decide on the best way to transport it from New Orleans to Concepción.
4	**Summary, links and judgements (1 lesson)** **Lesson 6 – Summary and links to other areas of mathematics** The aim of this lesson is to make links from the context of the Disaster relief unit of work with mathematics lessons and exam-type questions. During this lesson there is opportunity for the group to be split according to their self-assessment during the starter, to have focused learning conversations with the teacher and the teaching assistant.

Other useful strategy resources

Refer to the progression maps for FDPRP and Measures.

Lesson 1 – Disaster relief scene setting

Overview

During this lesson pupils will be learning about the geography of the area and the population demographics. There is opportunity to link this work with geography and citizenship.

Learning objective

- Identify the necessary information to solve a mathematical problem.

Learning outcome

By the end of the lesson you will:

- have identified the information needed to solve a real-life disaster relief problem.

Starter (20 minutes)	
Vocabulary	**Resources**
none	■ Map of the world ■ Photos of previous tsunami ■ Useful websites that may support the lesson: – www.oxfam.org.uk – www.cia.gov/cia/publications/factbook/geos/ci.html#People – www.prb.org – www.shelterbox.org

Set the scene by reading out the following script:

'There has been a tsunami along the South American Pacific Coast at Concepción in Chile. It is your job to organise the relief aid that needs to be sent to the area. As and when we have more information we will contact you with a situation report.'

Show pupils a map of the world so that they can see where Concepción is, and pictures from the last tsunami so that they can relate to the problem to be addressed.

- In pairs, pupils discuss what facts they would need to know in order to begin planning the disaster relief (e.g. number of people in the area, what funding is available).
- After 10 minutes, group pairs together and ask them to agree on five facts that they would need to know in order to begin some calculations.
- Share ideas and record them on the board.

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Main activity (30 minutes)	
Vocabulary	**Resources**
■ Conversion ■ Proportion ■ Equivalent	■ Resource sheet 1.1 ■ Poster paper ■ Flip chart pens ■ Glue

Whole-class discussion, collaborative group work

In this lesson pupils work in groups to make decisions about relevant facts from an information sheet. The teaching assistant will need to support pupils with low literacy.

Resource sheet 1.1 details a variety of facts that may be needed to solve the problem.

Facts have been researched from the following websites:

- www.oxfam.org.uk
- www.cia.gov/cia/publication/factbook/index.html
- www.prb.org
- www.shelterbox.org

Ask pupils to consider all of the facts that they have been given and to discuss how they might organise the information. They should do this in groups of three or four, one pupil recording.

(Groupings could include population/transportation/conversion facts, with their importance, vital facts, etc.)

Come back together as a class to discuss the cards and decide on a method of organising them. Discuss different models and flow charts for organising the data.

Q *Which facts do you think are the most important in planning the disaster relief?*

Q *Which facts have you grouped together, and why?*

Q *What further information could you work out or estimate from the information given?*

Groups of pupils can then refine their models and include further groups (e.g. transportation, populations, conversion facts, food).

Stick the cards onto large poster paper so that they can be used during the rest of the unit.

Plenary (10 minutes)	
Vocabulary	**Resources**
none	none

Pupils discuss in pairs:

Q *What mathematics do you think you will need to use to be able to calculate the required amount of aid, and how the aid will be distributed (percentages, conversions, fractions of quantities, etc.)?*

As a group, discuss different mathematical skills that may be needed to solve the problem.

Explain that the targets for the unit are to be able to:

- convert between fractions, decimals and percentages;
- calculate simple percentages;
- calculate the outcome of a percentage increase/decrease;
- use ratio to solve a problem;
- solve problems using speed.

Lesson 2 – How many people have been affected by the disaster?

Overview

During this lesson pupils will be calculating the numerical figures relating to the population in Concepción at the present time (2007). This will involve percentage calculations.

Learning objectives

- Recognise the equivalence of percentages, fractions and decimals; calculate simple percentages and use percentages to compare simple proportions.
- Calculate percentages and find the outcome of a given percentage increase.

Learning outcome

By the end of the lesson you will be able to:

- use percentage increases to calculate the size of the population that is displaced in Concepción.

Starter (15 minutes)	
Vocabulary	**Resources**
■ Percentage ■ Increase ■ Decrease	■ Resource sheet 2.1 ■ Mini whiteboards

Situation report:

'It is your job to calculate how many people you think have been displaced by the tsunami so that we can work out the scale of the disaster and begin to plan our relief.'

Give pairs of pupils **resource sheet 2.1**. Give them a few minutes to explore the other percentages that can be calculated if 100% = 16 136 000 people.

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Take some feedback and explore what is happening along each of the branches of the percentage web.

Q *Which percentages can you easily calculate?*

Q *In this context what might 110% represent?*

From lesson 1 the population of Chile in 2005 was 16 136 000.

The population of the country is growing at a rate of 5% per annum.

Q *How could you find 5%?*

Q *How would you find a 5% increase?*

Ask pupils to use mini whiteboards in pairs to find the population in 2006 and 2007 using the ideas generated from the spider diagram.

Q *What is the projected population in 2006?*

Q *What is the projected population in 2007? (Use the current date)*

Note: It is important that pupils realise that the figure representing 100% or a 'whole' changes each year.

Main activity (35 minutes)	
Vocabulary	**Resources**
■ Percentage ■ Fraction ■ Decimal ■ Round ■ Estimate	■ Resource sheet 1.1 (from lesson 1) ■ Resource sheet 2.2 ■ Resource sheet 2.3 (solutions) ■ Calculators

Collaborative paired work

In this lesson pupils work collaboratively in pairs to solve percentage problems. The teaching assistant will need to support pupils by reminding them of fractions, decimals and percentage facts. He/she will also be able to carry out informal assessment of pupils' knowledge and skills.

Pupils are to complete **resource sheet 2.2** in pairs, drawing on ideas on how to calculate percentages from the starter. Reference to the cards handed out in lesson 1 (resource sheet 1.1) is required.

When solving the problems pupils will have an opportunity to develop skills including conversion between fractions, decimals and percentages.

The main aim of the activity is for pupils to realise that finding a 5% increase can be done either by finding 5% and then adding this to the original amount, or more efficiently by finding 105%. Encourage pupils to estimate what each answer is going to be and then to discuss how the calculator can be used to check.

Note: The pupils will need to assume that the population of Concepción is growing at the same rate as that of Chile and that the proportion of ages remains the same.

Plenary (10 minutes)	
Vocabulary	**Resources**
■ Fraction ■ Percentage ■ Decimal ■ Simplify	■ Resource sheet 2.4

Using **resource sheet 2.4**, ask pupils to decide whether the statements are true or false.

Q *Twenty-seven sixtieths of the population have been assumed displaced. By simplifying this fraction, can you show it as a percentage?*

Q *Talk me through how you would find an increase of 8%.*

Summarise the key points that the pupils have agreed with you on percentage calculations.

Homework

Using the figures generated in the lesson (resource sheet 2.2), write a paragraph to Oxfam and the Secretary of State for International Development detailing how many people you think have been displaced by the tsunami, your justification, and the assumptions that you needed to make.

Make links with literacy. For example, the main categories of non-fiction are:

- instructions
- recount
- explanation
- information
- persuasion
- discursive writing
- analysis
- evaluation

What type of writing will be needed?

Lesson 3 – How much water and food is needed for the displaced population?

Overview

In this lesson pupils will be writing equivalent ratios and using these to solve simple proportion problems. By the end of the lesson pupils will have calculated how much water and food are needed for the displaced population. The homework is to calculate the cost per day for this food and water.

Learning objectives

- Recognise and find equivalent ratios.
- Use the unitary method to solve simple word problems involving ratio and direct proportion.
- Use proportional reasoning to solve a problem, choosing the correct numbers to take as 100%, or as a whole.
- Convert one metric unit to another (e.g. grams to kilograms).

Learning outcome

By the end of the lesson you will be able to:

- use equivalent ratios to calculate how much food is needed for the displaced population;
- use proportional reasoning to calculate how much water is needed for the displaced population.

Starter (20 minutes)

Vocabulary	Resources
■ Ratio ■ Simplify ■ Equivalent ratio ■ Simplest form	■ Resource sheet 3.1 ■ A3 paper ■ Information cards from lesson 1

Situation report:

'It is your job to tell us how much water and food is needed for the displaced people in Concepción. We will then prepare the water and food ready for transportation.'

Using the fact that 12 600 kg of food will supply 30 000 people, given in lesson 1, model the process (using **resource sheet 3.1**) of finding some equivalent ratio expressions.

Ask pupils in pairs to construct a spider diagram of equivalent ratios that they can deduce from the starting fact that 12 600 kg food will supply 30 000 people.

During the activity encourage pupils to use different strategies (e.g. dividing by powers of ten, halving, using factors).

Q *Can you talk me through what you are doing to find an equivalent ratio?*

Q *What is the simplest ratio that you have written?*

Q *What other knowledge are you using when finding equivalent ratios (e.g. conversion facts)?*

Discuss as a group the different facts that have been derived.

Q *Which of the ratio statements do you think is the most useful?*

Discuss the different possible strategies that could be used to answer the question.

Q *How much food is needed for the assumed displaced 365 400 people?*

420 g for every person per day
365 400 x 420 = 153 468 000 g = 153 468 kg

Main activity (25 minutes)	
Vocabulary	**Resources**
■ Equivalent ratio ■ Simplest form	■ Resource sheet 3.2 ■ Resource sheet 3.3 ■ Ratio Strips ITP

Whole-class discussion, collaborative paired work

In this lesson pupils work collaboratively in pairs to sort cards, helping them to discuss true and false statements. The teaching assistant will need to help some pairs of pupils engage with the activity and interpret the card statements.

Given the fact that 50 tonnes of water will supply 30 000 people per day, ask pupils to work in pairs using **resource sheet 3.2** to sort the cards into true and false statements. Pupils could position the true statements into a flow diagram as in the starter and say how they are linked.

Q *Which facts did you need to know when sorting the cards?*

Q *What do we mean by simplest form?*

Q *Which ratio card do you think is in the simplest form? And why?*

Q *Which ratio is the most useful?*

Use ratio blocks ITP or **resource sheet 3.3** to model how some of the true statements fit with the ratio 5:3.

Plenary (15 minutes)	
Vocabulary	**Resources**
■ Multiplier ■ Ratio	■ Resource sheet 3.4 ■ Resource sheet 3.5 ■ Resource sheet 3.6

Q *If I know the amount of water, how can I efficiently work out how many people it will supply?* (**Use resource sheet 3.4**.)

Use the ratio blocks to encourage the answer 'divide the amount by 5 and then multiply by 3' and extend thinking towards multiplying by $^{3}/_{5}$.

Q *If I know the number of people, how can I efficiently work out how much water is needed?* (**Use resource sheet 3.5**.)

Use the ratio blocks to encourage the answer 'divide the amount by 3 and then multiply by 5' and extend thinking towards multiplying by $^{5}/_{3}$.

Q *How can we calculate how much water is needed for 365 400 people?* (**Use resource sheet 3.6**.)

365 400 ÷ 3 × 5 = 609 000 litres of water

365 400 × $^{5}/_{3}$ = 609 000 litres of water

(For further guidance on progression in multiplicative reasoning refer to the FDPRP progression map and the Year 7, Year 8 and Year 9 mini packs.)

Homework
■ How much will it cost to provide food and water for the displaced people each day, if for every £5 you get 40 litres of water, and for every £4 you get 6 kg of food? ■ Resource sheet 3.7 **Solution** £76 125 per day for water £102 312 per day for food

Lesson 4 – Speed, distance and time

Overview

During this lesson the pupils will be using the formula relating speed, distance and time to work out how quickly each mode of transport can distribute aid.

Learning objectives

- Understand and use measures of speed to solve problems.
- Identify the necessary information to solve mathematical problems.

Learning outcome

By the end of the lesson you will be able to:

- calculate the speed, distance and time for three modes of travel.

Starter (15 minutes)	
Vocabulary	**Resources**
■ Formula ■ Rearrange ■ Speed ■ Distance ■ Time	■ Mini whiteboards and pens ■ Resource sheet 4.1 ■ Scissors

On the board write '*The cruising speed of a Hercules transport plane is 540 km/h.*'

Ask pupils the following questions, assuming the plane maintains cruising speed. Pupils should record responses on mini whiteboards.

Q *How far does the plane travel in 1 hour?*

Q *How far does the plane travel in 2 hours?*

Q *How far does the plane travel in 2½ hours? How did you calculate your answer?*

Q *How far does the plane travel in 5 hours? How did you calculate your answer?*

Q *Using the answers so far how could you work out how far the plane travels in 6½ hours?*

Note: Pupils may be using additive strategies to answer these questions, but try to steer pupils towards a multiplicative approach.

- Put the words 'speed', 'distance' and 'time' on the board. Ask the pupils in pairs to discuss the words and try to deduce a formula that will answer the questions asked above.
- Share ideas and record them on the board. Generalise their ideas and state the formula (if not already found) distance = speed × time
- Issue **resource sheet 4.1** and ask pupils to cut up the cards. State one fact '15 × 3 = 45', and ask the pupils in pairs to find three other facts involving the numbers and operations. (3 × 15 = 45, 45 ÷ 15 = 3, 45 ÷ 3 = 15.) Then ask the pupils to substitute the speed, distance and time cards to generalise the three formulae.
- Share ideas, including using shorthand notation and record the three formulae on the board. These will be used in the main activity: d = s × t; s = d ÷ t; t = d ÷ s.

Main activity (30 minutes)	
Vocabulary	**Resources**
■ Conversion ■ Formula ■ Speed ■ Distance ■ Time	■ Resource sheet 4.2 ■ Calculators

Whole-class discussion, collaborative paired work

In this lesson pupils work collaboratively in pairs to solve a complex problem. The TA will need to support some pairs in engaging with the activity and interpreting the information. He/she may also need to model a simplified version of the activity as a way of initiating actions by the pair.

Situation report:

'It is your job to organise the relief aid to be sent to the area of the tsunami. The supplies are located in New Orleans in southern USA. The airport at Concepción has been damaged and the Hercules aircraft cannot land there. So instead the Hercules aircraft are flying from New Orleans and landing at Santiago airport in Chile. From there the aid is then being relayed by helicopters and trucks on to Concepción.'

Issue the pupils with **resource sheet 4.2** which has a table to complete.

Pupils will need to choose the relevant information cards used in lesson 1 to start this task.

Encourage the pupils to work in pairs and use the relationship between speed, distance and time as explored in the starter.

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Plenary (15 minutes)	
Vocabulary	**Resources**
■ Formula ■ Rearrange	■ Resource sheet 4.3 (solutions)

Share answers and strategies on the board using **resource sheet 4.3** as appropriate.

Q *Given that distance = speed × time and with the knowledge you have from this lesson, what else can we write down about speed, time and distance?*

Q *How can we write the three expressions using letters?*

Q *What other formulae do you know? How can we rearrange them as we have with $d = s \times t$?*

Summarise the main points of the lesson.

Lesson 5 – Organising the distribution of aid

Overview

During this lesson pupils will be using a variety of information from the unit to calculate the weight of the required aid and will plan on the best way to transport it from New Orleans to Concepción.

Learning objectives

- Identify the necessary information to carry through tasks and solve mathematical problems.
- Solve more complex problems by breaking them into smaller steps or tasks, choosing and using efficient techniques for calculation.

Learning outcome

By the end of the lesson you will be able to:

- identify and organise the information needed to plan how to transport the aid to Concepción.

Starter (15 minutes)	
Vocabulary	**Resources**
■ Litres ■ Kilograms	■ Mini whiteboards ■ Resource sheet 1.1

Recap on the facts that you have found out so far:

- The estimated number of displaced people is 365 400 (lesson 2).

- The amount of water needed per day is about 609 000 litres (lesson 3).
- The amount of food needed per day is about 153 468 kg (lesson 3).
- The cost of water is about £76 125 per day (lesson 3 homework).
- The cost of food is about £102 312 per day (lesson 3 homework).

Pose the questions below to groups of four. Encourage pupils to use mini whiteboards and to discuss strategies that are being used.

Q *What will the shelter, food and water for **ten** days weigh?*

Total weight for ten days' provision = 3 897 600 kg
(water = 609 000 kg, food = 1 534 680 kg, shelter boxes = 1 753 920 kg)

Q *What will the shelter, food and water cost for **ten** days' provision?*

Total cost for ten days' provision = £19 369 245
(water = £761 250, food = £1 023 120, shelter boxes = £18 270 000)

Main activity (30 minutes)	
Vocabulary	**Resources**
none	■ Picture of Hercules transport aircraft ■ Picture of Sea King helicopter with underslung load ■ Picture of truck ■ Resource sheet 4.2 from last lesson ■ Resource sheet 5.1 ■ Resource sheet 5.2

Whole-class discussion, group work with individual roles

In this lesson pupils work in small groups to produce a plan. Each pupil has a specific role in the group. The teaching assistant will need to support some groups in managing this process.

Situation report:

'The aid has been organised in New Orleans. There are 70 Hercules transport aircraft ready in New Orleans, and 100 helicopters and 40 trucks ready at Santiago. What instructions are to be given to ensure that aid reaches the displaced people as soon as possible?'

The total provision for ten days weighs 3 897 600 kg.

Q *How shall we transport this weight to ensure that it arrives in the minimum possible time?*

Encourage pupils to work in groups of three or four to organise the facts that they need to solve the problem. **Resource sheet 5.1** can be used for support where necessary. Pupils have to write a plan detailing how they will send the aid, including any assumptions.

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Show pupils **resource sheet 5.2** which shows some questions to help with their planning. Pupils need to agree as a group the best way to represent their plan. Give each person in the group a role (e.g. spokesperson, chair, note-taker). The TA can work with key groups to help them manage the process.

Plenary (10 minutes)	
Vocabulary	**Resources**
none	none

As a class decide on three golden rules for writing a plan of this nature.

Let the spokesperson from each group feed back how they are planning to send the aid and how long it will take to transport the required aid to the destination.

Lesson 6 – Summary and links to other areas of mathematics

Overview

The aim of this lesson is to make links from the context of the Disaster relief unit of work to mathematics lessons and examination-type questions. During this lesson there is opportunity for the group to have focused learning conversations with the teacher and/or the TA to assist self-assessment.

Recap on the main learning objectives for the unit

Pupils will assess their ability to:

- use the equivalence of fractions, decimals and percentages to compare proportions; calculate percentages and find the outcome of a given percentage increase or decrease;
- use the unitary method to solve simple word problems involving ratio and direct proportion;
- use proportional reasoning to solve a problem, choosing the correct numbers to take as 100% or as a whole;
- identify the necessary information to carry through tasks and solve mathematical problems.

Lesson outcome

By the end of the lesson you will have:

- assessed your understanding of the learning objectives above and identified targets for further development.

Starter (15 minutes)	
Vocabulary	**Resources**
■ Fraction ■ Decimal ■ Percentage ■ Ratio ■ Speed, distance, time	■ Resource sheet 6.1

Ask pupils to identify the mathematics they have used during the Disaster relief unit of work: for example, fractions, decimals, percentages, ratios, speed and calculations (mental and with a calculator).

Explain that **resource sheet 6.1** is for pupils to provide evidence of achievement from their work on the project and evidence from other work.

Main activity (35 minutes)	
Vocabulary	**Resources**
■ Percentage ■ Ratio ■ Speed, distance, time	■ Resource sheet 6.2

Collaborative paired work

In this lesson pupils work collaboratively in pairs to classify questions and then to answer the questions they are insecure about. The TA will need to support pairs in engaging with the process and analysing questions.

Give pupils a variety of questions in a different context different from resource sheet 6.2.

Ask them to work in pairs to group them into five categories:

- converting between fractions, decimals and percentages;
- calculating simple percentages;
- calculating the outcome of a percentage increase/decrease;
- using ratio to solve a problem;
- using the formula relating speed, distance and time;

Pupils are to work in pairs through the problems that they are less secure about and to make links with the methods that they have used during the unit.

Ask pupils to assess their levels of confidence, using smiley faces or, traffic-lighting, on resource sheet 6.1, while working through the problems.

Focus for learning conversations

During this time it should be possible for pupils to have learning conversations with the teacher or TA focused on resource sheet 6.1. The following prompts (taken from the FDPRP progression map) may be useful questions to informally assess pupils' progress towards the stated objectives.

Use the equivalence of fractions, decimals and percentages to compare proportions; calculate percentages and find the outcome of a given percentage increase or decrease.

- Which sets of equivalent fractions, decimals and percentages do you know?
- Talk me through how you would increase/decrease £12 by, for example, 15%. Can you do it in a different way? How would you find the multiplier for different percentage increases/decreases?
- The answer to a percentage increase question is £10. Make up an easy question. Make up a difficult question.

Use the unitary method to solve simple word problems involving ratio and direct proportion.

- 5 miles is about the same as 8 km. Can you make up some conversion questions that you could answer mentally?
- Can you make up some conversion questions for which you would have to use a more formal method?
- How would you work out the answers to these questions?

Use proportional reasoning to solve a problem, choosing the correct numbers to take as 100%, or as a whole.

- Which are the key words in this problem? How do these words help you to decide what to do?
- What are the important numbers?
- What are the important links that might help you solve the problem?
- How do you decide which number represents 100% or a whole when working on problems?
- Do you expect the answer to be larger or smaller? Why?
- What would you estimate the answer to be? Why?

Identify the necessary information to carry through tasks and solve mathematical problems.

- What information do you have? What information is important for solving the problem? Is there anything else you need to know?
- What method will you use?
- What is it important to record to show how you are going about solving the problem? Words, symbols, diagrams…?

Plenary (20 minutes)	
Vocabulary	**Resources**
none	■ Resource sheet 6.1

Use the plenary to give pupils clear opportunities to talk about what they have learned during the unit of work and what they have found difficult, using the learning objectives detailed on handout 6.1 as a focus. Encourage them to talk about how they can transfer the skills learned back into other mathematics lessons.

Based on pupils' responses and traffic-lighting on resource sheet 6.1, ask pupils to write two targets for future development.

Disaster relief resource sheet 1.1	
Aid per person costs U.S. $65	Current population of Chile in 2005 was 16 136 000 people
Sikorsky Sea King helicopter holds 54 shelter boxes	51% of the population in Chile are female
Sikorsky Sea King helicopter can carry 6000 pounds of external load	1/4 of the population in Chile is aged between 0 and 14
1 cm^3 of water = 1 gram 1 litre of water = 1 kg	2.2 lb = 1 kg
1000 litres of water = 1 tonne	67% of the population in Chile is aged between 15 and 64
50 tonnes of water will supply 30 000 people per day	8% of the population in Chile is aged 65 and over
Cost of a shelter box is £500	92% of the population in Chile have adequate sanitation facilities
Each shelter box provides emergency food, shelter and medical for 10 people	10% of money raised goes on Admin and fundraising costs
Concepción population in 2002 was 636 000	16% of houses were damaged in the Indonesian Tsunami
Population growth in Chile is 5% per annum	27/60 of the population were displaced in the Indonesian Tsunami
Concepción is a city in Chile and is the second largest urban conglomeration	39/150 people in Chile are aged between 10 and 24
Concepción was the scene of a Tsunami in 1960 after an earthquake off the Chilean coast	Hercules (military transporter aircraft) can carry 45 000 lb of cargo and fly at 410m.p.h
Chile is GMT – 5 hours	12 600 kg of food will feed 30000 people for 1 day
A shelter box weighs 48kg	Exchange rate £1 : $ 1.50

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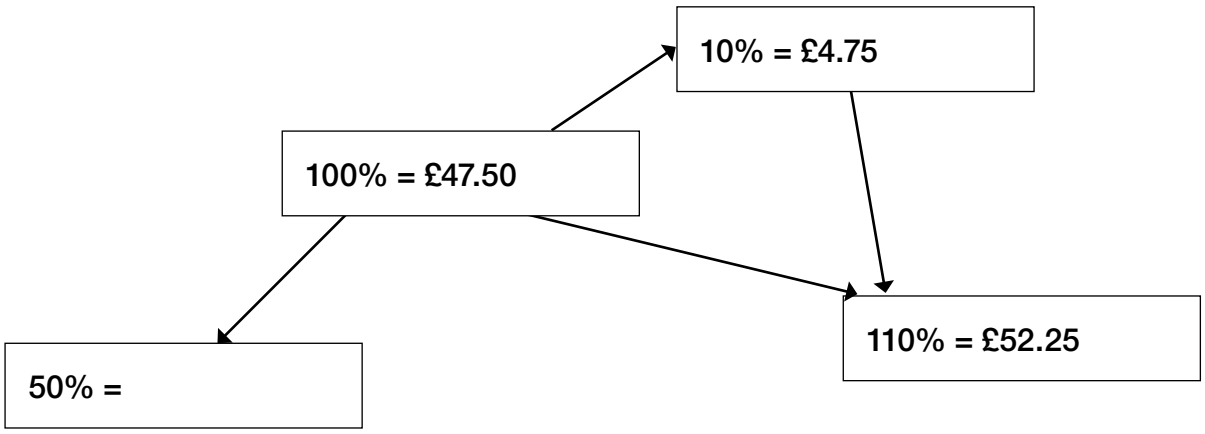
Disaster relief resource sheet 2.1



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Disaster relief resource sheet 2.2	
Facts needed to find out	Figures needed for report.
Population of Chile 2005	16 136 000
Population of Chile 2007	
Population of Chile aged 0 – 14 in 2007	
Population of Chile aged 15 – 64 in 2007	
Population of Chile aged 65 and over in 2007	
Population of Concepción 2002.	
Population of Concepción 2007.	
Round to nearest 1000.	
Population of Concepción aged 0 – 14 in 2007	
Population of Concepción aged 15 – 64 in 2007	
Population of Concepción aged 65 and over in 2007	
Assumed Population Displaced.	
Number of Shelter boxes needed for the displaced people.	
Extra medical help for those aged 65 or over.	
Cost of shelter boxes in £s.	
Cost of Shelter boxes in $.	

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Disaster relief resource sheet 2.3	
Facts needed to find out	Figures needed for report.
Population of Chile 2005	16 136 000
Population of Chile 2007	17 789 940 16 136 000 x 1.05, then ans. X 1.05 =
Population of Chile aged 0 – 14 in 2007	4 447 485 25% of 17 789 940
Population of Chile aged 15 – 64 in 2007	11 919 260 67% of 17 789 940
Population of Chile aged 65 and over in 2007	1 423 195 8% of 17 789 940
Population of Concepción 2002.	636 000
Population of Concepción 2007. Round to nearest 1000.	812 000 636 000 x 1.05^5 = 81 171.50738
Population of Concepción aged 0 – 14 in 2007	203 000 25% of 812 000
Population of Concepción aged 15 – 64 in 2007	544 040 67% 0f 812 000
Population of Concepción aged 65 and over in 2007	64 960 8% of 812 000
Assumed Population Displaced.	365 400 27/60 of 812 000
Number of Shelter boxes needed for the displaced people	36 540 One box for 10 people.
Extra medical help for those aged 65 or over.	Need more information.
Cost of shelter boxes in £s.	£17 904 600 36 540 x 490.
Cost of Shelter boxes in $.	$26 856 900 £17 904 600 x 1.5

Disaster relief resource sheet 2.4	
To find 5% you find 10% then half	To find 5% you divide by 5
Finding 10% is the same as multiplying by 0.1	To find 10% you divide by 10
To find a 5% increase you multiply by 1.5	To find a 5% increase you find 5% then add on to the original amount
To find a 5% increase you multiply by 1.05	If you want to increase by 5% and then 5% again you can increase by 10%
Finding a 5% decrease is the same as finding 95%	Finding a 5% increase is the same as finding 105%

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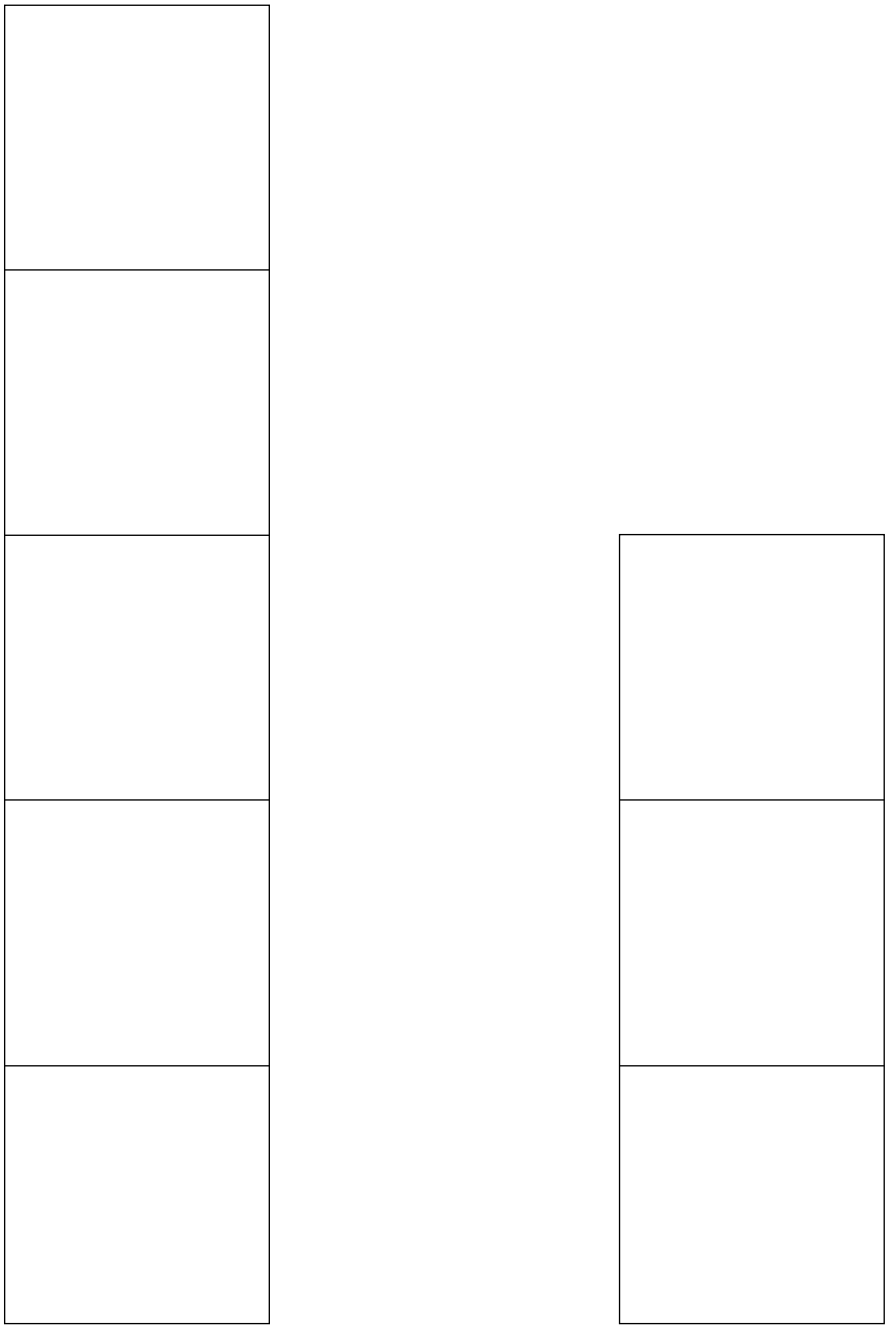
Disaster relief resource sheet 3.1	
Given the fact that 50 tonnes of water will supply 30 000 people per day	
TRUE CARDS	**FALSE CARDS**
5 tonnes of water will supply 3000 people per day	5 tonnes of water will supply 300 000 people per day
5000 litres of water will supply 3000 people per day	500 litres of water will supply 3000 people per day
5 litres of water will supply 3 people per day	3 litres of water will supply 5 people per day
$1^{2}/_{3}$ litres of water will supply 1 person per day	50 000 litres of water will supply 3000 people per day
50 000 litres of water will supply 30 000 people per day	1 litre of water will supply $1^{2}/_{3}$ person per day
25 litres of water will supply 15 people per day	60 litres of water will supply 1 person for 10 days

Disaster relief resource sheet 3.2



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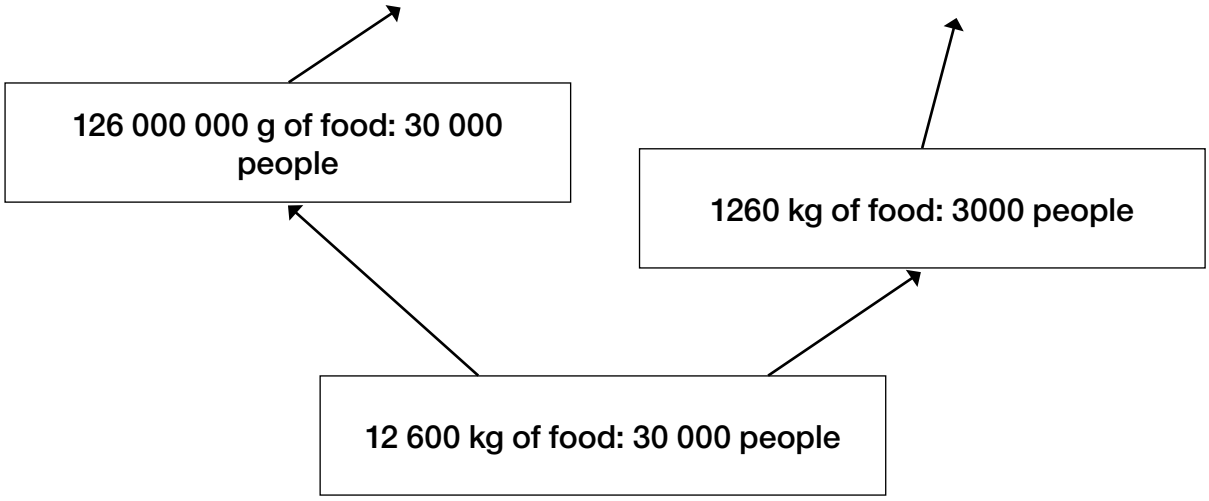

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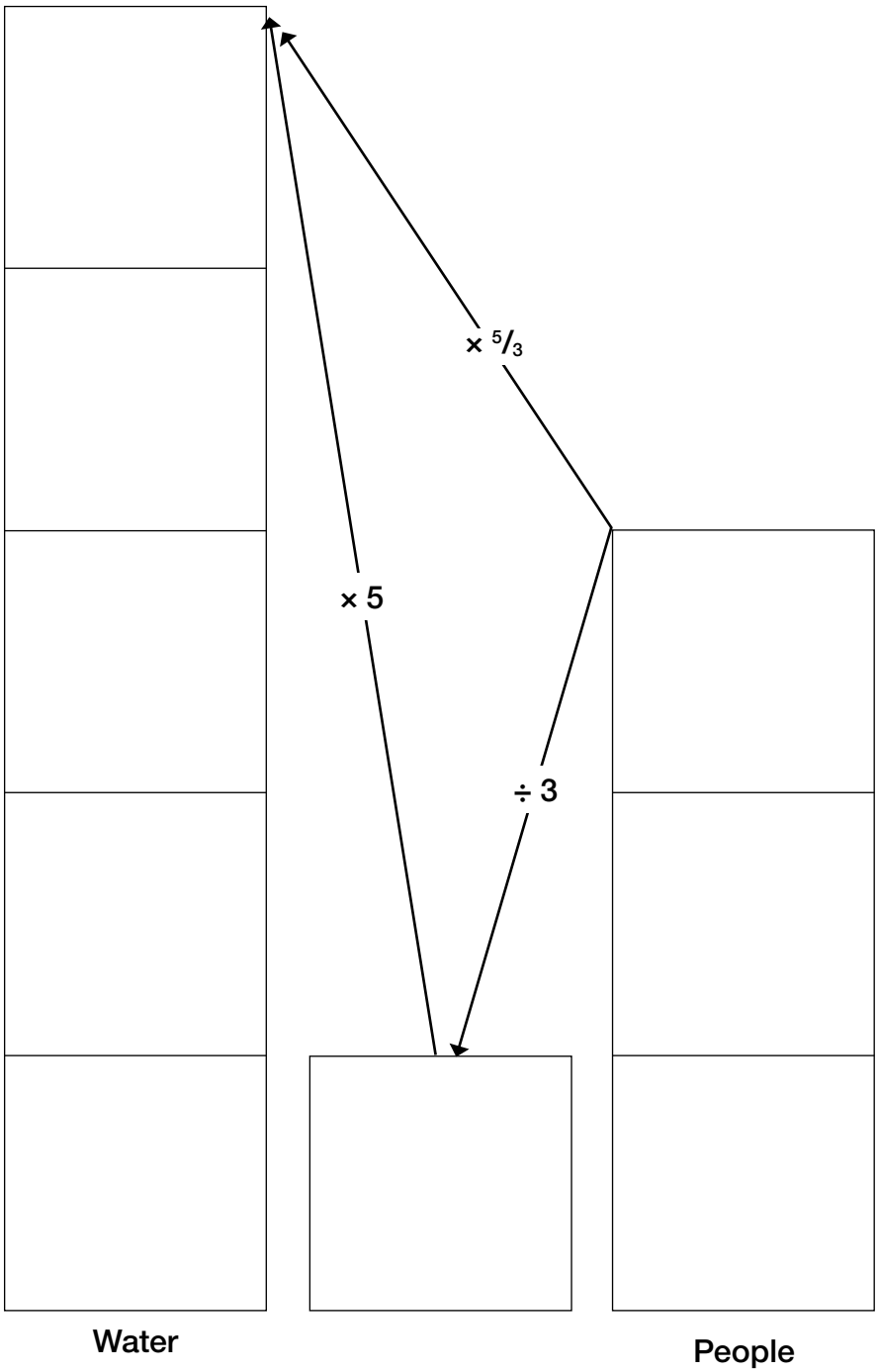
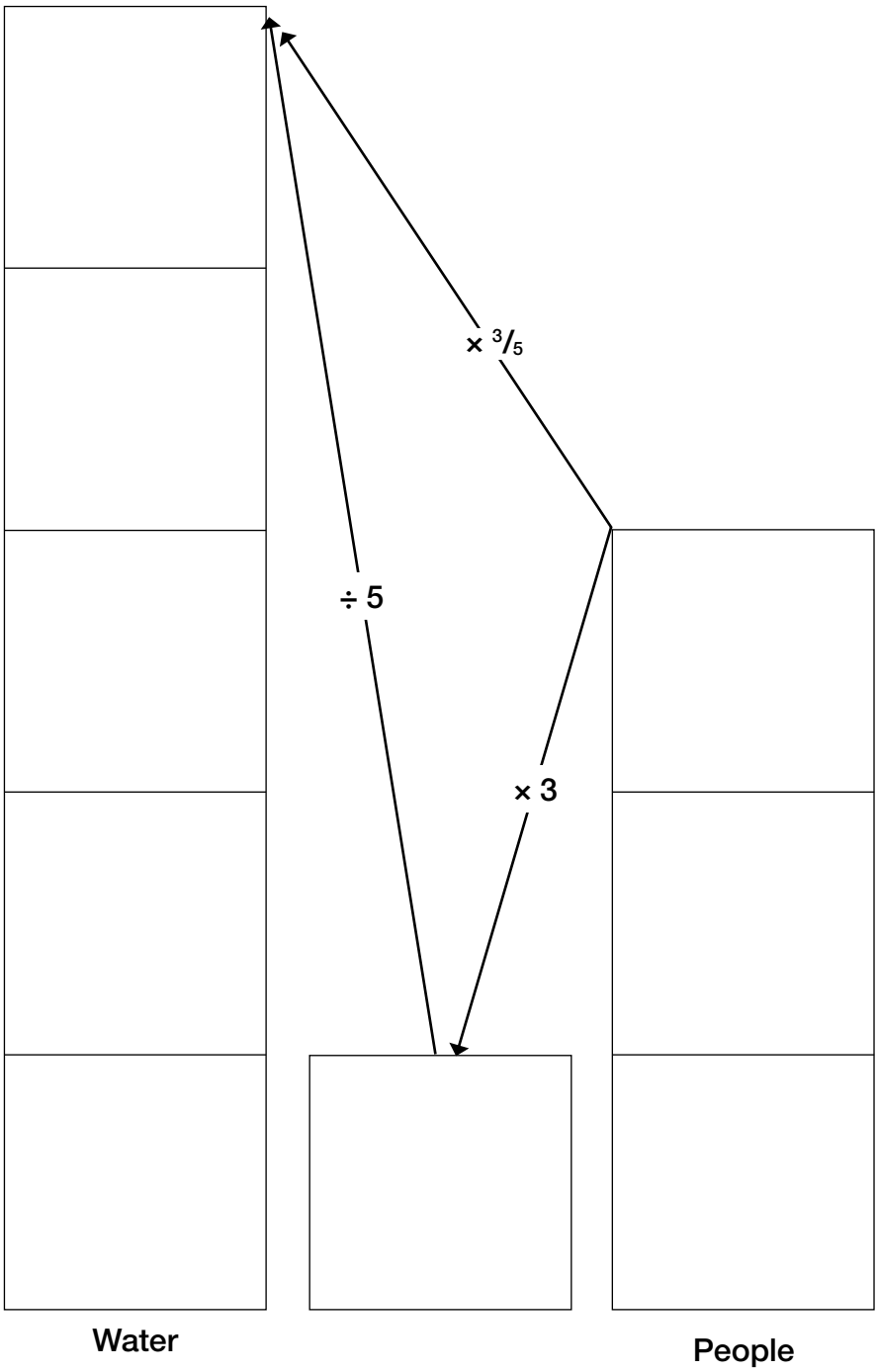
Number of people to amount of water



Amount of water to number of people



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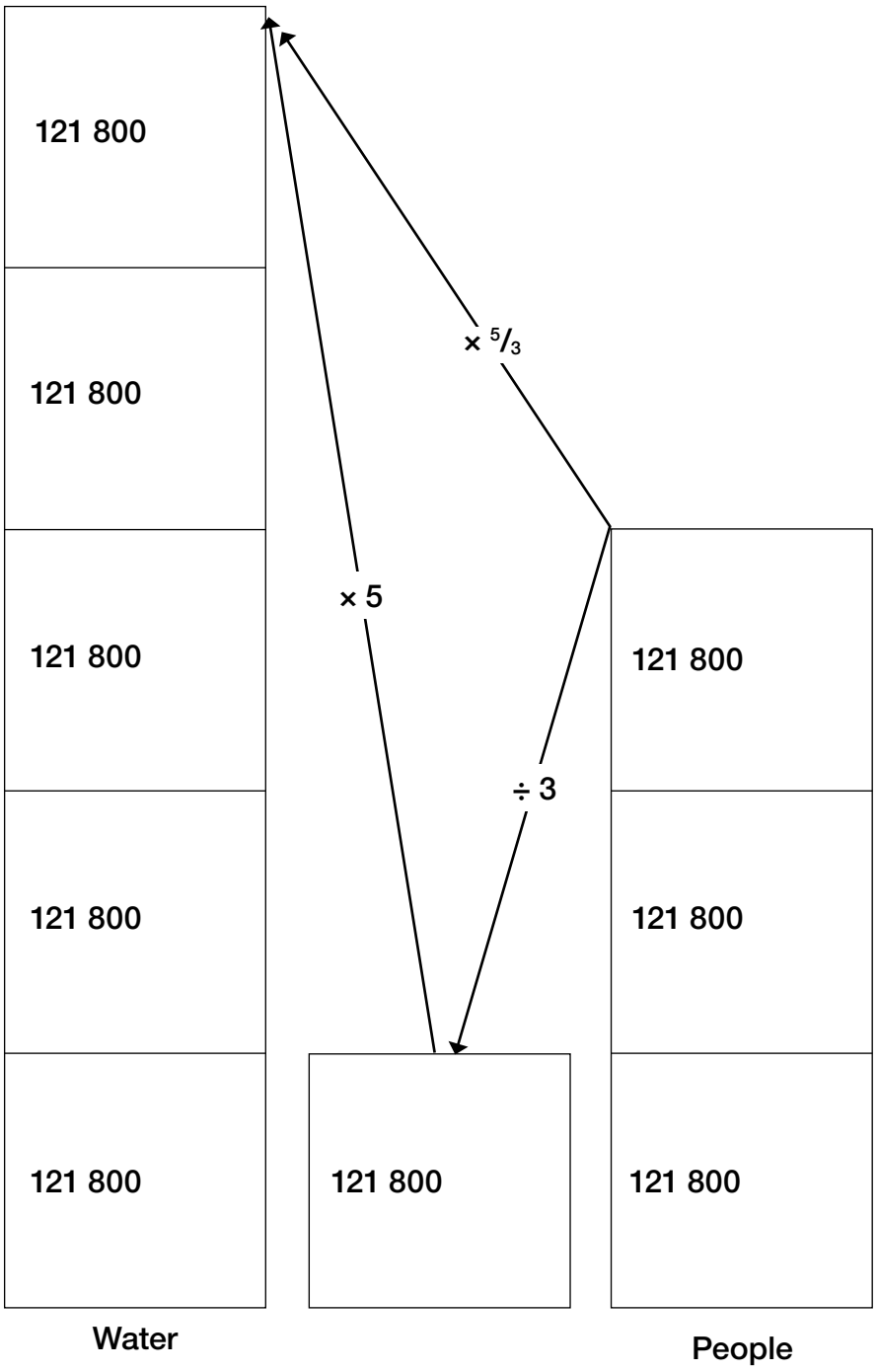
Disaster relief resource sheet 3.6



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Disaster relief resource sheet 3.7

The following is needed for the 365 400 displaced people:

- 609 000 litres of water per day
- 153 468 kg of food per day

If for every £5 you get 40 litres of water and for every £4 you get 6 kg of food.

How much will it cost to provide food and water for the displaced people each day?

£5 : 40 litres of water	£4 : 6 kg of food

Resource sheet 4.1

Shelterbox		Water		Water		Food	
48Kg	£490	40Kg	£5	6Kg	£5	6Kg	£4
Shelterbox		Water		Food		Food	
48Kg	£490	40Kg	£5	6Kg	£4	6Kg	£4
Shelterbox		Water		Food		Food	
48Kg	£490	40Kg	£5	6Kg	£4	6Kg	£4
Water		Water		Food		Food	
40Kg	£5	40Kg	£5	6Kg	£4	6Kg	£4
Water		Water		Food		Food	
40Kg	£5	40Kg	£5	6Kg	£4	6Kg	£4
Water		Water		Food		Food	
40Kg	£5	40Kg	£5	6Kg	£4	6Kg	£4
Water		Water		Food		Food	
40Kg	£5	40Kg	£5	6Kg	£4	6Kg	£4

Food		Food	
6Kg	£4	6Kg	£4
Food		Food	
6Kg	£4	6Kg	£4
Food		Food	
6Kg	£4	6Kg	£4
Food		Food	
6Kg	£4	6Kg	£4

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Disaster relief resource sheet 4.2

Use your ratio cards to help you with these questions.

Q1 What fraction of the number of packs of food is the number of packs of shelter?

Q2 What fraction of the number of packs of water is the number of packs of shelter?

Q3 What fraction of the number of packs of food is the number of packs of water?

Q4 What fraction of the number of packs of water is the number of packs of food?

Q5 What fraction of the whole amount is the number of packs of water?

Q6 What fraction of the whole amount is the number of packs of food?

Q7 How many packs of water will I need if I have 140 packs of food? (Hint: remember the number lines from last lesson)

Q8 How many packs of water will I need if I have 210 packs of food?

Q9 How many packs of food will I need if I have 240 packs of water?

Q10 How many packs of food will I need if I have 320 packs of water?

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Disaster relief resource sheet 4.3

Use your ratio cards to help you with these questions.

Q1 If I have 200kg of water what weight of food do I need?

Q2 If I have 500kg of food what weight of water do I need?

Q3 From your cards what is the ratio of the weights of shelter box to water to food for 10 people for 14 days? Write this as a ratio as simply as possible.

Q4 Divide the load capacity that you worked out earlier into this ratio. What weight of shelter boxes, water and food can be carried in each helicopter?

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Disaster relief resource sheet 5.1

The cruising speed of a Hercules transport aircraft is 540 km/h.	The distance from Santiago to Concepción is 520 km by road and air.
The load capacity of a Sikorsky helicopter is 6000lbs or 2727 kg.	There are 40 trucks available to transport aid from Santiago.
The load capacity of a Hercules is 45 000lbs or 20 455 kg	The Sikorsky helicopters take 2¼ hrs to get from Santiago to Concepción.
The distance from New Orleans to Santiago is 7830km	The total number of people who need emergency aid is 365 400
The weight of a shelter box for 10 people is 50 kg	The weight of water and food for 10 people for the first 14 days is 202kg
1 kg =2.2lbs	8km = 5 miles
The load capacity of each truck is 2000kg	The average time taken by the trucks travelling from Santiago to Concepción is 7 ¾ hrs

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Disaster relief resource sheet 5.2

Name : .....

Use the information on resource sheet 5.1 to find solutions to following questions:

Question 1

a) How much time will it take for the Hercules flight from New Orleans to Santiago?

b) One flight had to detour to re-fuel, the extra distance covered was 405km. How much time was the total journey?

Question Two

a) What is the average speed of the trucks from Santiago to Concepción?

b) Using the fact that 8km:5miles, convert your answer from part a) to mph.

Question Three

How much time is the helicopter journey from Santiago to Concepción?

Question Four

One of the trucks had to change a tyre, and its average speed is now only 40km/h, how far has it travelled when the other trucks reach Concepción?

Question Five

Draw a possible distance time graph for the truck's journey from Santiago to Concepción. You should label the important points of the graph.

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Disaster relief resource sheet 6.1 - Pupil self-evaluation grid			
Objective	☺ 😐 ☹	Example from the Disaster relief project	Example from a different context
I can convert between fractions, decimals and percentages			
I can calculate simple percentages			
I can calculate the outcome of a percentage increase / decrease			
I can use ratio to solve a problem			
I can identify the information needed to solve a problem			

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Hounslow

Kent

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Middlesbrough

Milton Keynes

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Oldham

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Southwark

Staffordshire

Sunderland

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Wigan

Wiltshire

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