



Key Stage 3 National Strategy

Literacy in design and technology

LEA consultants and subject advisers

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Objectives from the *Framework for teaching English: Years 7, 8 and 9*

General introduction to *Literacy in series*

The aim of the subject-specific material in the *Literacy in series* is to exemplify aspects of the *Literacy across the curriculum* training file for individual subjects.

Where appropriate, the relevant section from the *Literacy across the curriculum* training file is indicated so that trainers and teachers can refer to it as and when they wish. This training file is available in every school and LEA. Further copies have been sent to the appropriate subject associations.

Methods of delivery

- LEAs can decide when and how to deliver the *Literacy in series* through 2002–2003 so that it fits with their action plans and/or the current needs of schools. It can be repeated as needs arise; it can be amended as expertise within schools grows.
- The material can be delivered as days or as individual sessions as appropriate to fit with current LEA practice and school needs.
- The material can be amended in response to local circumstances and by involving local expertise. The final session on schemes of work will help where a department from one school can share its experience and expertise with others. This would ensure that local priorities, for example, the needs of pupils for whom English is an additional language, can be met.
- Further examples from local schools can be added to the sessions or substituted for some of the existing examples.
- Trainers can be drawn from the LEA (for example, teacher advisers or LEA subject advisers) or from schools (for example, advanced skills teachers or respected heads of departments or teachers).

Key principles

- To develop consistent approaches to teaching and learning in literacy across departments, and to build increased awareness of the skills, knowledge and understanding that pupils could be expected to bring to lessons
- To use speaking and listening to develop subject learning
- To develop active reading strategies to increase pupils' ability to read for a purpose and engage with text, and the learning to be gained from it
- To demonstrate the sequence for writing and modelling writing for a key text type within the subject; seeing how it is done helps pupils to achieve it for themselves more quickly
- To make suggestions for the learning of subject-specific vocabulary

English Framework objectives

- At the end of each folder, the objectives from the *Framework for teaching English: Years 7, 8 and 9* which apply across the curriculum appear in an appendix: most are the key objectives (in bold) but others have been added for clarity or exemplification.
- This will help schools identify their literacy curricular targets and ensure common approaches through the objectives.

Developments in cross-curricular literacy

- As expertise grows, schools may wish to decide which department teaches a particular aspect of literacy, for example, explanations in non-fiction writing, and how other subject areas can support and develop pupils' learning by reinforcing it and applying it to their subject as appropriate. This will save time and ensure that pupils have a consistent approach to, for example, the writing of explanations.
- As expertise in, for example, active reading strategies or managing group talk develops and pupils know the expectations across the curriculum, their confidence will grow and their ability to take responsibility for their learning will also develop. This, again, will save time for teachers as they will not have to keep teaching the skills.

1 Word level

You will need:

- OHTs 1.1–1.5
- Handouts 1.1–1.3 for each participant
- several sheets of large paper and felt pens, enough for groups of 3 or 4
- an etymological dictionary
- if you have them, materials for the games recommended in Handout 1.3

Timing:

1.1 Introduction	5 minutes
1.2 Spelling strategies	30 minutes
1.3 Vocabulary	25 minutes
Total	60 minutes

1.1 Introduction (5 minutes)

Welcome participants and acknowledge any past experience that exists among your audience.

Show OHTs 1.1 and 1.2 to introduce the aims for the day and the session.

OHT 1.1

Aims for the day

- To consider how literacy skills can help pupils make progress in design and technology
- To suggest practical strategies for classroom use

OHT 1.2

Aim for the session

- To suggest approaches to spelling and vocabulary in the design and technology lesson

1.2 Spelling strategies (30 minutes)

Introduce the session by explaining that pupils find some of the words in design and technology difficult to spell. Most departments have a list of key spellings which they encourage pupils to learn.

Distribute *Handout 1.1*, which contains the design and technology words from the spelling list from the *Framework for teaching English: Years 7, 8 and 9*.

These are the subject-specific words all pupils should be expected to spell accurately. Departments can, of course, add their own.

Handout 1.1

Design and technology spelling list

aesthetic	machine
brief	manufacture
carbohydrate	mineral
component	natural
design	nutrition
diet	polyester
disassemble	portfolio
evaluation	presentation
fabric	production
fibre	protein
flour	recipe
flowchart	sew
hygiene	specification
ingredient	technology
innovation	tension
knife/knives	textile
linen	vitamin

Show OHT 1.3 and ask participants to discuss, in groups of three or four, how they might help pupils who were struggling to remember these particular spellings. What strategies would they suggest for each word? Allow 10 minutes.

OHT 1.3

Some useful spellings

adaptable	appearance
component	design
ingredient	manufacture
process	resilient
suitable	technology
temperature	versatile

Take feedback by asking participants to help you list the range of strategies suggested. Use OHT 1.4 to round up the main points.

OHT 1.4

Spelling strategies

- Refer to root meanings, e.g. *proto* = original
- Break it into sounds, e.g. c-o-m-p-o-n-e-n-t
- Break it into syllables, e.g. e-val-u-a-tion
- Break it into affixes, e.g. re-search
- Apply a rule, e.g. *I before E except after C, for brief*
- Refer to a word in the same word family, e.g. design, sign, signature
- Use a key word, e.g. *process* as a key word for excess, recess, etc.
- Look for words within words, e.g. *one* in *component*
- Say it as it looks, e.g. *technology*
- Use a mnemonic, e.g. one collar, two sleeves, for *necessary*
- Visual memory (look-say-cover-write-check)

Draw out the following points.

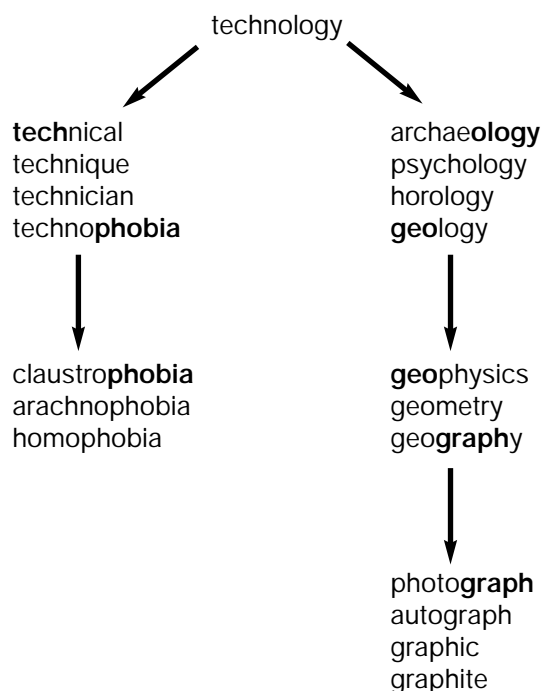
- A number of words will yield to more than one strategy, e.g. several words contain other smaller words within them.
- There are other strategies not listed here, for example, applying spelling rules.

Point out that design and technology is rich in root words drawn from Latin and Greek.

Show OHT 1.5 and show how it is constructed by taking a single word from each list to start a new list.

OHT 1.5

Word web



Ask participants for the meaning of the roots:

tech = make, do

ology = study

phobia = fear

graph = draw

geo = earth

Point out that it is possible to work backwards from the list to work out the meaning of the root and to spell new words by analogy with known words by using the root.

Distribute large sheets of paper and felt pens so that three or four participants can work together, and give different words as starting points for different groups: e.g. manufacture, process, carbohydrate, production, polyester.

After 15 minutes ask participants if they have worked out the meaning of all their roots. Have ready a dictionary of etymology to recommend and refer to. Display the sheets.

1.3 Vocabulary (25 minutes)

Subject-specific terminology enables precise meaning to be conveyed. But not all words in design and technology are free of ambiguity.

Distribute *Handout 1.2*.

Handout 1.2		
Using words in different contexts		
Word	Everyday/other context	Design and technology context
bias		
current		
discrimination		
grain		
mould		
smart		
tension		

Ask participants to take 10 minutes filling in the subject-specific meaning of each word and the other meaning(s). There is space on the handout to add further words. Draw out the importance of teaching subject-specific use; one cannot assume that pupils will know subject-specific meanings.

Now turn participants away from words with several meanings to the use of subject-specific terminology more generally. Ask participants to take 10 minutes in small groups to think up two or three short activities that would help pupils to remember subject terminology once it has been introduced and explained to them, for example, as a quick refresher or revision activity at the start of a lesson.

Take feedback. Some suggestions are listed on *Handout 1.3*.

Handout 1.3

Activities for learning subject-specific vocabulary

- Laminate a set of key word cards and definition cards for matching activities. Read aloud the definitions and ask teams to provide the term
- Delete subject-specific terminology from a passage and ask pupils to write in the correct terms
- Display terms and definitions on the wall
- Set a crossword puzzle in which the words are terms and the clues are definitions
- Set a 'key terms' word search in which the definition rather than the word is given as a clue
- Feed the subject-specific words into a hand-held spellchecker so that they are used automatically for the word games
- Ask groups to devise A3 posters that illustrate the terms

Draw out the following points.

- The best learning is achieved not through a test but through an active task.
- It is best to introduce terminology at the time it is in use in the topic, so that pupils see how it is used in context; the activities in the handout are intended as refresher activities.

Aims for the day

OHT 1.1

- To consider how literacy skills can help pupils make progress in design and technology
- To suggest practical strategies for classroom use

Aim for the session

OHT 1.2

- To suggest approaches to spelling and vocabulary in the design and technology lesson

Some useful spellings

OHT 1.3

adaptable

appearance

component

design

ingredient

manufacture

process

resilient

suitable

technology

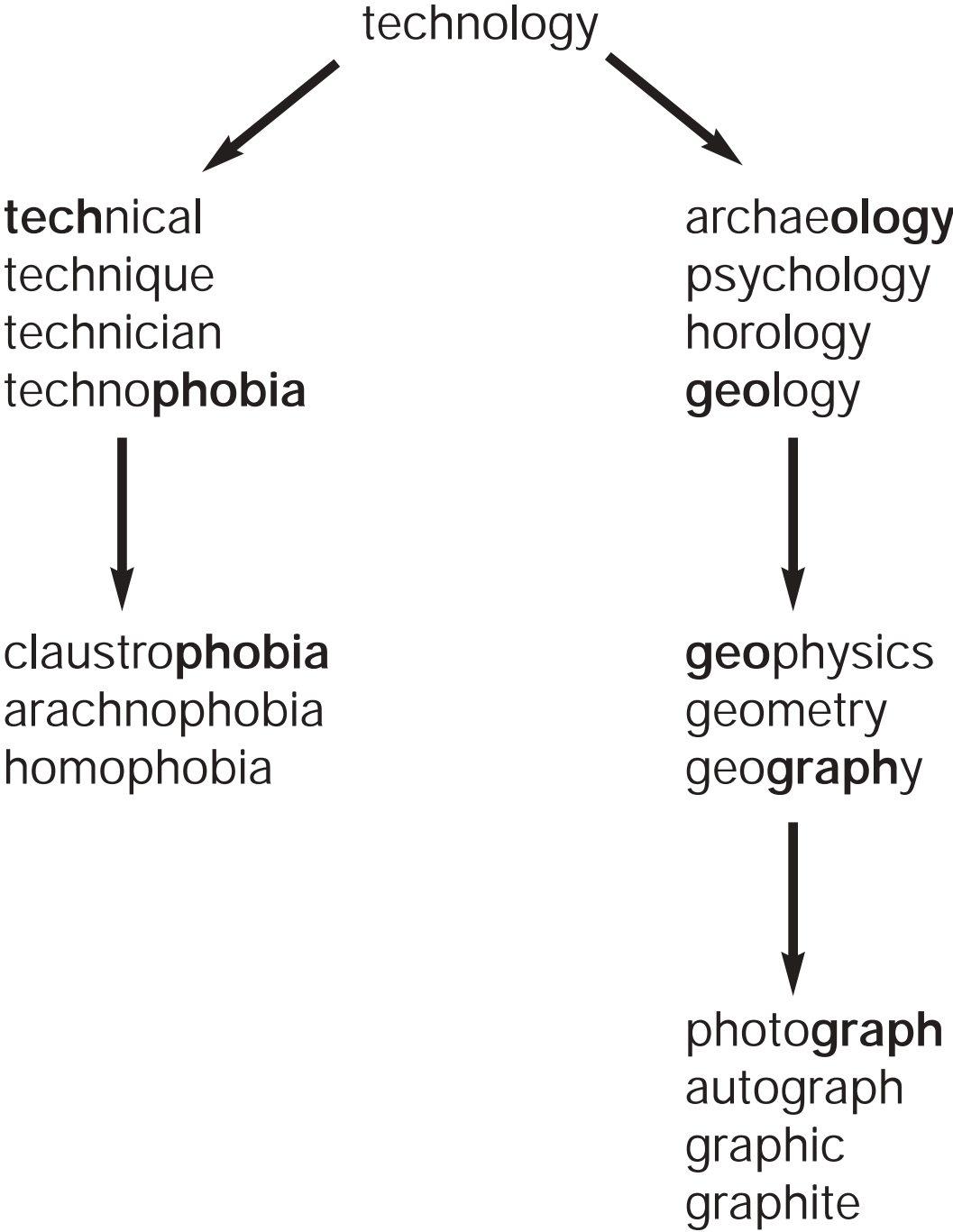
temperature

versatile

Spelling strategies

OHT 1.4

- Refer to root meanings, e.g. *proto* = original
- Break it into sounds, e.g. c-o-m-p-o-n-e-n-t
- Break it into syllables, e.g. e-val-u-a-tion
- Break it into affixes, e.g. re-search
- Apply a rule, e.g. *I before E except after C*, for *brief*
- Refer to a word in the same word family, e.g. design, sign, signature
- Use a key word, e.g. *process* as a key word for excess, recess, etc.
- Look for words within words, e.g. *one* in *component*
- Say it as it looks, e.g. *technology*
- Use a mnemonic, e.g. one collar, two sleeves, for *necessary*
- Visual memory (look–say–cover–write–check)



Design and technology spelling list

Handout 1.1

aesthetic

brief

carbohydrate

component

design

diet

disassemble

evaluation

fabric

fibre

flour

flowchart

hygiene

ingredient

innovation

knife/knives

linen

machine

manufacture

mineral

natural

nutrition

polyester

portfolio

presentation

production

protein

recipe

sew

specification

technology

tension

textile

vitamin

Using words in different contexts

Handout 1.2

Word	Everyday/other context	Design and technology context
bias		
current		
discrimination		
grain		
mould		
smart		
tension		

Activities for learning subject-specific vocabulary

Handout 1.3

- Laminate a set of key word cards and definition cards for matching activities. Read aloud the definitions and ask teams to provide the term
- Delete subject-specific terminology from a passage and ask pupils to write in the correct terms
- Display terms and definitions on the wall
- Set a crossword puzzle in which the words are terms and the clues are definitions
- Set a 'key terms' word search in which the definition rather than the word is given as a clue
- Feed the subject-specific words into a hand-held spellchecker so that they are used automatically for the word games
- Ask groups to devise A3 posters that illustrate the terms

2 Speaking and listening

You will need:

- OHTs 2.1–2.5
- Handouts 2.1–2.2 for each participant
- A3 sheets of paper for the activity in section 2.2
- flipchart, pens
- video: *Literacy in design and technology: speaking and listening*

Timing

2.1 Introduction	5 minutes
2.2 Oral frames	30 minutes
2.3 Using talk to deepen understanding	30 minutes
2.4 Moving on	10 minutes
Total	75 minutes

2.1 Introduction (5 minutes)

Show OHT 2.1.

OHT 2.1

Aims

- To consider the ways in which speaking and listening can support the development of concepts in design and technology
- To identify teaching strategies to support that development

Introduce the session using the following points.

- We often use group work and pair work, but pupils will benefit from being taught how to use these ways of working effectively.
- We often assume talk is 'natural' and easy, but it isn't for many pupils.
- We don't always take full advantage of the range of types of talk available.
- Talk has as many if not more 'text types' than writing. The main categories, e.g. explanation, instruction, description, information, are used in talk as well as in written text.
- Talk is also quick, fluid and shared: it can do some things better than writing, e.g. exploratory work, quick sharing.

2.2 Oral frames (30 minutes)

Show OHT 2.2.

OHT 2.2
Useful phrases for evaluating and analysing a product

To begin with
At first
Firstly
Initially
There are several reasons why
In order to
I now know that
One problem was
A possible solution would be
This shows that
Perhaps I could have
To improve this I need
The result is
As a result
Overall I feel

Participants will immediately recognise these as phrases that can be deployed in both speech and writing when evaluating a design or product. Use the first four words to show how variations on a key phrase can be used to fit any sentence. This sort of grammatical reshaping is a valuable asset to speakers because one often starts an evaluation before the sentence is grammatically polished.

Activity

- 1 Now ask participants to spend 2 minutes coming up with similar phrases for exploratory, hypothetical, speculative talk. Start them off with: *What if...?*
- 2 Take feedback, and get someone to log the suggestions on a flipchart. Suggestions might include:

<i>Supposing...</i>	<i>I wonder if...?</i>
<i>Imagine...</i>	<i>Ought we to...?</i>
<i>Conceivably...</i>	<i>What about...?</i>
<i>Perhaps...</i>	<i>Why would...?</i>
<i>Maybe...</i>	<i>It's possible that...</i>
<i>Could we...?</i>	<i>It's probable that...</i>
<i>It might...</i>	
- 3 Suggest to participants that gathering useful terms would make a very good starter activity prior to group work, and would feed into written work, too.

- 4 Divide participants into three sectors, and ask each to take a different kind of talk and list some phrases on a large piece of paper for display.
 - Ask one to take **collaborative problem-solving**, e.g. generating a design proposal.
 - Ask another to take **drawing out similarities and differences**, e.g. in different products.
 - Ask another to take **explaining a process**, e.g. a design proposal.
- 5 Offer to copy the results for circulation.

2.3 Using talk to deepen understanding (30 minutes)

Explain that talk is often referred to as a 'tool' for learning. Show OHT 2.3 to explain how this is.

OHT 2.3

Talk can help us to:

- think through ideas
- express thoughts, feelings and opinions
- influence other people
- articulate ideas
- share knowledge
- feed back and review ideas
- adapt and refine ideas
- reach closure, accommodation or acceptance of different ideas
- negotiate solutions

And much more...

Introduce the video. Dawn Barraclough-Green is teaching a Year 7 class, focusing on developing their understanding of what a design specification might be. The video extract shows the class using talk to evaluate a range of bread products.

The lesson was an hour long and was structured as follows:

- 1 Introduction and discussion of the target group and sandwich with whole-class feedback.
- 2 Discussion to arrive at criteria for judging a product.
- 3 Discussing a bread product in the light of pupils' suggested criteria.
- 4 A plenary where the teacher drew out the similarities between their criteria and those of a company called Buns R Us.

The speaking and listening objectives were:

SL1 use talk as a tool for clarifying ideas;

SL10 identify and report the main points arising from a discussion.

Explain that the video has been edited to focus on the discussion and feedback. Distribute *Handout 2.1* and ask participants to consider the questions and jot down their observations on the handout as they watch the video.

Show the video and then ask participants to spend 5 minutes in pairs discussing the video by comparing the notes made on the handout. The aim is to highlight successful features of teaching that promote purposeful talk, and to consider qualities in the pupils' speaking and listening. Take brief feedback.

OHT 2.4/Handout 2.1

Video grid

SL1 use talk as a tool for clarifying ideas

SL10 identify and report the main points arising from a discussion

How are pupils organised?	
What type of questions does the teacher use?	
What strategies are used to encourage purposeful talk?	
How does the teacher encourage pupils to use design and technology-specific language?	
How successful are the pupils in meeting the speaking and listening objectives?	

Points to make:

- The lesson structure permits the discussion to move through several phases to a conclusion.
- The teacher has formed the groups so that all pupils can participate.
- The objectives and purpose for the talk are clear.
- The teacher models the kinds of questions to ask. These are open questions which permit discussion to develop and continue.
- She focuses pupils' talk onto specific aspects of design and technology.
- By the time pupils present their findings, they have been enabled to use much more specific vocabulary as well as understand the nature of the importance of a target group to the design specification.

Conclude by drawing participants' attention to *Handout 2.2* (from module 7 of *Literacy across the curriculum*) which provides practical suggestions on the various ways group talk can be managed according to task.

Handout 2.2

Strategies for making group discussion purposeful and promoting a range of speaking and listening

See full-size version of the handout at the end of this session.

Take participants through *Handout 2.2* and briefly explain the strategies involved.

2.4 Moving on (10 minutes)

Explain that the department shown in the video is in the early stages of looking at the way it uses talk to develop design and technology. It decided to focus on Year 7 in the first year of implementing the strategy. Dawn used two objectives from the framework to support her planning:

SL1 use talk as a tool for clarifying ideas;

SL10 identify and report the main points arising from a discussion.

Show OHT 2.5, which is a selection of Year 8 speaking and listening objectives from the *Framework for teaching English: Years 7, 8 and 9*.

OHT 2.5

**Year 8 Speaking and listening objectives from the
*Framework for teaching English: Years 7, 8 and 9***

5 ask questions to clarify understanding and refine ideas

**10 use talk to question, hypothesise, speculate,
evaluate, solve problems and develop thinking
about complex issues and ideas**

11 recognise and build on other people's contributions

3 make a formal presentation in standard English, using
appropriate rhetorical devices

Explain to participants that the OHT highlights objectives from the Framework which support the focus on improving the quality of talk.

Give participants 5 minutes to work in pairs and to think of specific points in their current schemes of work where the objectives could fit in.

Refer back to *Handout 2.2*. Which strategies might they specifically use?

Take feedback, aiming to build up a list of Year 8 opportunities for teaching and using talk, ensuring that the following points are made.

- Design and technology is dependent on pupils being able to hypothesise, speculate and solve problems. Explicitly teaching the language to do this helps pupils think more clearly, express themselves with precision and develop the language skills needed in writing.
- The ability to choose standard English and use it with confidence when appropriate is a skill needed throughout life and supports the development of a clear writing style.

Conclude the session by making the following key points.

- Using Framework objectives helps the teaching of skills required of an effective speaker and listener.
- Planning for speaking and listening ensures that the talk supports the learning in design and technology and ensures progression in the talk.
- Further support is available in *Literacy across the curriculum: module 7*, The management of group talk, and module 8, Listening.

Aims

OHT 2.1

- To consider the ways in which speaking and listening can support the development of concepts in design and technology
- To identify teaching strategies to support that development

Useful phrases for evaluating and analysing a product

OHT 2.2

To begin with

At first

Firstly

Initially

There are several reasons why

In order to

I now know that

One problem was

A possible solution would be

This shows that

Perhaps I could have

To improve this I need

The result is

As a result

Overall I feel

Talk can help us to:

- think through ideas
- express thoughts, feelings and opinions
- influence other people
- articulate ideas
- share knowledge
- feed back and review ideas
- adapt and refine ideas
- reach closure, accommodation or acceptance of different ideas
- negotiate solutions

And much more...

Video grid

OHT 2.4

SL1 use talk as a tool for clarifying ideas

SL10 identify and report the main points arising from a discussion

How are pupils organised?	
What type of questions does the teacher use?	
What strategies are used to encourage purposeful talk?	
How does the teacher encourage pupils to use design and technology-specific language?	
How successful are the pupils in meeting the speaking and listening objectives?	

Year 8 Speaking and listening objectives from the *Framework for teaching English: Years 7, 8 and 9*

OHT 2.5

- 5 ask questions to clarify understanding and refine ideas
- 10 use talk to question, hypothesise, speculate, evaluate, solve problems and develop thinking about complex issues and ideas**
- 11 recognise and build on other people's contributions
- 3 make a formal presentation in standard English, using appropriate rhetorical devices

Video grid

Handout 2.1

SL1 use talk as a tool for clarifying ideas

SL10 identify and report the main points arising from a discussion

How are pupils organised?	
What type of questions does the teacher use?	
What strategies are used to encourage purposeful talk?	
How does the teacher encourage pupils to use design and technology-specific language?	
How successful are the pupils in meeting the speaking and listening objectives?	

Strategies for making group discussion purposeful and promoting a range of speaking and listening

Handout 2.2
1 of 2

Pair talk

Pupils work together in pairs – possibly friendship, possibly boy–girl, etc. Each pair then joins up with another pair to explain and compare ideas.

Listening triads

Pupils work in groups of three. Each pupil takes on the role of talker, questioner, recorder. The talker explains something, or comments on an issue, or expresses an opinion. The questioner prompts and seeks clarification. The recorder makes notes and gives a report at the end of the conversation. Next time, roles are changed.

Envoys

Once groups have carried out a task, one person from each group is selected as an 'envoy' and moves to a new group to explain and summarise, and to find out what the new group thought, decided or achieved. The envoy then returns to the original group and feeds back. This is an effective way of avoiding tedious and repetitive 'reporting back' sessions. It also puts a 'press' on the envoy's use of language and creates groups of active listeners.

Snowball

Pairs discuss an issue, or brainstorm some initial ideas, then double up to fours and continue the process, then into groups of eight in order to compare ideas and sort out the best or to agree on a course of action. Finally, the whole class is drawn together and spokespersons for each group of eight feed back ideas. A useful strategy to promote more public discussion and debate.

Rainbow groups

A way of ensuring that pupils are regrouped and learn to work with a range of others. After small groups have discussed together, pupils are given a number or colour. Pupils with the same number or colour join up, making groups comprising representatives of each original group. In their new group pupils take turns to report back on their group's work.

Jigsaw

The advantage of a 'jigsaw' is that it offers a structure for group work, and promotes a range of speaking and listening.

Home groups

The teacher divides the whole class into small groups (commonly four pupils per group). These are teacher-initiated in order to make each group reflect the balance of the whole class – gender, ability, attitude.

Each group is given a common task. Handouts are employed in order to set the task. Reading material is kept to a manageable length and complexity. If the home groups are of four, then there are four questions or tasks within the main task – one for each member of the group. Questions or tasks are allocated within each group, through negotiation between the pupils.

Expert groups

All the pupils who have selected a particular question or task regroup and work together on what is now a common problem and outcome. By the time this stage of the session is completed, each has become an expert on this matter, through discussion and collaboration with the other 'experts'.

Return home

Original groups reform. Dissemination begins. The pupils know that there will be a follow-up task requiring understanding of all four questions or sets of information, not just their own speciality. All the pieces of the jigsaw have to fit together.

Final task

The home groups are set a final task. This could be a group outcome, or an individual task. The crucial element is to ensure that pupils have to draw on the combined 'wisdom' of the home group in order to complete it successfully.

3 Reading

You will need:

- OHTs 3.1–3.5
- Handouts 3.1–3.6 for each participant
- blank OHTs
- flipchart, pens
- highlighter pens in two colours, whiteboards or laminated paper

Timing:

3.1 Introduction	10 minutes
3.2 Reading work sheets and textbooks	15 minutes
3.3 Active reading strategies	30 minutes
3.4 Example of a reading activity	15 minutes
3.5 Conclusion	5 minutes
Total	75 minutes

3.1 Introduction (10 minutes)

Show OHT 3.1 to introduce the session.

OHT 3.1

Aim

- To be able to use a variety of ways to support pupils in their reading in design and technology

Explain that the kind of reading demanded depends very much on the task pupils are required to do and their reason for reading. Refer to OHT 3.2.

OHT 3.2

Ways of reading

Continuous reading	Reading a text in an uninterrupted, linear way
Close reading	Careful reading involving detail, reflection, referring back, checking
Skimming	Glancing quickly through to get the gist: is it worth a read?
Scanning	Searching for particular information

Give participants 3 minutes to discuss if and when the above techniques might be used in design and technology. Take feedback and list on a flipchart.

- Continuous reading: e.g. reading for pleasure an article about food
- Close reading: e.g. reading to prepare a presentation about an aspect of a discovery/invention/technique; reading instructional work sheets
- Skimming: to see if a book contains any information on a given topic
- Scanning: to look for specific information, e.g. on a web page

3.2 Reading work sheets and textbooks (15 minutes)

Explain that:

- textbooks are rarely used in design and technology, but support sheets and instruction sheets are common as pupils move through Key Stage 3;
- instruction sheets often contain a variety of ways of conveying information such as words (to give instruction), pictures (how to do the action in a safe manner) and graphics (e.g. arrows to show a sequence).

Activity

Ask the participants to work in pairs and divide the pairs into two groups.

Distribute *Handout 3.1* to half the pairs and *Handout 3.2* to the other group of pairs.

Handout 3.1

How to make it

1. You will be given a piece of thin MDF (see note). You will be given the top part of your mould. You will need to shape it to look like your design. Cut your shape out using a coping saw or scroll saw. You must leave it straight with no large indentations.
2. You need to make the sides of the mould piece of MDF (see note) and round them off. The sides under the recesses of the mould.
3. You will now be given a piece of thin MDF. This will become the base part of your mould. Draw around the larger piece of MDF on to other thinner piece. Now use 5. Insert your line at the way around.

Sensor case Possible manufacturing plan

1. To achieve the corners of the finished cabinet, this will allow your plastic to be sprung. The base plate does not need a straight angle. You need to be a bit to and not to some part of the plastic case itself.
2. You can if you wish additional shapes to your base. The straight is fine. DO NOT DO OVER THE INSIDE LINE. To your base and of 10. Leave it from THE TOP PART OF YOUR MOLD.
3. You will need to be able to slide your edge of the base plate.
4. You may wish to add an edge to the top as well. This needs to fit under the space on top. Keep it simple. Start it out of the MDF. The case.
5. You will need to be able to slide your edge of the base plate.
6. You will need to be able to slide your edge of the base plate.
7. You will need to be able to slide your edge of the base plate.
8. You will need to be able to slide your edge of the base plate.
9. You will need to be able to slide your edge of the base plate.
10. You will need to be able to slide your edge of the base plate.
11. You will need to be able to slide your edge of the base plate.

Handout 3.2

See full-size version of the handout at the end of this session.

Give one pair in each group a blank OHT for feedback to the full group.

Using OHT 3.3, set the task and give 8 minutes.

OHT 3.3

(Pupils would not be given these sheets **cold**)

- What do pupils need to know in order to read and follow the instructions?
- What problems might pupils encounter as they try to follow the instructions?

After 8 minutes, stop the discussion and ask the pairs with the OHTs to feed back their findings.

Briefly take any further points and ensure that the following points have been made.

Handout 3.1

- This handout contains subject-specific vocabulary for equipment and for instructions such as step 12 where the blade has to *lean onto* the MDF and step 5 (*File the straights a little*).
- The title is on the right-hand side, which may suggest that the sheet should be read from right to left.
- The picture of the sensor will influence pupils to produce a similar one; the word *could* might be overlooked.
- There is no list of what is needed to make sure pupils have all their equipment before they start.
- The numerical sequence is clear.
- Block capitals are used for emphasis in step 5.
- The diagrams support the text, though pupils will need to study them carefully to see the difference between *before* and *after* in step 2.

Handout 3.2

- The sheets of this handout are not numbered and the second sheet does not have numbers by the instructions.
- Subject-specific vocabulary is applied to kit and actions.
- Symbols are used a great deal.
- There is no list of equipment required.
- Step 3 is alongside step 2; the others follow down the page.

Next, give participants 3 minutes to decide how pupils might be helped to follow the instruction sheets.

Take feedback, ensuring the following points are made.

- Pupils need to be secure in the subject-specific vocabulary to be used.
- They need to be clear about words like *could* and *may*, which ensure the suggestions are suggestions, not instructions.
- They need to be shown the route through the sheet before they start.
- Pupils need the support of an appropriate chart of symbols on the wall.
- They need to know that capital letters indicate importance.
- They need to know how the pictures or graphics support the written text.
- Common approaches to the layout of instruction sheets across the department will help pupils to read more quickly.

Acknowledge that teachers do support pupils in their reading, but sometimes it is taken for granted that pupils can read a new work sheet or textbook page without support. Often those who struggle with reading, struggle more with crowded pages containing a mixture of ways of representing information.

3.3 Active reading strategies (30 minutes)

Remind participants that 'active reading strategies' (often called by the acronym DARTS, which stands for 'directed activities related to texts') are designed to enable pupils to:

- engage with texts in an active way – by having something specific to do with the text, such as sequencing it, or supplying missing words, or highlighting specific information.

The teaching skill lies in choosing the activity that will help pupils reach the lesson objective.

Distribute *Handout 3.3* and allow 5 minutes for participants to fulfil the task in pairs. Take feedback, drawing out the importance of matching activity to objective.

Handout 3.3	
<p>Link the task to the appropriate reading activity. Some may link to more than one.</p> <p>Use the objectives to guide your choice.</p>	
Task	Activity
<p>A set of notes for an outline plan for designing and making</p> <p>You want the pupils to evaluate the plans, order into a sequence and add additional ideas</p>	<p>Cut the passage up</p> <p>Pupils have to sort into the correct sequence</p>
<p>A prose description of a product that uses a range of modern materials</p> <p>You want pupils to understand some of the key terminology used</p>	<p>Highlight or underline key words and phrases</p>
<p>A set of instructions for making a simple product</p> <p>You want pupils to identify and retain the sequence</p>	<p>Pupils have to label an illustration</p>
<p>A magazine article profiling the work of a contemporary designer</p> <p>You want pupils to identify and appreciate how the designer is influenced by the needs and values of intended users (audience)</p>	<p>Pupils have to label an illustration</p>

Tell participants that you have in your hand a list of some benefits and some limitations about using active reading strategies like these. Ask anyone if they could suggest a benefit or two. Then ask for limitations. Round off by showing OHT 3. 4.

OHT 3.4

Active reading tasks:

- oblige close reading
- engage pupils and encourage participation
- make daunting passages more accessible
- give purpose and focus to the reading
- go beyond 'just reading' to constructing meaning
- draw out key points very clearly

But

- Beware over-use
- They only work if they match the objective
- They take time to prepare
- They can diminish the content to a game
- You still need to draw out the learning

Tips

- Laminate materials for durability
- Always debrief

Now explain that you are going to use a short case study to enable participants to apply this approach using active reading strategies to some specific design and technology texts.

3.4 Example of a reading activity (15 minutes)

Put up OHT 3.5.

OHT 3.5

As part of a Year 8 unit on exploring materials, pupils have been asked to explore the properties of materials when designing so they will be able to identify appropriate materials for a task (QCA unit 8Aii).

The more able have been given a passage from the QCA website (www.qca.org.uk/ca/subjects/dandt/smart_modern).

Explain that the above is a task based on design and technology objectives.

Distribute *Handouts 3.4* and *3.5* and explain that participants will go through a brief activity demonstrating active reading strategies.

Handout 3.4

See full-size version of the handout at the end of this session.

Handout 3.5

Statement	True	False	Proof
Modern materials are not natural			
Smart materials start off in general use			
Smart and modern materials are the same			
Smart materials are unnatural			
Smart materials respond to heat			
Smart materials think			
Pizza topping can be smart			
Smart fabrics get up your nose			
Tights can make your skin soft			
Smart socks make your feet smell			
Genetically modified food is smart			
SMAAs can be made to change at certain temperatures			
Smart and modern materials are found in many common products			

Starter activity

Pupils use whiteboards or paper.

- What do we mean by *smart* in everyday life? Count to three, 'show me'.
- What do we mean by *modern* in everyday life? Count to three, 'show me'.

The above activates prior knowledge and cues pupils in to the topic.

Explain that they will now be asked to check the everyday meaning against the design and technology-specific meaning: this clarifies the purpose for the reading task.

- 1 Ask participants to scan *Handout 3.4* and highlight the words 'smart' and 'modern' in the text, using a different coloured highlighter pen for each word. (2 minutes)
- 2 Ask participants to read closely the sentences surrounding the highlighted words and decide on design and technology meanings for *smart* and *modern*. (2 minutes)

To check understanding, ask participants to write the subject-specific meaning for *smart* on their whiteboards; count to three and then say 'show me'.

Do the same for *modern*.

Now ask participants in pairs to read *Handout 3.4* closely. Half of the group should complete the first seven statements' grid on *Handout 3.5*; the other half complete the second seven. The task involves deciding whether statements are true or false based on a close reading of the text.

Take feedback on two statements from each half.

Distribute *Handout 3.6* which is the completed grid.

Handout 3.6			
Statement	True	False	Proof
Modern materials are not natural	✓		Changes depend on human intervention
Smart materials start off in general use		✓	Some eventually become available for general use
Smart and modern materials are the same		✓	However, it is sometimes hard to distinguish smart from modern materials/fine dividing line
Smart materials are unnatural		✓	Many naturally occurring food ingredients are smart
Smart materials respond to heat	✓		Starches respond to differences in temperature
Smart materials think		✓	Materials can't think: they appear to think
Pizza topping can be smart	✓		Thickens when heated, runs when cooled
Smart fabrics get up your nose		✓	Smart fabrics can have allergy controls in them
Tights can make your skin soft	✓		One manufacturer has tights with e.g. moisturisers
Smart socks make your feet smell		✓	Anti-microbial protection can stop the growth of bacteria which make feet smell
Genetically modified food is smart		✓	GM food is an example of a modern food product
SMAs can be made to change at certain temperatures	✓		Can be conditioned to change at predetermined temperatures
Smart and modern materials are found in many common products	✓		Perform essential roles in a wide range of ubiquitous products. Ubiquitous means everywhere

Explain that participants have:

- located information;
- adopted an appropriate reading strategy;
- interacted with the text;
- monitored their understanding;
- made a record;
- evaluated the information;
- communicated their information.

Having gone through the process themselves, ask participants to take 2 minutes to discuss the task in pairs and decide on four ways in which it supports pupils in their reading **and** encourages understanding.

Take brief feedback.

Points to make:

- Pupils are provided with a structured way into the text which contextualises the content and focuses them on subject-specific meaning.
- The statements direct them to the nature of the materials.
- They have to read both statements and text carefully to decide on the veracity of the statements.
- The statements encourage thinking and understanding about the ambiguity in the two terms.
- The speaking and listening involved in pair work supports understanding and the development and refining of ideas.
- Using the statements makes copying impossible.
- Pupils are not left alone and vulnerable in developing their understanding.

- Pupils are left with an aide-memoire that can also be used to assess understanding.
- A further outcome could be for able pupils to present their learning to the class in an oral presentation which encourages a reworking of the original into a new text type. This would further check understanding as well as supporting the rest of the class in accessing this information.

3.5 Conclusion (5 minutes)

Conclude by reminding participants of the following.

- Pupils need to access prior knowledge to provide a context for their reading.
- Pupils need to be shown the reading skills they need to apply in their reading.
- Pupils need a clear purpose for their reading.
- Pupils need to transform what they read into another kind of text to ensure they have processed and internalised the knowledge they have gained.
- Further support and ideas can be found in *Literacy across the curriculum* in module 5, Active reading strategies, and module 6, Reading for information.

Aim

OHT 3.1

- To be able to use a variety of ways to support pupils in their reading in design and technology

Ways of reading

OHT 3.2

Continuous reading	Reading a text in an uninterrupted, linear way
Close reading	Careful reading involving detail, reflection, referring back, checking
Skimming	Glancing quickly through to get the gist: is it worth a read?
Scanning	Searching for particular information

(Pupils would not be given these sheets **cold**)

- What do pupils need to know in order to read and follow the instructions?
- What problems might pupils encounter as they try to follow the instructions?

Active reading tasks:

OHT 3.4

- oblige close reading
- engage pupils and encourage participation
- make daunting passages more accessible
- give purpose and focus to the reading
- go beyond 'just reading' to constructing meaning
- draw out key points very clearly

But

- Beware over-use
- They only work if they match the objective
- They take time to prepare
- They can diminish the content to a game
- You still need to draw out the learning

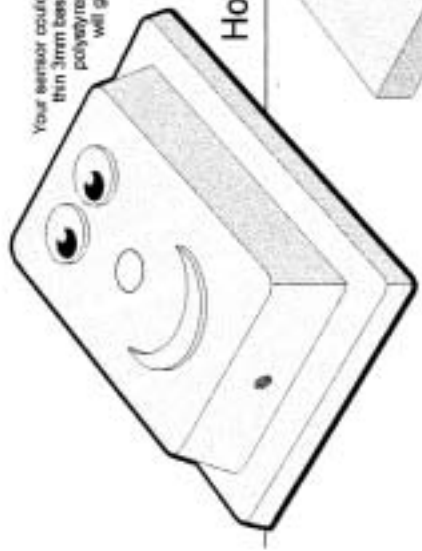
Tips

- Laminate materials for durability
- Always debrief

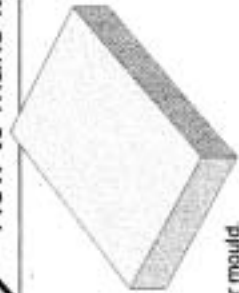
As part of a Year 8 unit on exploring materials, pupils have been asked to explore the properties of materials when designing so they will be able to identify appropriate materials for a task (QCA unit 8Aii).

The more able have been given a passage from the QCA website (www.qca.org.uk/ca/subjects/dandt/smart_modern).

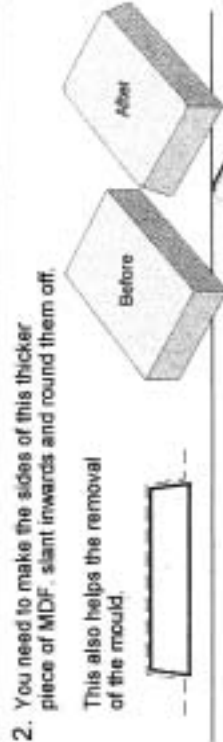
Your sensor could look like this. It has a thin 3mm base and a vacuum formed polystyrene top. Your electronics will go inside.



How to make it.



1. You will be given a piece of thick MDF (pre cut). This will become the top part of your mould.
You will need to shape it to look like your design. Cut your shape out using a coping saw or scroll saw.
You must keep it simple with no large indentations.



2. You need to make the sides of this thicker piece of MDF, slant inwards and round them off. This also helps the removal of the mould.
3. You will now be given a piece of 3mm MDF. This will become the base part of your mould.
Draw around the larger piece of MDF on to your thinner piece. Now add 5-8mm to your line all the way around.

Possible manufacturing plan

4. Try to leave the corners of the base part curved. This will save your plastic from spilling.
The base piece does not need a draught angle. You want it to be a tight fit and not to come out of the plastic case easily.



5. You can if you wish add extra shapes to your base. File the straights a little.

DO NOT GO OVER THE INSIDE LINE. YOUR BASE MUST BE LARGER THAN THE TOP PART OF YOUR MOULD.



6. You will need to file and abrade (sand) your edges of both pieces.
7. You may wish to add an image to the top as a detail. This needs to fit within the space on top. Keep it simple. Make it out of thin MDF, thin card.

8. You now need to sanding seal both elements of MDF separately. Then abrade with fine glass paper.

9. You need to stick both parts together temporarily with double sided tape.

10. Using a 3mm drill bit drill 1 hole in the middle of your mould all the way through and around the edges of the thicker piece with a 1mm drill.



11. You are now ready to vacuum form.



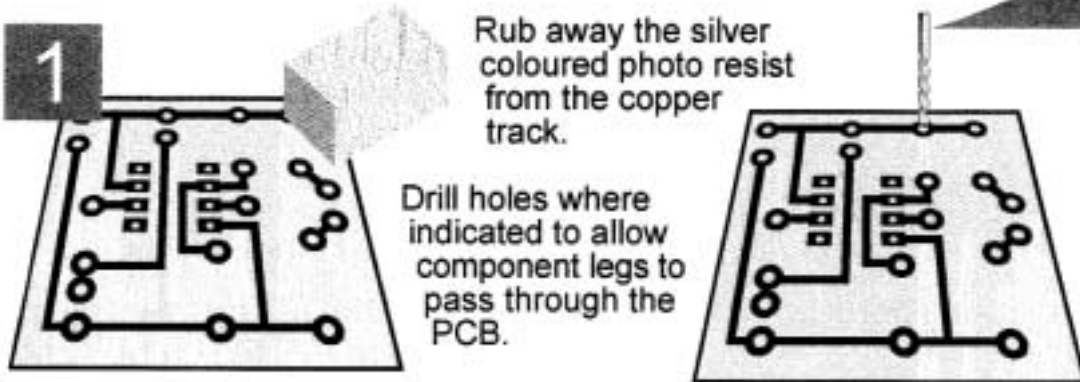
Put a small 3mm spacer underneath your mould. It helps make the plastic a good fit.

12. You now cut around the base using a knife. Cut off most of the waste first. Then trim by leaning the blade onto your MDF base.

Electronic Sensor

Printed circuit board preparation and population

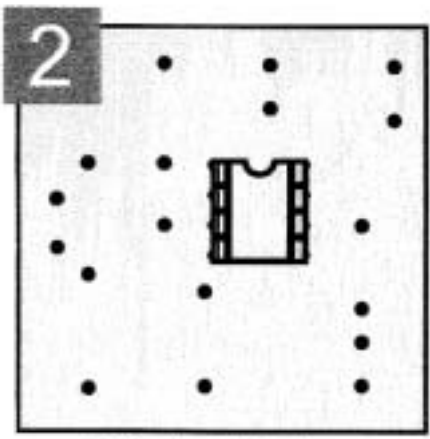
1



Rub away the silver coloured photo resist from the copper track.

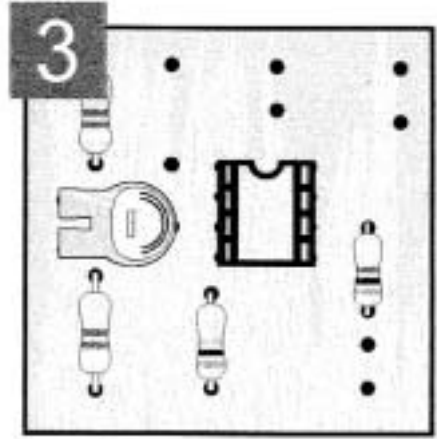
Drill holes where indicated to allow component legs to pass through the PCB.

2



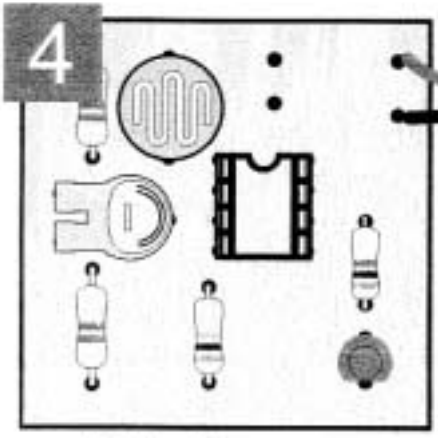
Solder the DIL holder

3



Solder the Variable resistor and resistors

4



Add the Battery snap, LED and LDR.

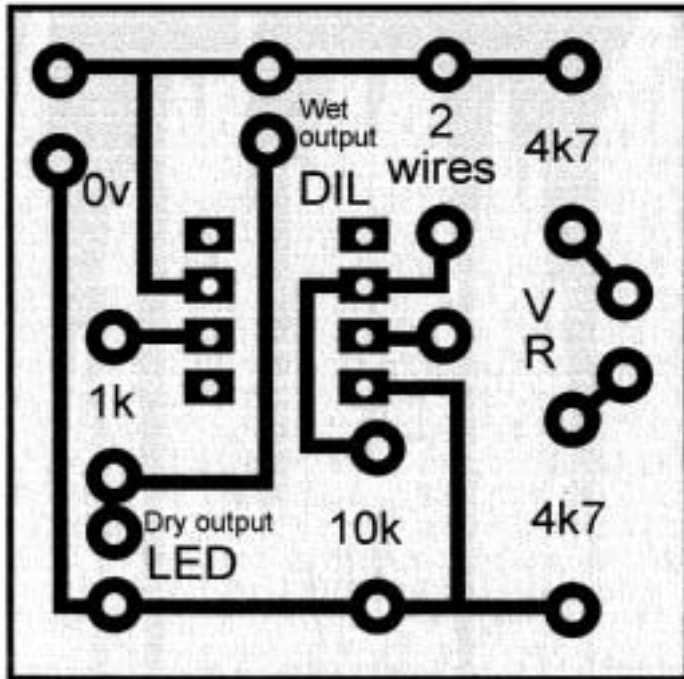
Your design may require your LDR / SENSOR or LED to be some way from your PCB.

Add leads (flex) to the component legs.



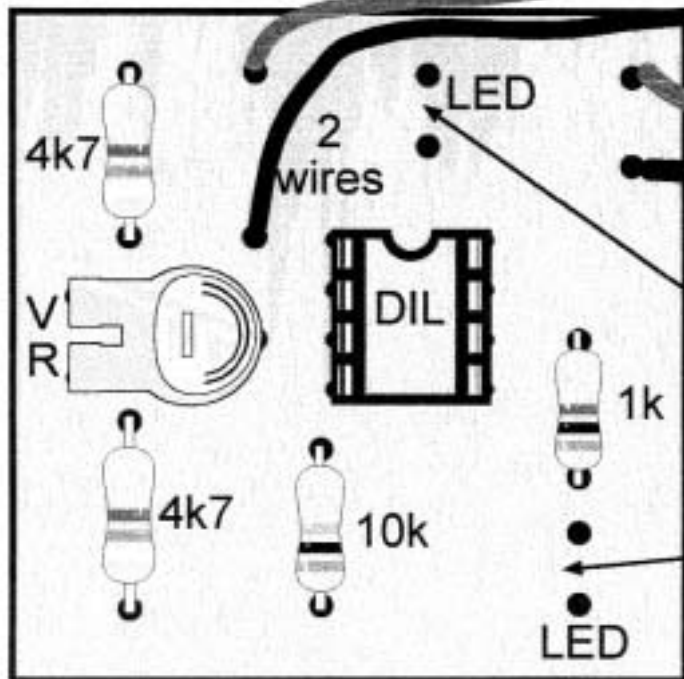
Electronic Sensor

Dry sensor/Moisture sensor



Solder side.

Copper track.



For the moisture sensor put the LED here.

For the dry sensor put the LED here.

Component side.

Handout 3.3

Link the task to the appropriate reading activity. Some may link to more than one.

Use the objectives to guide your choice.

Task	Activity
A set of notes for an outline plan for designing and making You want the pupils to evaluate the plans, order into a sequence and add additional ideas	Cut the passage up Pupils have to sort into the correct sequence
A prose description of a product that uses a range of modern materials You want pupils to understand some of the key terminology used	Highlight or underline key words and phrases
A set of instructions for making a simple product You want pupils to identify and retain the sequence	Pupils have to label an illustration
A magazine article profiling the work of a contemporary designer You want pupils to identify and appreciate how the designer is influenced by the needs and values of intended users (audience)	Pupils have to label an illustration

What is a smart/modern material?

Modern materials are developed through the invention of new or improved processes, for example, as a result of 'man' made materials/ingredients or human intervention, in other words not naturally occurring changes. They are altered to perform a particular function. Many smart and modern materials are developed for specialised applications but some eventually become available for general use.

Smart materials respond to differences in temperature or light and change in some way. They are called smart because they sense conditions in their environment and respond to those conditions. Smart materials appear to 'think' and some have a 'memory' as they revert back to their original state. The term 'smart' can be ambiguous as in some cases it is difficult to distinguish between modern and smart.

Food smart/modern materials

Many naturally occurring food ingredients are smart in that they respond to heat and light and some changes are reversible. Such working characteristics are already frequently exploited in food technology.

Modified starches respond to differences in temperatures, for example, they swell (thickening) in hot water or when heated, but return to a flow when cool. This working characteristic is used in pizza toppings. The topping thickens when heated in the oven and so does not run off the base, but on slight cooling the topping is runny again ready for eating. Other modified starches are used in instant desserts, which thicken without heating but do not return to their original state.

Examples of modern food materials include genetically modified foods, anti-oxidants, modified enzymes, probiotic yoghurts/drinks, TVP, Quorn and Tofu.

Smart/modern textiles

Fibre and fabric technological developments have created a whole range of smart and modern textiles which can be used in many applications. These textiles have been used in functional sportswear, medical and safetywear, and fashion clothing. Smart fabrics have been developed which can create a sense of well-being – they have anti-stress or calm-inducing properties. One manufacturer, for example, has developed a range of well-being tights micro-encapsulated with fragrant oils, moisturisers or vitamins.

Smart textiles have a number of medical uses. Fabrics can be encapsulated with substances required by the body or antiseptics. Allergy control fabrics can be used in bedding for people with breathing problems caused by dust mites.

Other smart textiles include sanitised fabrics for sportswear and socks which have anti-microbial protection. Anti-bacterial and anti-fungal fabrics have been used in clothing, linens, towels and carpets. Many synthetic fibres now have moisture management properties.

SOFTSWITCH technology is currently under development. It combines composite and conductive textile technology to produce wearable electronic fabrics. Further information can be found at www.softswitch.co.uk.

Resistant materials and systems of control

Smart/modern materials

Examples of these smart and modern materials include conductive polymers, colour-changing liquid crystals and motion control gels.

Although there is a fine dividing line between modern and smart materials, several increasingly common materials, such as shape memory alloys (SMA), exhibit behaviour characterised by intelligent responses within a defined product context. Graphite-loaded polymer can provide a self-regulating heating element. As the material warms, it expands and reduces conductivity between the graphic particles. SMAs can be conditioned to change structure (and shape) at predetermined temperatures – producing desirable shape changes in garments interwoven with SMA wire.

Many modern and smart materials perform essential roles in a wide range of ubiquitous products. Motion control gels (e.g. smart grease) regulate the movement of components in contact to provide the right 'feel' or desirable characteristics. Sliding microscope barrels, variable resistors and slow spring-return CD drawers all incorporate motion control gels.

Handout 3.5

Statement	True	False	Proof
Modern materials are not natural			
Smart materials start off in general use			
Smart and modern materials are the same			
Smart materials are unnatural			
Smart materials respond to heat			
Smart materials think			
Pizza topping can be smart			
Smart fabrics get up your nose			
Tights can make your skin soft			
Smart socks make your feet smell			
Genetically modified food is smart			
SMA's can be made to change at certain temperatures			
Smart and modern materials are found in many common products			

Handout 3.6

Statement	True	False	Proof
Modern materials are not natural	✓		Changes depend on human intervention
Smart materials start off in general use		✓	Some eventually become available for general use
Smart and modern materials are the same		✓	However, it is sometimes hard to distinguish smart from modern materials/fine dividing line
Smart materials are unnatural		✓	Many naturally occurring food ingredients are smart
Smart materials respond to heat	✓		Starches respond to differences in temperature
Smart materials think		✓	Materials can't think: they appear to think
Pizza topping can be smart	✓		Thickens when heated, runs when cooled
Smart fabrics get up your nose		✓	Smart fabrics can have allergy controls in them
Tights can make your skin soft	✓		One manufacturer has tights with e.g. moisturisers
Smart socks make your feet smell		✓	Anti-microbial protection can stop the growth of bacteria which make feet smell
Genetically modified food is smart		✓	GM food is an example of a modern food product
SMA's can be made to change at certain temperatures	✓		Can be conditioned to change at predetermined temperatures
Smart and modern materials are found in many common products	✓		Perform essential roles in a wide range of ubiquitous products. Ubiquitous means everywhere

4 Writing

You will need:

- OHTs 4.1–4.5
- Handouts 4.1–4.8 for each participant
- flipchart and pens
- video: *Literacy in design and technology: writing*

Timing:

4.1 Understanding writing in the design process	20 minutes
4.2 Video sequence: modelling annotations	20 minutes
4.3 Working on evaluations	25 minutes
4.4 Conclusion	10 minutes
Total time	75 minutes

4.1 Understanding writing in the design process (20 minutes)

Use OHT 4.1 to introduce the aims of the session.

OHT 4.1

Aims

- To be aware of the different forms and purposes for writing in design and technology
- To demonstrate how to support and improve the quality of pupils' writing

Now show OHT 4.2, which illustrates the design process.

OHT 4.2

Writing in design and technology



Explain that:

- the process also describes the range of contexts for writing required in design and technology;
- each part of the design process has its own text structure and characteristic way of using language which pupils need to be aware of;
- evaluation is central to the design process.

Distribute *Handout 4.1*.

Handout 4.1 Different kinds of writing in design and technology			
Process stage	Purpose for writing	Forms of writing	Some typical phrases
Situation	to describe purpose for which the product is required	short notes/ paragraph	
Analysis	to discuss the requirements of the situation	summary/ concluding notes	
Design brief	to outline the task, then adapt as developments are made	bullet points/list	
Specifications	to record the required features of the product	list of priorities	...must have ...will be ...in addition the product might also...
Research	to show similar products, possible materials, to communicate main findings	short notes/ annotation	
Generation of ideas	to show ideas, thinking and exploration	visual representation with notes/annotation	
Design development	to clarify/rework ideas to present ideas	detailed notes/ annotations, presentations, drawings and notes	
Planning	to describe how making will take/took place	flowchart, recipe, plan of making (including list of equipment and sequence)	
Evaluation	to evaluate throughout the design process to reflect on learning and future targets	extended writing divided by sub-headings, short notes, annotation, visual presentation	...went well because... ...was a problem because... However, although... Despite the fact that...

Ask participants in pairs to take 10 minutes to identify typical phrases they would expect to see in each form of writing: two have been completed as a guide.

After 10 minutes take feedback onto a flipchart and then distribute *Handout 4.2* to summarise the discussion. Make the point that the handout is not exhaustive.

Handout 4.2

Different kinds of writing in design and technology

Process stage	Purpose for writing	Forms of writing	Some typical phrases
Situation	to describe purpose for which the product is required	short notes/ paragraph	...might need ...might be helped by
Analysis	to discuss the requirements of the situation	summary/ concluding notes	I/We need to find out...
Design brief	to outline the task, then adapt as developments are made	bullet points/list	I am/we are going to...
Specifications	to record the required features of the product	list of priorities	...must have ...will be In addition the product might also...
Research	to show similar products, possible materials, to communicate main findings	short notes/ annotation	I/We found out... I/We measured... I/We looked at...
Generation of ideas	to show ideas, thinking and exploration	visual representation with notes/annotation	...might work well because... ...might be difficult because...
Design development	to clarify /rework ideas to present ideas	detailed notes/ annotations, presentations, drawings and notes	I/We might use... I/We decided...
Planning	to describe how making will take/took place	flowchart, recipe, plan of making (including list of equipment and sequence)	I/We intend to... I/We need to... The next step will be...
Evaluation	to evaluate throughout the design process to reflect on learning and future targets	extended writing divided by sub-headings, short notes, annotation, visual presentation	...went well because... ...was a problem because... However, although... Despite the fact that...

Make the following points.

- A design and technology department can complete such a grid so that there is a jointly agreed structure, and then repeat the exercise with pupils as appropriate.
- An appropriate grid could be put on the classroom wall as a support and reference point.
- Pupils should go through the process before the grid is posted up, as it is during the process that understanding develops.
- The approach ensures consistency across the department, which is vital for pupils, especially those for whom writing is more difficult or who are learning English as an additional language.

4.2 Video sequence: modelling annotations (20 minutes)

Distribute *Handout 4.3*.

Handout 4.3	
A sequence for teaching writing	
Establish clear aims	The purpose of the writing is to evaluate the project: you will need to assess your product against your success criteria from your design brief
Provide examples	Pupils need to be taught the principles of evaluations using high quality text which exemplifies the text type at text, sentence and word level
Explore the features of the text	They need to analyse the features with the teacher to develop an understanding of the text structure, the sentences which are required to do the job and the kinds of vocabulary which make meaning clear and precise
Define the conventions	A writing frame may be devised as the reading and teaching/learning proceeds
Demonstrate how it is written	The teacher will demonstrate to the class how to write a section of the required text type, talking as s/he does it to show the kinds of decisions which writers make as they write
Compose together	Pupils write sentences or small sections to share with the class and the teacher for constructive criticism
Scaffold the first attempts	Offer the writing frame mentioned above or offer guidelines as to the structure required
Independent writing	Pupils work on the writing themselves
Draw out key learning	Remind pupils of the structure, sentences and words they have been using in their writing so they can do it quickly and with less and less support when they meet the text type again

Explain that the handout picks up on the sequence for writing which is promoted by the Key Stage 3 National Strategy.

Take participants through the handout briefly and emphasise the following points.

- Providing models of text is vital to enable pupils to understand what is required at whole-text, sentence and word level.
- Being shown how to write by the teacher, who explains the choices made, helps pupils succeed in their early attempts rather than setting them up to fail by simply asking them to do the task, unsupported.
- Sharing the composition with the teacher and their peers helps pupils develop their ideas and check that they are on the right lines before they work independently.
- Drawing out the key learning helps pupils to internalise what they have learnt and to move more quickly to being able to write successfully and independently.

Explain that participants will now see some of the above at work in a video example.

Julie Donnachie is working on annotating a product, in this case headwear, in order to find out how it was made and why it was made that way, prior to the pupils drawing up a design specification for a similar product. She wants pupils to go beyond simple statements and move into fitness for purpose and construction. In order to elicit more details, she models how to annotate an item of headwear. She has selected an example from her own research and starts straight away to develop the annotation.

Ask participants to note, as they watch the video, how pupils are supported by the teacher to ensure a more detailed, and hence successful, outcome.

After the video, give participants 2 minutes to share their thinking with the person next to them and then take feedback.

Ensure that the following points are made.

- The pupils are clear about what they are writing and why.
- The teacher has modelled the annotation process and explained her thinking as she does it. This draws out both what to note and why it is important.
- The pupils work to criteria to ensure they cover the points required.
- The pupils share the writing with a peer so they are supported and have the opportunity to clarify and amend their thinking. Sharing with the whole class provides challenge in a supportive environment.
- The teacher draws out key learning at the end and is then able to note improvements for next time: in this case more work is required on the construction of the item.

4.3 Working on evaluations (25 minutes)

Explain that it is recognised that writing an evaluation, although key to design and technology, is often not done well by pupils.

Give participants 5 minutes in pairs to decide why this might be so.

Take feedback. Suggestions might include the following.

- It is difficult because it involves higher order thinking.
- It is often rushed.
- There is a lack of awareness about the difference between formative and summative evaluations.
- Pupils find it difficult to extend their response and justify their reasons for choices, actions and changes they would make.
- There is often a lack of clear success criteria against which to measure the process or product.
- Writing frames and questions may limit the response.

Distribute *Handouts 4.4* and *4.5*.

Show OHT 4.3. Explain that it is a typical example of an evaluation task.

OHT 4.3/Handout 4.4

Evaluate your clock

- 1 What are the good things about your design?
- 2 How does it comply with what your clients wanted?
- 3 What changes would you make if you could make the clock again?
- 4 Does your clock work as a design?
- 5 Did your product turn out as you had hoped from your design?
- 6 Were there any difficulties to overcome as you made the clock?
- 7 Did you change any aspect of your design as you made your clock?

2 The part played by the design of the writing task in the responses

- The questions do not invite reasons: they do not ask why/how questions.
- Yes/no questions have received a yes/no answer.
- The questions have not necessarily supported the pupil in evaluating the design and whether it helped make the product or not.
- Make the point that products need clear success criteria to evaluate against and that pupils find success criteria difficult.
- The writing frame was not clear enough to support detailed writing.
- It did not support extended response or the use of complex sentences about cause and effect, and connectives such as *although*, *if* and *however* as in *Handout 4.1*.

Other points to make:

- Writing frames and question sheets are very useful in preparing pupils to write in the early stages of learning a text type and its structures.
- However, they are only ever meant as a short-term measure to start pupils off.
- Products need clear success criteria to evaluate against and pupils find success criteria difficult.

Refer back to *Handout 4.3* and ask participants to take 5 minutes in pairs to decide how using the sequence for writing might help to improve the pupils' written evaluations.

Take feedback from one pair and then ask others to add suggestions where appropriate.

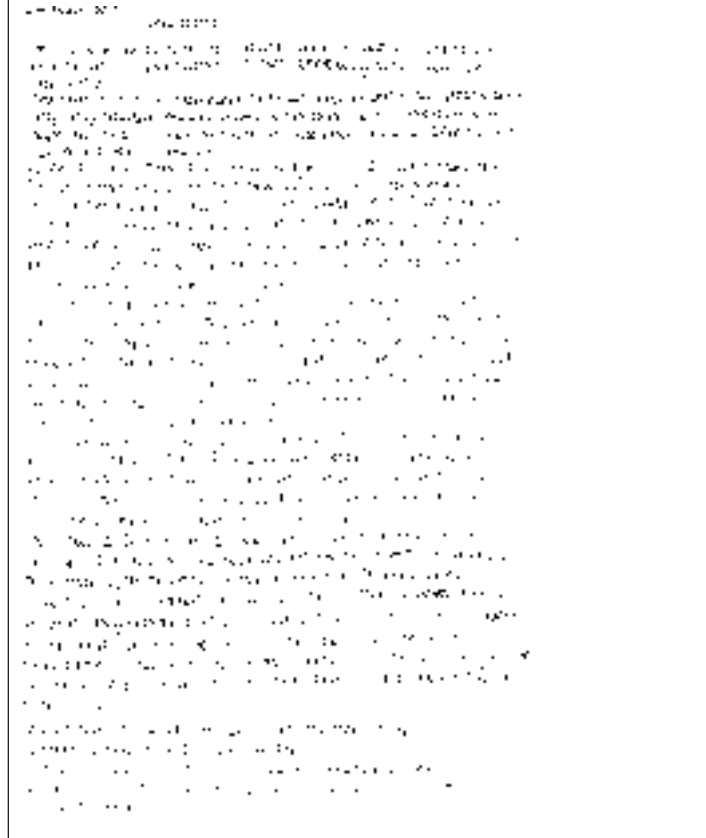
Ensure the following points are made.

- Being clear about the purpose of the evaluation would support the writing.
- Offering examples of evaluations and analysing what is required at text, sentence and word level would ensure pupils know how to write the evaluation.
- Modelling a section, articulating the thinking, shows pupils how to do the writing in this context.
- Providing time to share the writing further builds confidence and refines content.
- Drawing out key learning helps pupils move forward and sets targets for next time.

Distribute *Handout 4.6* and explain that this work was done after the pupils had gone through the sequence for writing. Show OHT 4.5.

OHT 4.5/Handout 4.6

Sample B



Ask participants in pairs to take 5 minutes to consider the strengths and weaknesses.

Take feedback and, if not mentioned, make the following points.

- Strengths:
 - describes clearly the design brief to evaluate the product against;
 - is clearly structured and largely appropriately paragraphed;
 - gives reasons and shows the pupil has reflected on the design and the making process;
 - describes changes and gives reasons for those changes;
 - contains appropriate connectives, e.g. *although, however, overall*;
 - uses appropriate design and technology-specific vocabulary, e.g. *orthographic projection, specifications, realisation*.
- Weaknesses:
 - title says little about the content;
 - penultimate paragraph is unclear.

Explain that this piece was the result of a shared writing session when the pupils were being moved on from using a writing frame to creating text independently.

4.4 Conclusion (10 minutes)

Explain that further guidance on teaching writing across the curriculum is provided in *Literacy across the curriculum* module 2, Writing non-fiction, and module 3, Writing style.

Distribute *Handouts 4.7* and *4.8*.

Give participants 5 minutes to skim-read them and decide how they might use them in their department.

Take brief feedback, ensuring that the following points are made.

- The handouts support the analysis of text types for departments, so common approaches and language can be agreed.
- The analysis can be repeated by pupils after reading some examples, so they have investigated and agreed the language required.
- The annotated example might prove helpful to teachers as an example of how to model the writing.
- The annotated example could provide a useful support for pupils as they write.

Handout 4.7 Analysing text types: Evaluation, including self-evaluation	
Purpose <ul style="list-style-type: none"> ■ What is its purpose? ■ Who is it for? ■ How will it be used? ■ What kind of writing is therefore appropriate? 	<ul style="list-style-type: none"> ■ To record the strengths and weaknesses of a performance/product ■ Part of the plan-do-review cycle, which might have an effect on future task setting/performance/ target setting ■ Often used as part of assessment process, linked to objective-based teaching, i.e. <i>Did you meet your objectives for this particular piece of work?</i> ■ Sometimes more long-term, e.g. evaluation of performance over module of work/term
Text level <ul style="list-style-type: none"> ■ Layout ■ Structure/organisation ■ Sequence 	<ul style="list-style-type: none"> ■ Title contains value judgement, e.g. <i>How well did your construction work? How well are you progressing in this subject?</i> ■ Sometimes in list form, including strengths and weaknesses, followed by a summary, followed by targets for the future ■ Bullet points, numbered or lettered items ■ Subheadings used to focus attention of writer, e.g. <i>How much did the materials cost? How long did it take you to make it? How successful was the testing period?</i>
Sentence level <ul style="list-style-type: none"> ■ Viewpoint (first/third person, etc) ■ Prevailing tense ■ Active/passive voice ■ Typical sentence structure and length ■ Typical cohesion devices 	<ul style="list-style-type: none"> ■ First person: singular for individual evaluation; plural for group evaluation ■ Past tense to reflect on performance; present to reflect on personal/group characteristics; future for target-setting ■ Active voice ■ Connectives used to balance strengths and weaknesses, e.g. <i>although, however, still, on the other hand</i> ■ Connectives used to indicate the use of evidence, e.g. <i>As in..., I know this because..., This shows that...</i> ■ Connectives used to establish cause and effect, e.g. <i>because, since, therefore, so, as a result</i> ■ Avoidance of meaningless evaluations and targets, e.g. <i>It didn't work very well: I will try harder with my spelling</i>
Word level <ul style="list-style-type: none"> ■ Stock words and phrases ■ Specialised or typical vocabulary ■ Elaborate/plain vocabulary choices 	<ul style="list-style-type: none"> ■ Technical vocabulary related to subject under review, e.g. in English, the spelling of unstressed vowels in polysyllabic words; in maths, the solving of simple quadratic equations ■ Vocabulary of comment, e.g. <i>We all felt that..., Some people in the group thought that...</i> ■ Vocabulary of constructive criticism, e.g. <i>John's suggestions, though inventive, were not generally accepted..., Perhaps at this point, I could have...</i>

Handout 4.8

Analysing text types:

Evaluation, including self-evaluation

Electronics and Materials Project
Plastic Badge with Flashing LED

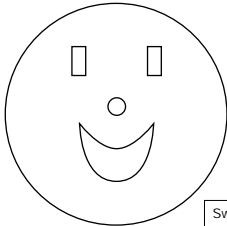
How well did your badge work?

I am very pleased with my badge because the clown face looks good when the nose lights up.

At first I had a problem painting the mould. I now know that when you paint the plastic mould you need to rough up the surface so that the paint sticks to it.

Initially making the circuit was difficult as I cut the copper track too short, however I cut the second piece to the correct length and it worked.

One problem that I found was that the battery tends to run out after about three days. To improve this I need to put a switch on so that it can be turned off when it is not in use.



Switch
The badge needs a push switch to stop you leaving it on.

Title contains value judgement, e.g. *How well did...*

First person: singular for individual evaluation

Past tense to reflect on performance; present tense to reflect on personal/group characteristics; future tense for target setting

Active voice

Connectives used to balance strengths and weaknesses, e.g. *however*

Vocabulary of comment and constructive criticism, e.g. *I felt that... Perhaps at this point, I could have...*

Aims

OHT 4.1

- To be aware of the different forms and purposes for writing in design and technology
- To demonstrate how to support and improve the quality of pupils' writing



Evaluate your clock

OHT 4.3

- 1 What are the good things about your design?
- 2 How does it comply with what your clients wanted?
- 3 What changes would you make if you could make the clock again?
- 4 Does your clock work as a design?
- 5 Did your product turn out as you had hoped from your design?
- 6 Were there any difficulties to overcome as you made the clock?
- 7 Did you change any aspect of your design as you made your clock?

Evaluation

1. The good things about my solution are :-
 - It is bright and colourful
 - It hangs so I don't need to cut the hands
 - I have only 2 pieces of plastic on top of each other so I didn't need to drill a wider hole half way through
2. Other people think my clock is good because of the colours and the shapes as the colours go well together
3. I don't think I would change anything as I am happy with it as it is.
4. Yes my clock does work as I wanted it to. as it will tell the time - perfect
5. No, I really really like my design as it is just what I wanted
6. I didn't have any difficulties so I couldn't overcome anything.
7. The only thing I changed the colour of the wire is red instead of blue, as there wasn't a piece of blue acrylic

Sample B

OHT 4.5

27th March 2001

Evaluation

The design brief was to create and make a decorative mirror involving abstract art, especially the painter Mondrian.

The specification demanded that the mirror be, free-standing, adjustable, made from a combination of materials, sophisticated and modern in appearance. I wanted to use music for make-up.

When I had completed my design, I checked to see how far it complied with the specification. Orthographic projection helped me to visualise it in 3D. I felt that, although it met the specifications in terms of being free-standing and adjustable, it seemed too simple and basic in its realisation. However, I decided to go ahead and see how it looked as I made it.

The design proved useful to guide me through the process, but I changed it as I made my product. In order to meet the specification in visible designs based on repetition, and to make it appear more complicated, I added clear stars. This improved the appearance and because it could stand in front of a window, light could shine through it.

I changed my design to incorporate my improvements, including the color of the main star. I changed it from a pale orange to a bright orange because I felt it was too dull for my bedroom and wouldn't fit in with the other colours on the mirror.

Overall I felt that I had improved on my original design. I had succeeded in making it free-standing, adjustable, and from a combination of materials. I felt it was modern in design, but when I asked my friends they thought the colours didn't go too well together - orange and blue didn't contrast well enough. Next time, I need to be more careful with the colours as my clear stars stuck down, taking the paint off as they stuck.

The product needs to be flat, rather than standing up as the glue dries.

I think the product could be marketable, however it would need to be in a range of colours to suit varying tastes.

Different kinds of writing in design and technology

Handout 4.1

Process stage	Purpose for writing	Forms of writing	Some typical phrases
Situation	to describe purpose for which the product is required	short notes/ paragraph	
Analysis	to discuss the requirements of the situation	summary/ concluding notes	
Design brief	to outline the task, then adapt as developments are made	bullet points/list	
Specifications	to record the required features of the product	list of priorities	...must have ...will be ...in addition the product might also...
Research	to show similar products, possible materials, to communicate main findings	short notes/ annotation	
Generation of ideas	to show ideas, thinking and exploration	visual representation with notes/annotation	
Design development	to clarify /rework ideas to present ideas	detailed notes/ annotations, presentations, drawings and notes	
Planning	to describe how making will take/took place	flowchart, recipe, plan of making (including list of equipment and sequence)	
Evaluation	to evaluate throughout the design process to reflect on learning and future targets	extended writing divided by sub-headings, short notes, annotation, visual presentation	...went well because... ...was a problem because... However, although... Despite the fact that...

Different kinds of writing in design and technology

Handout 4.2

Process stage	Purpose for writing	Forms of writing	Some typical phrases
Situation	to describe purpose for which the product is required	short notes/ paragraph	...might need ...might be helped by
Analysis	to discuss the requirements of the situation	summary/ concluding notes	I/We need to find out...
Design brief	to outline the task, then adapt as developments are made	bullet points/list	I am/we are going to...
Specifications	to record the required features of the product	list of priorities	...must have ...will be In addition the product might also...
Research	to show similar products, possible materials, to communicate main findings	short notes/ annotation	I/We found out... I/We measured... I/We looked at...
Generation of ideas	to show ideas, thinking and exploration	visual representation with notes/annotation	...might work well because... ...might be difficult because...
Design development	to clarify /rework ideas to present ideas	detailed notes/ annotations, presentations, drawings and notes	I/We might use... I/We decided...
Planning	to describe how making will take/took place	flowchart, recipe, plan of making (including list of equipment and sequence)	I/We intend to... I/We need to... The next step will be...
Evaluation	to evaluate throughout the design process to reflect on learning and future targets	extended writing divided by sub-headings, short notes, annotation, visual presentation	...went well because... ...was a problem because... However, although... Despite the fact that...

A sequence for teaching writing

Handout 4.3

Establish clear aims	The purpose of the writing is to evaluate the project: you will need to assess your product against your success criteria from your design brief
Provide examples	Pupils need to be taught the principles of evaluations using high quality text which exemplifies the text type at text, sentence and word level
Explore the features of the text	They need to analyse the features with the teacher to develop an understanding of the text structure, the sentences which are required to do the job and the kinds of vocabulary which make meaning clear and precise
Define the conventions	A writing frame may be devised as the reading and teaching/learning proceeds
Demonstrate how it is written	The teacher will demonstrate to the class how to write a section of the required text type, talking as s/he does it to show the kinds of decisions which writers make as they write
Compose together	Pupils write sentences or small sections to share with the class and the teacher for constructive criticism
Scaffold the first attempts	Offer the writing frame mentioned above or offer guidelines as to the structure required
Independent writing	Pupils work on the writing themselves
Draw out key learning	Remind pupils of the structure, sentences and words they have been using in their writing so they can do it quickly and with less and less support when they meet the text type again

Evaluate your clock

Handout 4.4

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Sample B

Handout 4.6

27th March 2001

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Analysing text types: Evaluation, including self-evaluation

Handout 4.7

<p>Purpose</p> <ul style="list-style-type: none"> ■ What is its purpose? ■ Who is it for? ■ How will it be used? ■ What kind of writing is therefore appropriate? 	<ul style="list-style-type: none"> ■ To record the strengths and weaknesses of a performance/product ■ Part of the plan-do-review cycle, which might have an effect on future task setting/performance/ target setting ■ Often used as part of assessment process, linked to objective-based teaching, i.e. <i>Did you meet your objectives for this particular piece of work?</i> ■ Sometimes more long-term, e.g. evaluation of performance over module of work/term
<p>Text level</p> <ul style="list-style-type: none"> ■ Layout ■ Structure/organisation ■ Sequence 	<ul style="list-style-type: none"> ■ Title contains value judgement, e.g. <i>How well did your construction work? How well are you progressing in this subject?</i> ■ Sometimes in list form, including strengths and weaknesses, followed by a summary, followed by targets for the future ■ Bullet points, numbered or lettered items ■ Subheadings used to focus attention of writer, e.g. <i>How much did the materials cost? How long did it take you to make it? How successful was the testing period?</i>
<p>Sentence level</p> <ul style="list-style-type: none"> ■ Viewpoint (first/third person, etc) ■ Prevailing tense ■ Active/passive voice ■ Typical sentence structure and length ■ Typical cohesion devices 	<ul style="list-style-type: none"> ■ First person: singular for individual evaluation; plural for group evaluation ■ Past tense to reflect on performance; present to reflect on personal/group characteristics; future for target-setting ■ Active voice ■ Connectives used to balance strengths and weaknesses, e.g. <i>although, however, still, on the other hand</i> ■ Connectives used to indicate the use of evidence, e.g. <i>As in..., I know this because..., This shows that...</i> ■ Connectives used to establish cause and effect, e.g. <i>because, since, therefore, so, as a result</i> ■ Avoidance of meaningless evaluations and targets, e.g. <i>It didn't work very well; I will try harder with my spelling</i>
<p>Word level</p> <ul style="list-style-type: none"> ■ Stock words and phrases ■ Specialised or typical vocabulary ■ Elaborate/plain vocabulary choices 	<ul style="list-style-type: none"> ■ Technical vocabulary related to subject under review, e.g. in English, the spelling of unstressed vowels in polysyllabic words; in maths, the solving of simple quadratic equations ■ Vocabulary of comment, e.g. <i>We all felt that..., Some people in the group thought that...</i> ■ Vocabulary of constructive criticism, e.g. <i>John's suggestions, though inventive, were not generally accepted..., Perhaps at this point, I could have...</i>

Analysing text types: Evaluation, including self-evaluation

Electronics and Materials Project
Plastic Badge with Flashing LED

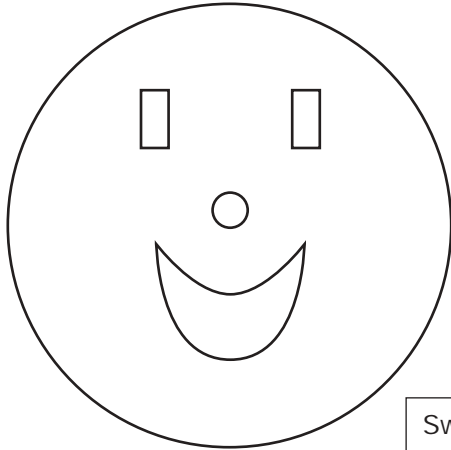
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First person: singular for individual evaluation

Past tense to reflect on performance; present tense to reflect on personal/group characteristics; future tense for target setting

Active voice

Connectives used to balance strengths and weaknesses, e.g. *however*

Vocabulary of comment and constructive criticism, e.g. *I felt that... Perhaps at this point, I could have...*

5 Planning for literacy objectives

You will need:

- OHT 5.1
- Handouts 5.1–5.3 for each participant
- copies of the appendix for each participant

Participants will need their own schemes or units of work for the task on literacy objectives.

Timing:

5.1 Introduction	10 minutes
5.2 Planning literacy objectives into a unit of work	30 minutes
5.3 Conclusion	5 minutes
Total	45 minutes

5.1 Introduction (10 minutes)

Use OHT 5.1 to set out the aims for the session.

OHT 5.1

Aims

- To consider how literacy objectives can be made clear in schemes of work
- To provide time for teachers to look at their own schemes or units of work and consider where they might teach literacy objectives to support learning in design and technology

Distribute *Handouts 5.1–5.3*. Explain that the handouts come from a pilot school that has already started to undertake a literacy review of its scheme of work.

Handouts 5.1–5.3

See full-size version of the handouts at the end of this session.

Give participants 5 minutes in pairs to look through the handouts and to discuss the content briefly. In particular, they should:

- note the literacy objectives at the end of each unit and consider how they support learning in design and technology;
- discuss how they can ensure that relevant literacy objectives are explicitly taught.

Take brief feedback as appropriate, ensuring that participants are aware of the cross-curricular literacy objectives set out in the appendix. When these are planned in, they support learning in design and technology by ensuring that the skills required to speak and listen, read and write in design and technology are taught.

5.2 Planning literacy objectives into a unit of work (30 minutes)

Explain that participants now have 30 minutes to begin to plan literacy objectives into their schemes or units of work. Distribute the appendix which provides the relevant objectives.

Key objectives are indicated in bold. These may well form the basis of whole-school curricular targets.

At the end of 25 minutes ask one participant to offer feedback. (5 minutes)

The following would be useful prompts.

- How did they find the process?
- How easily did the objectives fit into existing schemes or units of work?
- Was the process useful in making more explicit the strategies pupils could use?
- Did the process help identify how pupils might be supported in learning design and technology?

Now invite brief comments from other participants.

Ensure that, by the end of the session, participants:

- are clear about the need to plan literacy objectives into their schemes as appropriate;
- are clear about how they can be sure that teachers will teach them;
- recognise that literacy objectives will raise attainment in design and technology by explicitly teaching vocabulary, reading skills and text types required in design and technology.

5.3 Conclusion (5 minutes)

Conclude by:

- reminding participants that further support can be found in the *Literacy across the curriculum* training file, available in every school;
- pointing out that module 9, Making notes, might prove useful to design and technology teachers;
- inviting participants to state two actions they intend to take as a result of the training day.

- To consider how literacy objectives can be made clear in schemes of work
- To provide time for teachers to look at their own schemes or units of work and consider where they might teach literacy objectives to support learning in design and technology



Archbishop Holgate's School

7a

Title	Picture III	Area of study.
Specialist area	Design and Technology	Design Brief
Year	Seven	Analysis
Duration	Six hours	Research
Unit	7A	Specification
		Ideas
		Development
		Evaluation

Unit 7A : Description

In this unit, pupils tackle a design and make assignment based on developing an acrylic photo holder to hold a passport sized photograph.

Progression and continuity

7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d

Expectations

Level : This unit is expected to take six hours.

Pupils will develop a detailed analysis of the design brief using a task analysis. They will develop a specification that reflects the most important areas included in the task analysis. Specification statements will be objective and attainable. The design proposals will be drawn accurately and through annotation demonstrate consideration of the product specification. Ideas will be coloured and use simple graphical techniques to show the effect of light and shade on the selected material. Finally the product will be evaluated against the specification and the designer will make objective evaluation statements about the photo holder.

Pupils will have considered the working characteristics of the material when developing the design solution. The correct tools and processes will have been used to finish the edges to a high standard and remove any waste material. The decorative element of the product will show a good understanding of the characteristics of the material and the tools and equipment available. The adhesive will have been applied carefully and any excess will have been removed.

Summary

Material (s): Acrylic

Design Brief

Snappy a photographic company have decided to give customers a promotional gift when they use the company's passport photo booths. The material for a holder and the product specification will be provided by the company. As a product designer you must provide four ideas for improving the presentation of the basic holder. These could include changing the size of the internal viewing window and adding decoration to the holder using waste acrylic. Finally you should evaluate your ideas before submitting your final design proposal.

National Curriculum:

1 Developing, planning and communicating ideas	a	b	c	d	e	f	g
2 Working with tools, equipment and materials			c	d			
3 Evaluating processes and products							
4 Knowledge ... materials and components		b	c	d			
5 Knowledge ... of systems and control	a	b	c	d	e	f	g
6 Knowledge ... of structures	a	b	c				
7 Breadth of study							

Key : Prior knowledge a Included in this unit

Expectations	Cross-curricular links
<p>Finally the student will have worked safely and shown consideration for others in the workshop environment.</p> <p>Level Pupils will develop an analysis of the design brief using a task analysis. They will develop a specification using random factors included in the task analysis. Specification statements will be subjective and the majority will be attainable. The design proposals will be drawn neatly and through annotation demonstrate consideration of the product specification. Ideas will be coloured and use simple graphical techniques to show the effect of light and shade. Finally the product will be evaluated and the designer will make subjective evaluation statements about the photo holder.</p>	<ul style="list-style-type: none"> Science: classification of materials by their working characteristics. Links to unit 7G 'Particle model of solids, liquids and gases' and unit 7I 'Energy resources' in the science scheme of work. English: displaying and communicating information. Art and design: investigating, combining and manipulating materials, taking account of purposes and audiences. Sustainable development: considering the effects of the extraction, use and eventual disposal of some materials on the natural environment and human health.
<p>Pupils will have superficially considered the working characteristics of the material when developing the design solution. The correct tools and processes will have been used to finish the edges to a good but inconsistent standard. Waste material will have been removed using the correct tools but the pupil could have made alterations to the design due to unforeseen difficulties. The decorative element of the product will show a limited understanding of the characteristics of the material and the tools and equipment available. The adhesive will have been applied carefully, excess adhesive will be evident. Finally the student will have worked safely and shown consideration for others in the workshop environment.</p>	<p>Literacy and numeracy</p> <p>Through the activities in this unit, pupils will be able to understand, use and spell correctly words relating to:</p> <ul style="list-style-type: none"> materials and their classifications, e.g. plastic (polyethylene, polystyrene, acrylic, polyester, poly-tetra-fluoro-ethylene, PVC) the characteristics and properties of materials, e.g. low density, bends, breaks, malleable, malleability, shatters, strong <p>Speaking and listening – through the activities pupils could:</p> <ul style="list-style-type: none"> ask questions to gain clarification and further information, e.g. Why...? How...? What...? What then...? share information and discuss ideas in groups, and solve problems <p>Reading – through the activities pupils could:</p> <ul style="list-style-type: none"> use skimming, scanning, highlighting and note-taking as appropriate to different texts Vocabulary and spelling – through the activities pupils could: read and use accurately terms which relate to key concepts in D&T
<p>Level Pupils will develop an analysis of the design brief using a task analysis. They will develop a specification using some factors included in the task analysis. Specification statements will be very subjective and some will be unattainable. The design proposals will be drawn neatly and through annotation demonstrate limited consideration of the product specification. Ideas will be coloured but will not use graphical techniques to show the effect of light and shade. Finally the product will be evaluated and the designer will make subjective evaluation statements about the photo holder.</p>	
<p>Pupils will not have considered the working characteristics of the material when developing the design solution. The correct tools and processes will have been used to finish the edges to an acceptable but inconsistent standard. Waste material will have been removed using the correct tools but the pupil could have made several alterations to the design due to unforeseen difficulties. The decorative element of the product will show no understanding of the characteristics of the material and the tools and equipment available. The adhesive will have been applied. Finally the student will have worked safely and shown consideration for others in the workshop environment.</p>	



Archbishop Holgate's School

Title Structures
Specialist area Design and Technology
Year Eight
Duration Seven hours
Unit 8A

8a

<p>Unit 8A : Description</p> <p>In this unit, pupils tackle a design and make assignment based on developing a model bridge to span a distance of 300mm and support a 10Kg load.</p>																																																																							
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<p>Expectations</p> <p>Level :</p> <p>Pupils will have developed a detailed analysis of the design brief using a task analysis. They will have written a specification that reflects the most important areas included in the task analysis. Specification statements will be objective and attainable. The design proposals will be drawn accurately and through annotation demonstrate consideration of the product specification. The technical drawing will include British standard dimensions and will be drawn using the correct scale. The design itself will show careful consideration of the problem. Through triangulation and bracing the structural properties of the materials used will have been considered and improved. Finally the final scale bridge will be evaluated against the specification and the designer will make objective evaluation statements about the structure.</p> <p>Pupils will have considered the working characteristics of the material when developing the design solution. The correct tools and processes will have been used to finish the edges to a very high standard and remove any waste material. The adhesive will have been applied carefully and any excess will have been re-</p>																																																																							
<p>Summary</p> <ul style="list-style-type: none"> Material (s): Balisa, string and card. <p>Design Brief</p> <p>CTW have been commissioned to design a footbridge to cross the river Cuse in York. CTW require you to submit a tender for the construction of the new bridge. You will need to include the following items in your tender</p> <ul style="list-style-type: none"> A detailed costing sheet A range of design proposals based on good research findings. A technical drawing of the bridge including British Standard dimensions A Gantt chart A scale model of the bridge Promotional material to support your tender. <p>National Curriculum.</p>																																																																							
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Handout 5.2

2 of 2

Expectations	Cross-curricular links
<p>moved. Finally the student will have worked safely and shown consideration for others in the workshop environment.</p> <p>Level :</p> <p>Pupils will have analysed the design brief using the task analysis. They will have developed a specification that reflects most of the areas included in the task analysis. Specification statements will be subjective but attainable. The design proposals will be drawn accurately and through annotation demonstrate consideration of the product specification. The technical drawing will include British Standard dimensions and will be drawn using a suitable scale. The design itself will show consideration of the problem. Through triangulation and bracing the structural properties of the materials used will have been considered and improved. Finally the final scale bridge will be evaluated against the specification and the designer will make subjective evaluation statements about the structure.</p> <p>Pupils will have considered some of the working characteristics of the material when developing the design solution. The correct tools and processes will have been used to finish the edges to a high standard and remove any waste material. The adhesive will have been applied carefully and any excess will have been removed. Finally the student will have worked safely and shown consideration for others in the workshop environment.</p> <p>Level :</p> <p>Pupils will have produced a basic task analysis diagram. They will have developed a specification that reflects the most obvious areas of the task analysis. Specification statements will be subjective and unattainable. The design proposals will be drawn neatly and through annotation demonstrate consideration of the product specification. The technical drawing will include British standard dimensions and will be drawn using the correct equipment, but will not be drawn to scale. The design itself will show consideration of the problem. Through triangulation or bracing the structural properties of the materials used will have been considered but possibly not improved (redundant members). Finally the final scale bridge will be evaluated and the designer will make subjective evaluation statements about the structure.</p> <p>Pupils will have not have considered the working characteristics of the material when developing the design solution. The correct tools and processes will have been used to finish the edges to a sound standard and remove any waste material. The adhesive will have been applied carefully in some areas. Finally the student will have worked safely and shown consideration for others in the workshop environment.</p>	<ul style="list-style-type: none"> • Science: classification of materials by their working characteristics. Links to unit 'Particle model of solids, liquids and gases' and unit 7i 'Energy resources' in the science scheme of work. • Science: this unit links to work in unit 'Forces and their effects'. It also builds on Year 8 work on compounds and mixtures by explaining changes of state of materials and chemical changes in terms of atoms. • ICT: using databases. • English: displaying and communicating information. <p>Literacy and numeracy</p> <p>Through the activities in this unit, pupils will be able to understand, use and spell correctly words relating to:</p> <ul style="list-style-type: none"> • the properties of materials and their working characteristics, e.g. flexibility, load bearing, strengthening, reinforcing, protecting, structural, hardness, tension, compression, elasticity, aesthetics <p>Reading – through the activities pupils could:</p> <ul style="list-style-type: none"> • select relevant information and link to other information, from a range of sources • undertake independent research using knowledge of how texts, databases, etc are organised and of appropriate reading strategies <p>Writing – through the activities pupils could:</p> <ul style="list-style-type: none"> • organise facts/ideas/information in an appropriate sequence • group sentences into paragraphs that are clearly focused and well developed • link ideas and paragraphs into continuous text which is organised and coherent



Archbishop Holgate's School

Title: Flat Flash Torch
 Specialist area: Design and Technology
 Year: Nine
 Duration: Eight hours
 Unit: 9a

9a

<p>Unit 9A : Description</p> <p>New batteries and bulbs make it possible to design and make slim versions of torches. Using appropriate materials, e.g. card, sheet plastic, suitable components, design and make a torch that has a membrane switch. The torch should be small enough to store in a personal organiser and carry promotional graphics for a commercial manufacturer or user. The students should also design a point of sale and packaging for the product.</p> <p>Progression and continuity</p> <table border="1"> <tr> <td>7</td> <td>a</td> <td>b</td> <td>c</td> <td>d</td> </tr> <tr> <td>8</td> <td>a</td> <td>b</td> <td>c</td> <td>d</td> </tr> <tr> <td>9</td> <td>a</td> <td>b</td> <td>c</td> <td>d</td> </tr> <tr> <td>10</td> <td>a</td> <td>b</td> <td>c</td> <td>d</td> </tr> </table> <p>Expectations</p> <p>Level :</p> <p>Pupils will develop a detailed analysis of the design brief using a task analysis. They will develop a specification that reflects the most important areas included in the task analysis. Specification statements will be objective and attainable. The design proposals will be drawn accurately and through annotation demonstrate consideration of the product specification. Ideas will be coloured and use a range of graphical techniques to show the effect of light and shade on the selected material. The packaging will protect and promote the product, and the development of the net will be complex but appropriate. The packaged product will be promoted further using the point of sale and provision will have been made to display several examples of the product. Finally the product will be evaluated against the specification and the designer will make objective evaluation statements about the flat flash torch using relevant research data.</p>	7	a	b	c	d	8	a	b	c	d	9	a	b	c	d	10	a	b	c	d	<p>Summary</p> <p>Material (s): Card, plastic and electronic components</p> <p>Design Brief</p> <p>Ranger.com have decided to give customers a promotional gift when they order five products from the Ranger.com website. Ranger sell equipment for people interested in outdoor pursuits including climbing, mountain bike riding and camping. The company have negotiated with a well known battery manufacturer to produce a range of disposable torches, and require you to design the casing, packaging and a point of sale for the product. As a product designer you must develop a product specification based on your research findings, and produce a range of ideas before developing a final solution. You are also required to produce a prototype of the product using modelling materials before starting to manufacture the unit.</p> <p>National Curriculum.</p> <table border="1"> <tr> <td>1</td> <td>Developing, planning and communicating ideas</td> <td>b</td> <td>f</td> <td>g</td> </tr> <tr> <td>2</td> <td>Working with tools, equipment and materials</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Evaluating processes and products</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Knowledge ... materials and components.</td> <td>b</td> <td>c</td> <td></td> </tr> <tr> <td>5</td> <td>Knowledge ... of systems and control</td> <td>b</td> <td>c</td> <td>d</td> </tr> <tr> <td>6</td> <td>Knowledge ... of structures</td> <td>a</td> <td>b</td> <td>c</td> </tr> <tr> <td>7</td> <td>Breadth of study</td> <td></td> <td></td> <td></td> </tr> </table> <p>Key : Prior knowledge <input type="checkbox"/> Included in this unit <input checked="" type="checkbox"/></p>	1	Developing, planning and communicating ideas	b	f	g	2	Working with tools, equipment and materials				3	Evaluating processes and products				4	Knowledge ... materials and components.	b	c		5	Knowledge ... of systems and control	b	c	d	6	Knowledge ... of structures	a	b	c	7	Breadth of study			
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<p>Expectations</p> <p>Pupils will have considered the working characteristics of the material when developing the design solution. The designer will have considered the environmental impact of the product and will have sought to minimise waste and produce a product that could be recycled or reused.</p> <p>Level : This unit is expected to take eight hours.</p> <p>Pupils will develop an analysis of the design brief using a task analysis. They will develop a specification that reflects some of the most important areas included in the task analysis. Specification statements will be objective and attainable. The design proposals will be drawn accurately and through annotation the designer will highlight key areas of the design. Ideas will be coloured and use a range of graphical techniques to show the effect of light and shade on the selected material. The packaging will protect and promote the product, and the development of the net will be sufficient, but not practical for manufacture or transportation. The packaged product will be promoted further using the point of sale. Finally the product will be evaluated against the specification and the designer will make objective evaluation statements about the flat flash torch using research data.</p> <p>Pupils will have considered the working characteristics of the material when developing the design solution. The designer will have considered the environmental impact of the product but will not have sought to minimise waste and produce a product that could be recycled or reused.</p> <p>Level : This unit is expected to take eight hours.</p> <p>Pupils will develop a superficial analysis of the design brief using a task analysis. They will develop a specification that reflects the most important areas included in the task analysis. Specification statements will be subjective and largely unattainable. The design proposals will be drawn neatly and through annotation demonstrate consideration of the main areas evident in the specification. Ideas will be coloured and use a range of graphical techniques to show the effect of light and shade on the selected material. The packaging will protect and promote the product, and the development of the net will be complex but appropriate. The packaged product will be promoted further using the point of sale and provision will have been made to display several examples of the product. Finally the product will be evaluated against the specification and the designer will make subjective and unsubstantiated evaluation statements about the flat flash torch.</p> <p>The student will still need to consider the working characteristics of the material when developing the design solution. The designer will make reference to the environment within the research or ideas section.</p>	<p>Cross-curricular links</p> <ul style="list-style-type: none"> • English: drawing up a specification, writing report (s). • Art and design: investigating, combining and manipulating materials, taking account of purposes and audiences. • Sustainable development: considering the effects of the extraction, use and eventual disposal of some materials on the natural environment and human health. <p>Literacy and numeracy</p> <p>Through the activities in this unit, pupils will be able to understand, use and spell correctly words relating to:</p> <ul style="list-style-type: none"> • designing, e.g. variations, personalisation, marketing, profit, loss, conflict, users, opinion, generating ideas, models, proposals, specification, spreadsheet • making, e.g. batch production, manufacturing aids, jigs, moulds, templates, quality, accuracy, identical, performance, production, scaling up <p>Writing – through the activities pupils could:</p> <ul style="list-style-type: none"> • show relationships between ideas by links which show purpose, eg in order to, so that, and reservation, e.g. although, unless, if • use punctuation correctly, e.g. full stops, commas, dashes, brackets, points, colons, to extend and clarify sentences
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Appendix

from the *Framework for teaching English: Years 7, 8 and 9*

Year 7 teaching objectives

Word level

Spelling

Pupils should revise, consolidate and secure:

- 7 the spellings of key words in each subject;

Spelling strategies

To continue learning, constructing and checking spellings, pupils should be able to:

- 8 recognise and record personal errors, corrections, investigations, conventions, exceptions and new vocabulary;
- 10 draw on analogies to known words, roots, derivations, word families, morphology and familiar spelling patterns;

Vocabulary

To continue developing their vocabulary, pupils should be able to:

- 14 define and deploy words with precision, including their exact implication in context;
- 21 read accurately, and use correctly, vocabulary which relates to key concepts in each subject, distinguishing between everyday uses of words and their subject-specific use, e.g. *energy, resistance*;

Sentence level

Sentence construction and punctuation

Pupils should be taught to:

- 1 extend their use and control of complex sentences by:
 - a recognising and using subordinate clauses;
 - b exploring the functions of subordinate clauses, e.g. *relative clauses such as 'which I bought' or adverbial clauses such as 'having finished his lunch'*;
 - c deploying subordinate clauses in a variety of positions within the sentence;
- 3 use punctuation to clarify meaning, particularly at the boundaries between sentences and clauses;
- 5 use the active or the passive voice to suit purpose;

Paragraphing and cohesion

- 8 recognise the cues to start a new paragraph and use the first sentence effectively to orientate the reader, e.g. *when there is a shift of topic, viewpoint or time*;
- 12 organise ideas into a coherent sequence of paragraphs, introducing, developing and concluding them appropriately;

Stylistic conventions of non-fiction

- 14 recognise and use stylistic conventions of the main forms of writing used in subjects, e.g. *science report, book review*;

Standard English and language variation

- 15 vary the formality of language in speech and writing to suit different circumstances;
- 17 use standard English consistently in formal situations and in writing;

Text level – Reading

Research and study skills

Pupils should be taught to:

- 1 know how to locate resources for a given task, and find relevant information in them, e.g. *skimming, use of index, glossary, key words, hotlinks*;
- 2 use appropriate reading strategies to extract particular information, e.g. *highlighting, scanning*;
- 3 compare and contrast the ways information is presented in different forms, e.g. *web page, diagrams, prose*;
- 4 make brief, clearly-organised notes of key points for later use;
- 5 appraise the value and relevance of information found and acknowledge sources;

Reading for meaning

- 7 identify the main points, processes or ideas in a text and how they are sequenced and developed by the writer;
- 8 infer and deduce meanings using evidence in the text, identifying where and how meanings are implied;

Understanding the author's craft

- 13 identify, using appropriate terminology, the way writers of non-fiction match language and organisation to their intentions, e.g. *in campaign material*;

Text level – Writing

Plan, draft and present

Pupils should be taught to:

- 1 plan, draft, edit, revise, proofread and present a text with readers and purpose in mind;
- 2 collect, select and assemble ideas in a suitable planning format, e.g. *flow chart, list, star chart*;
- 3 use writing to explore and develop ideas, e.g. *journals, brainstorming techniques and mental mapping activities*;

Write to inform, explain, describe

- 10 organise texts in ways appropriate to their content, e.g. *by chronology, priority, comparison*, and signpost this clearly to the reader;

Write to persuade, argue, advise

- 15 express a personal view, adding persuasive emphasis to key points, e.g. *by reiteration, exaggeration, repetition, use of rhetorical questions*;

Speaking and Listening

Speaking

Pupils should be taught to:

- 1 use talk as a tool for clarifying ideas, e.g. *by articulating problems or asking pertinent questions*;
- 4 give clear answers, instructions or explanations that are helpfully sequenced, linked and supported by gesture or other visual aid;
- 5 promote, justify or defend a point of view using supporting evidence, example and illustration which are linked back to the main argument;

Group discussion and interaction

- 10 identify and report the main points emerging from discussion, e.g. *to agree a course of action including responsibilities and deadlines*;
- 13 work together logically and methodically to solve problems, make deductions, share, test and evaluate ideas;

Year 8 teaching objectives

Word level

Pupils should be taught to:

Spelling

- 4 learn complex polysyllabic words and unfamiliar words which do not conform to regular patterns;
- 5 secure the spelling of key terms and new words from across the curriculum;

Vocabulary

- 9 appreciate the precise meaning of specialist vocabulary for each school subject, and use specialist terms aptly in their own writing;
- 10 extend the range of prepositions and connectives used to indicate purpose, e.g. *in order to*, *so that*, or express reservations, e.g. *although*, *unless*, *if*;

Sentence level

Pupils should be taught to:

Sentence construction and punctuation

- 1 combine clauses into complex sentences, using the comma effectively as a boundary signpost and checking for fluency and clarity, e.g. *using non-finite clauses*;
- 5 recognise and exploit the use of conditionals and modal verbs when speculating, hypothesising or discussing possibilities;

Paragraphing and cohesion

- 6 explore and compare different methods of grouping sentences into paragraphs of continuous text that are clearly focused and well developed, e.g. *by chronology, comparison or through adding exemplification*;
- 7 develop different ways of linking paragraphs, using a range of strategies to improve cohesion and coherence, e.g. *choice of connectives, reference back, linking phrases*;

Standard English and language variation

- 11 understand the main differences between standard English and dialectal variations, e.g. subject-verb agreement, formation of past tense, adverbs and negatives, use of pronouns and prepositions;

Year 8 teaching objectives

Text level – Reading

Pupils should be taught to:

Research and study skills

- 1 combine information from various sources into one coherent document;
- 2 undertake independent research using a range of reading strategies, applying their knowledge of how texts and ICT databases are organised and acknowledging sources;
- 3 make notes in different ways, choosing a form which suits the purpose, e.g. *diagrammatic notes, making notes during a video, abbreviating for speed and ease of retrieval*;

Reading for meaning

- 6 recognise bias and objectivity, distinguishing facts from hypotheses, theories or opinions;

Understanding the author's craft

- 10 analyse the overall structure of a text to identify how key ideas are developed, e.g. *through the organisation of the content and the patterns of language used*;

Text level – Writing

Pupils should be taught to:

Plan, draft and present

- 2 re-read work to anticipate the effect on the reader and revise style and structure, as well as accuracy, with this in mind;
- 3 use writing for thinking and learning by recording ideas as they develop to aid reflection and problem solving;

Write to inform, explain, describe

- 11 explain complex ideas and information clearly, e.g. *defining principles, explaining a scientific process*;

Write to persuade, argue, advise

- 14 develop and signpost arguments in ways that make the logic clear to the reader;

Write to analyse, review, comment

- 16 weigh different viewpoints and present a balanced analysis of an event or issue, e.g. *an environmental issue or historical investigation*;

Year 8 teaching objectives

Speaking and Listening

Pupils should be taught to:

Speaking

- 1 reflect on the development of their abilities as speakers in a range of different contexts and identify areas for improvement;
- 5 ask questions to clarify understanding and refine ideas;

Listening

- 7 listen for a specific purpose, paying sustained attention and selecting for comment or question that which is relevant to the agreed focus;

Group discussion and interaction

- 10 use talk to question, hypothesise, speculate, evaluate, solve problems and develop thinking about complex issues and ideas;

Year 9 teaching objectives

Word level

Pupils should be taught to:

Spelling

- 2 spell accurately all high-frequency words and new terms from all subject areas;

Spelling strategies

- 3 recognise their strengths as spellers, identify areas where they need to improve and use appropriate strategies to eliminate persistent errors;

Vocabulary

- 7 recognise layers of meaning in the writer's choice of words, e.g. *connotation, implied meaning, different types or multiple meanings*;

Sentence level

Pupils should be taught to:

Sentence construction and punctuation

- 1 review and develop the meaning, clarity, organisation and impact of complex sentences in their own writing;
- 3 write with differing degrees of formality, relating vocabulary and grammar to context, e.g. *using the active or passive voice*;

Paragraphing and cohesion

- 5 evaluate their ability to shape ideas rapidly into cohesive paragraphs;

Standard English and language variation

- 9 write sustained standard English with the formality suited to reader and purpose;

Text level – Reading

Pupils should be taught to:

Research and study skills

- 2 synthesise information from a range of sources, shaping material to meet the reader's needs;
- 3 increase the speed and accuracy of note-making skills and use notes for re-presenting information for specific purposes;
- 4 evaluate the relevance, reliability and validity of information available through print, ICT and other media sources;

Reading for meaning

- 7 compare the presentation of ideas, values or emotions in related or contrasting texts;

Text level – Writing

Pupils should be taught to:

Plan, draft and present

- 3 produce formal essays in standard English within a specified time, writing fluently and legibly and maintaining technical accuracy when writing at speed;

Inform, explain, describe

- 9 integrate diverse information into a coherent and comprehensive account;

Persuade, argue, advise

- 13 present a case persuasively enough to gain the attention and influence the responses of a specified group of readers;
- 14 make a counter-argument to a view that has been expressed, addressing weaknesses in the argument and offering alternatives;

Analyse, review, comment

- 16 present a balanced analysis of a situation, text, issue or set of ideas, taking into account a range of evidence and opinions;

Year 9 teaching objectives

Speaking and Listening

Pupils should be taught to:

Speaking

- 2 use standard English to explain, explore or justify an idea;

Listening

- 7 identify the underlying themes, implications and issues raised by a talk, reading or programme;

Group discussion and interaction

- 9 discuss and evaluate conflicting evidence to arrive at a considered viewpoint;
- 10 contribute to the organisation of group activity in ways that help to structure plans, solve problems and evaluate alternatives;

