

5 *Looking sideways in the curriculum*

5.1 How to make links that work

The Nuffield view is that links to other subjects will not happen accidentally. If you want your students to use what they have learned in other subjects, you will need to plan carefully to ensure that this happens. In order to make this a manageable exercise, the Nuffield approach is to identify a Capability Task which is suitable for linking to one particular subject and plan the teaching of this task so that the use of the subject is integral to the success of the designing and making activity. This will almost certainly involve liaison with the teachers of these other subjects. At the most basic level, this is to ensure that the content of the other subject that you may wish to draw on has already been taught. It is worth discussing with colleagues the use you want students to make of this content. It is important that you do not make conceptual demands that are too high. It is also important to compare vocabularies and develop a consistent approach to the meaning and use of specialist language. During these conversations, it is important to be flexible, to respond positively to suggestions and to take the opportunity to develop a curriculum relationship in which the work in the subjects is co-ordinated at the level of planning across the Key Stage. It is also important that design and technology makes good use of cross-curricular features such as sustainability or key skills. There will be staff at your school who have responsibility for these areas of the curriculum and, as in linking with individual subjects, preliminary conversations with these colleagues are an essential precursor to successful planning and implementation.

Of course, this does not mean that you should not encourage and celebrate the occasions when students spontaneously use other subjects in design and technology.

The rest of this chapter gives examples describing how certain Capability Tasks can be linked to other areas of the curriculum through the way the task is started and ideas generated and developed.

5.2 Linking with sustainability in Year 7 through Novelties Inc.

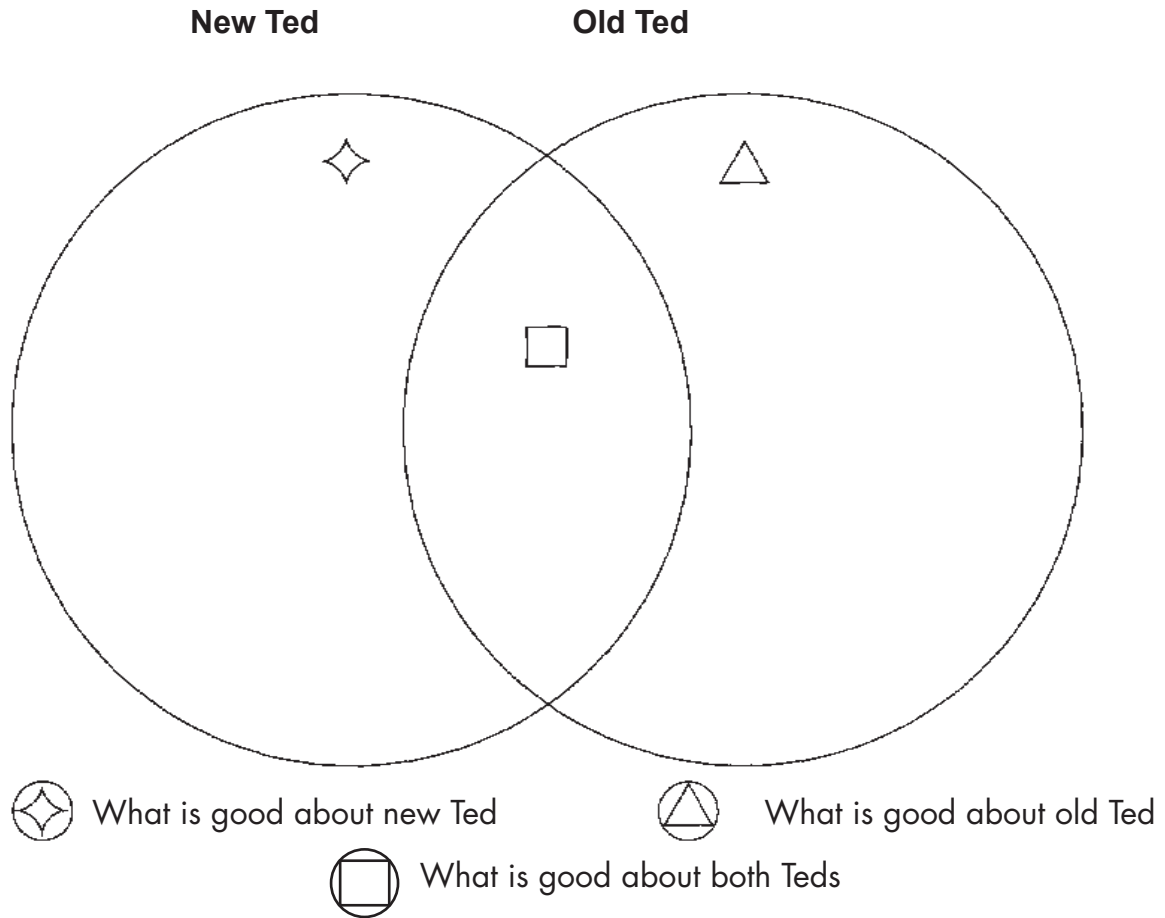
To introduce the idea of design for the environment or sustainable design, one principle that is useful for students to understand is the 'Teddy Bear Factor' that some products have. Designers are now building this TBF into products so that we keep them longer and even like them more when they are old. Examples of this are:

- antique furniture with the 'patina of age';
- the Phillips Alessi 'family of kitchen appliances', designed to last;
- cars now being built with ten-year anti corrosion system. So we keep our cars longer.

Novelties Inc. is an unusual way to raise students' awareness of the Teddy Bear Factor, as so many novelties are thrown away and have a short life span. The challenge for students is to think of how, through a simple food product, you could redirect consumer attention to the quality of the novelties on sale in the museum/garden centre/other gift shop. By asking students to design and make a food novelty with the Teddy Bear Factor, you are raising their awareness and challenging them to think creatively about sustainability.

Starting

Use the 'show start' approach to begin the task with two teddy bears, one new and one old. Ask the students, without prompting, to fill in a Venn Diagram.



This diagram is the basis for discussion about other products that have or could have the TBF.

Design brief

Design and make a decorated biscuit that demonstrates the TBF, for sale in large horticultural gardens and stately homes. Its purpose is to launch the 'Teddy Bear Souvenirs' range of quality souvenirs. Stately homes and horticultural gardens are trying to move on from teatowels and mugs.

Trapping ideas

- As a class activity, using sources from magazines, make a collection of images/products that have TBF. (You can modify SRT 4 Using image boards)
- As a group, students should think about the consequences of people wanting products to last longer. (You can modify SRT 33 Evaluating outcomes – winners and losers)
- As an individual activity every student should draw a sketch of an old Teddy Bear – large postcard size. (Five minutes maximum.) You can display all the sketches and invite votes for 'biggest TBF'. You can write a list of what is successful: bald, one eye, hairy, moth-eaten, patches.

5.3 Linking with science in Year 7 through Rainbow Radios

An understanding of the workings of a radio, except at the most basic level, is too advanced for most Year 7 students. They will, of course, get considerable skill, satisfaction and enjoyment from assembling a working radio and this can set the scene for later work in science about the electromagnetic spectrum. The appearance of a radio is also significant and tells us about its status as a product. The Capability Task Rainbow Radios is not intended to teach students about the science underpinning the way a radio works but this does not mean that it cannot be used to link with science.

Starting

Use the 'talk start' approach to beginning the task. This involves you in 'acting' for three minutes to set the scene. You will need these props – umbrella, plant pot, portable radio and garden fork (small). Switch the radio on in front of the class and pretend to garden. Then say 'I love to garden listening to the radio. Oh no! It has started to rain, I will have to prop my umbrella over my radio. What a shame my Rainbow Radio could not be a Rainproof Radio.'

This is an opportunity to ask students to think about a product in use. Talk about portable radios and where they are used, why radios are not waterproof and who would use them if they were. You can discuss why damp would affect it and how we keep water out.

You can bring the talk start to a close by asking the class to produce a list of where they could use a radio out of doors. This sets the scene for writing the brief and gives opportunities to develop the range of ideas.

Design brief

Design and make a rainproof Rainbow Radio suitable for use on a particular outdoor occasion.

Trapping ideas

There are two approaches to the task: one is to provide some sort of cover for a radio with a non-waterproof case; the other is to waterproof the case. You can enable your students to explore these two approaches by dividing the class into two groups. Ask the first group to do a quick sketch (large postcard size) of a 'cover' for the radio (rather like an umbrella or tent). Ask the second group for ideas on waterproofing an actual radio case (again written on a large postcard).

Display the postcards and ask the class to vote on which they think is the most promising approach.

The result of the vote determines the approach taken by the class to tackling the Capability Task. Whichever approach the class takes to rainproof the radio, there is the opportunity to make explicit links with science in the following ways:

- using information about the properties of materials;
- investigating the waterproofing properties of materials;
- testing the effectiveness of the proposed solutions.

You might even be able to arrange for some of these activities to take place in science lessons.

5.4 Linking with art and design in Year 8 through Better food

The justification for spending quality time in the art and design field when you are aiming for a new pasta dish is that the visual and tactile stimulation and the process of assembling ideas is a rich stimulus. As cold pasta snacks are a mixture of textures, colours and tastes, they lend themselves to a visual treatment to encourage students to be more extreme in their thinking.

Starting

Use the 'walk start' approach to begin the task. Take your class to the nearest supermarket. Explain that they will be looking only at snack meals that are pasta based. For each such snack that they find, they should write answers to the following questions.

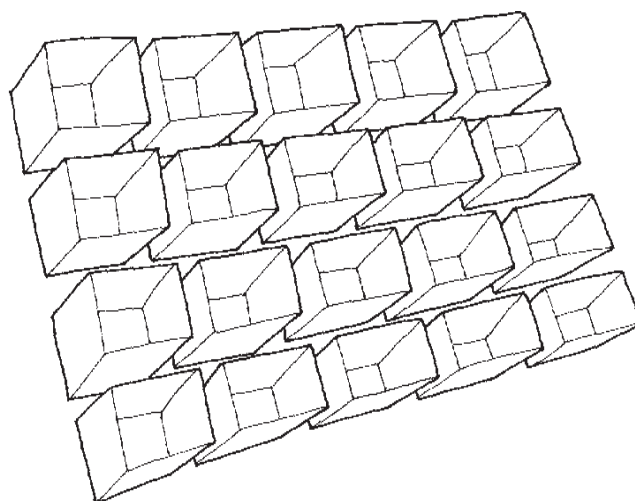
- Who would buy it?
- Why would they buy it?
- How much is it?
- Is there an obvious improvement that could be made?
- Is there a surprising ingredient that would capture people's attention?
(What? Jelly Bean pasta?)

Design brief

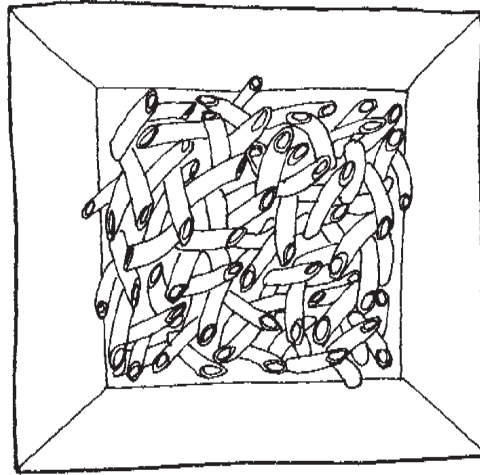
Over 95 years Mama Pasta has gone from dried pasta to pasta snack meals sold in chill counters. Design and make an 'Extreme Pasta' that takes Mama Pasta into new markets through the use of new ingredients and different appearance. 'Extreme Pasta' needs a graphic treatment for the lids. Think wild!

Trapping ideas

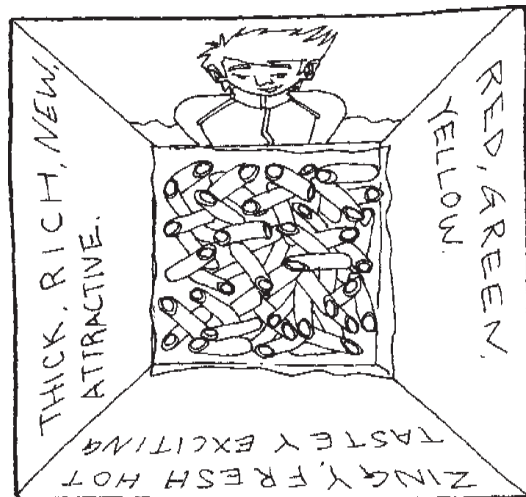
Give each student a small card box, no more than 15 cm square, with an open top. Tell them that they will decorate each of the inside surfaces of the box with important design ideas and that at the end they will have a set of pigeon holes filled with pasta design ideas.



Using dried pasta, each student prepares a square of pasta on a piece of clear plastic to fit inside the base of the box.



The students now decorate the interior of the box to the following scheme:



They can use illustrations, found images, coloured papers, found materials and coloured acetates, words from magazines, IT produced word lists.

Basically, each student 'papers' the inside of the small box and uses this to inform decisions about the extremeness of his or her pasta dish. You can assemble all the boxes, either on a wall or free standing, and they can act as a resource to inform students' design decisions about the extremeness of their pasta dish.

5.5 Linking with thinking skills in Year 8 through Carrying

There are three leading areas about Thinking suggested here:

- process of inquiry;
- inference;
- contradiction.

At the end of the task, you can check on students' grasp of these by asking each student to complete the following paragraph.

To design and make my cute carrier I was asked to think in three new ways:

- inquiry;
- inference;
- contradiction.

Using 'inquiry' helped me to ...

Using 'inference' helped me to ...

Using 'contradiction' helped me to ...

Starting

1 Using process of inquiry

Ask your class what they think these people need to carry around with them:

- a three-year-old boy at nursery;
- a nine-year-old girl;
- a twelve-year-old boy;
- a lollipop lady of 45.

Ask them whether there are any commonalities.

Ask them how they could find out more details.

Set the homework of finding out more and completing this process of inquiry journey.

I didn't know.....

Now I do know

What I did to find out

2 Using inference

This requires observation. Organise your class into groups of six and ask them to observe people at busy bus stops on their way to school in the morning. Ask them to note what people carry and what they think is inside the carriers.

Ask them back at school to fill in an inference diagram.

The person was carrying ...

This infers ...

My guess at what is in the carrier is ...

3 Using contradiction

Prepare a small collection of sealed carriers with mystery objects inside. Try to make sure the contents are not obvious. For example:

- lunch box with shoe;
- plastic bag with sawdust;
- handbag with knife and fork;
- back pack with oranges.

Organise the students into groups of five or six. One student is chosen to start and knows what is in the container. He or she tells a lie about what it contains. The others have to contradict giving reasons such as: 'It can't be that because it doesn't feel heavy enough.' Everyone should speak.

Although these three exercises are time consuming, they are a powerful way to set the scene for thinking about carrying and carriers.

5.6 *Linking with maths in Year 9 through Better weighing*

Most secondary school students are expected to carry their books/equipment around with them from class to class. Most bags are carried on one shoulder. There are issues related to posture, bad backs, shoulder strain through carrying a heavy weight in an unbalanced, unsupported way. This task offers an opportunity not only to design and make a simple balance but also to inform students and teachers about the weight of books carried around and to generate some school strategies to counter shoulder strain.

It is proposed that the task is to design and make balances aligned to a health and safety campaign. These shoulder strain detectors will simply show the danger zones of weight. The mathematical potential is five-fold:

- calculations;
- calibration awareness;
- weight tolerances for people;
- variations in load carrying;
- calculating optimum weights for health and safety.

Starting

Use the 'walk start' approach to begin the task. Starting this task by walking about gives students an opportunity to notice how people carry their stuff and to start thinking about their school in particular. Walk the students to the nearest shops or similar location and get them to note how/what/when people carry things. Ask each student to make notes on ten people.

Repeat the procedure, making notes on four students each (perhaps in the school playground on three different mornings). Ask to weigh the bag plus contents and identify to which year group the students belong.

Put the information into a large table that all students can see, or give each student a printed copy of the table. An interesting task for the class is now to see what this sample of information can reveal about what students have to carry to school.

- Is there any difference between different year groups?
- Does the day of the week make any difference?
- Can you explain these differences?

For homework, ask the students to find out the distance they carry their books on journeys to and from school and in moving from lesson to lesson in school. This information can be tabulated and analysed to see what it reveals.

- What variation is there in the distance things are carried on the journey to and from school?
- Do some days require longer time spent carrying than others?

You can also ask students to estimate the time they themselves spend carrying things.

Clearly, there is the opportunity for using ICT to handle and develop this data but simply looking at the tables to find interesting numerical facts is worthwhile in itself. Unless the ICT is managed carefully it can distract students from the basic data analysis.

All these investigations build a picture of the amount and extent of carrying experienced by the students so that they have a sense of carrying so many kilograms in a particular way over time.

Design brief

To design and construct a simple balance for Year 7, 8 or 9 that shows when schoolbags are too heavy; the 'too heavy' weight needs to be agreed through researched information. The students should also be able to suggest ways to reduce the weight carried around school and/or better ways to carry the weight.

Trapping ideas

This task involves three subtasks:

- 1 developing ideas for weighing students bags;
- 2 developing ideas for raising awareness of safe carrying;
- 3 developing ideas for lowering the weight of school bags.

Divide the class into three groups, giving the groups one of the following 'quick annotated sketch' tasks. These should be made on large postcards.

- 1 Sketch a possible means of weighing the bags. You can suggest possibilities:
simple beam, lever arm, spring in tension, spring in compression.
- 2 List ten words about safer carrying.
- 3 Devise two campaign slogans for lowering schoolbag weights.

This task should take no more than 15 minutes maximum. You can pin up the postcards and use them initially as a basis for class discussion and afterwards as a continual stimulus/reference point.