



A TEACHER'S HANDBOOK FOR THE NATIONAL CURRICULUM

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	Symbols used in the book:
	NC symbol
	Green band are NC requirements
	Signposting to aid progression
	Red number blobs are years
	Curriculum links indicated by the jigsaw icon
	Supporting materials can be found on the accompanying CD

pages

2. COMMUNICATING IDEAS



National Curriculum

Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

1 2

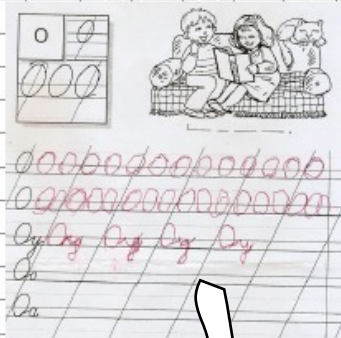
As part of Design and Technology communication is a most important activity as we always need to share ideas and explain thought to others.

We have two major ways of passing information, oral and written but in Design and Technology communicating by drawing is vital and drawing depicting things three dimensionally is crucial.

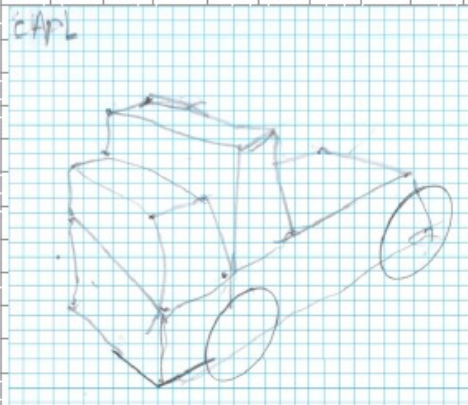
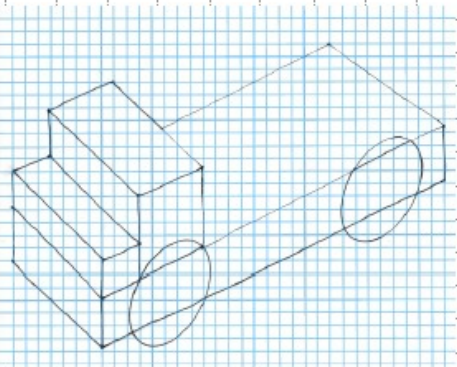
Children should be encouraged to talk about their ideas and write about their ideas. However to draw in a manner that other people can understand is equally as important. Speaking and writing have their conventions, we teach children how and when to speak and how to write.

We teach children how to form letters using a pencil or pen. This is about the forming of shapes, drawing or sketching is about forming shapes. When learning how to form letter shapes we use specially ruled paper. Drawing in Design and Technology at this level involves drawing things together to form solid shapes such as cubes, cylinders, pyramids, triangles, spheres and cones.

We do not need extra special paper a piece of 5 mm squared paper of A5 size is perfect. Try to use A5 size in portrait fashion as this will be less intimidating. The children can now have success.



Sample pages



8. JOINING



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Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]

1 2

Joining materials falls into two categories, those of permanent, not to be taken apart and those of temporary, designed to be dismantled.

Glue of any kind whether on card and paper or for wood is permanent. Thread for fabric is also considered permanent.

Glue. We use stick glue such as Pritt stick or UHU stick for paper but we use white washable PVA for card and wood. PVA should be spread very thinly as glue dries by absorption and by evaporation. A good adage would be "wet not white". The best glue spreader is found on the end of ones hand, tissues or paper towels must be available.



Low-Melt Glue. This melt glue is used for joining materials at a lower temperature than the normal glue. It can happen both from the nozzle of the glue gun and the glue itself as the glue melts at 130 degrees C, far hotter than boiling water. Low temperature melting glue can be distinguished from high melting point in that the glue sticks are oval in section rather than round.

Some glue guns have a wire stand which collapse readily. The version we use is much improved with an integral moulded stand. Mains powered glue guns will require testing each year.



Caution and care need to be taken when a glue gun is in use. Children need to be taught how to be safe and not fear using a glue gun. Instant bonding can save hours of frustration.

3S's
 It is useful to think that you are designing:
 Something for... The product
 Someone for... The end user
 Some purpose The product function

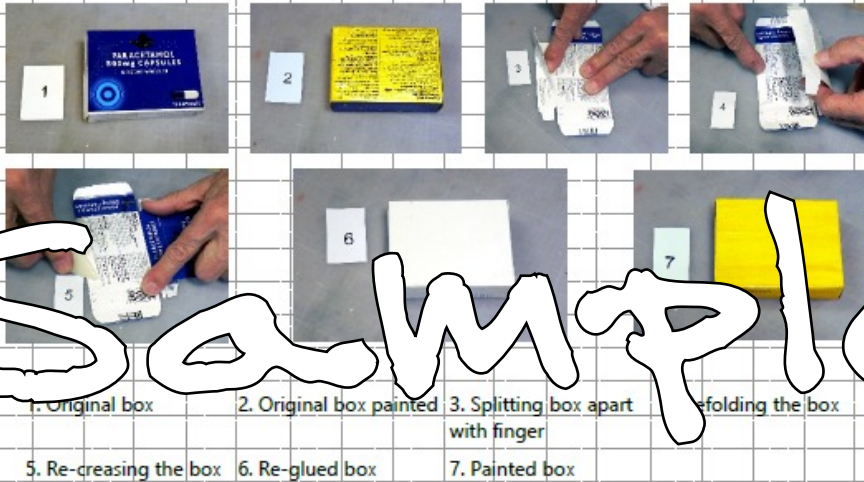
9. CARDBOARD BOX STRUCTURES



Build structures, exploring how they can be made stronger, stiffer and more stable

1 2

Often construction in Primary Schools starts by combining discarded card boxes. These are then treated to a coat of powder paint. Better results can be obtained if help can be had to turn the boxes inside out and re-glued. The paint will coat much better on the non-printed surface and be more aesthetically acceptable. We know this is just another job but the end result is worth it.



We selected a light colour to try to cover a dark colour on the box as we can not prejudice what colours children will choose.

The photograph shows a selection of card boxes that have been turned inside out and re-glued ready for selection by children.



A tissue box turned inside out and made into a vehicle for teddy.



10. WOODEN STRUCTURES



Build structures, exploring how they can be made stronger, stiffer and more stable

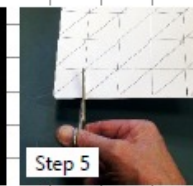
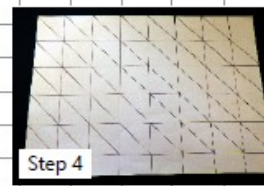
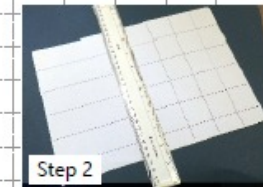
1 2

A range of wooden structures can be created using 10 x 10 mm square section hardwood and strengthened using card triangles. These structures, when the PVA glue is dry are extremely strong.

The wood squares should be cut with a junior hacksaw and held in a vice or on a sawing board after careful measurement.



Card triangles. Any non-textured and non-corrugated card of weight 100 to 320 gms could be used. To avoid multiple measuring use the width of the classroom rule and a sharp pencil to mark out a large number of squares, then cover these into triangles. Corners need double triangles and frame corners require three.



3S's
 It is useful to think that you are designing:
 Something for... The product
 Someone for... The end user
 Some purpose The product function

12. MECHANISMS | LEVERS, LINKAGES, AND SLIDERS.

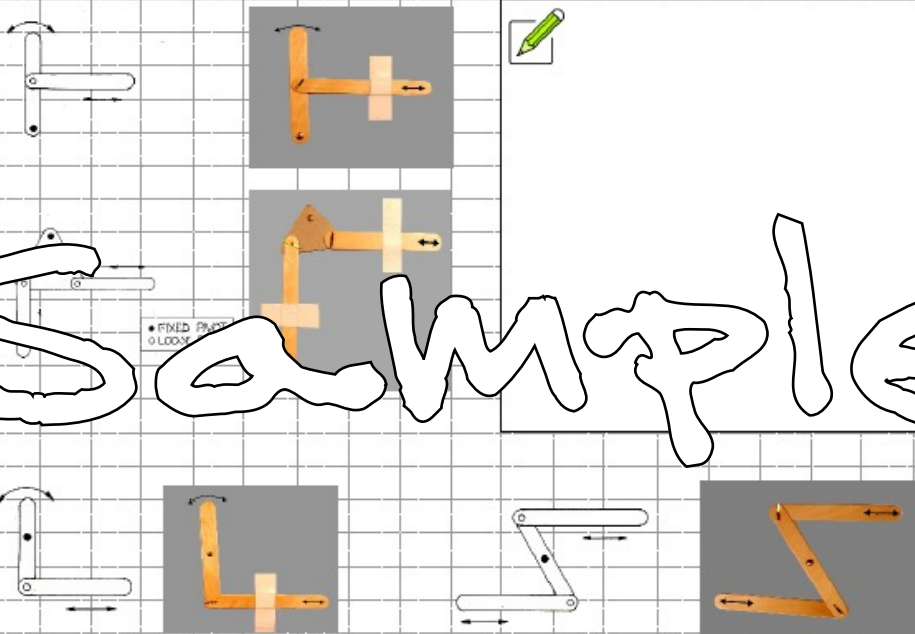


National Curriculum

Explore and use mechanisms [for example, levers, linkages and sliders], in their products



Levers, linkages, and sliders can be made using lollypop sticks or gluing layers of card together. Successful mechanisms can be adapted to fit in greetings cards. If lollypop sticks are used very careful drilling is required and pivots can be made from paper fasteners. We would always favour punching the lollypop sticks (see cutting tools section).



Here's an example of a card using one of the mechanisms shown, the lollypop stick at the top could have another card shape stuck to it such as the hand.



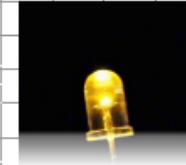
14. USING SIMPLE CIRCUITS

Lights. Traditionally we have used small filament bulbs (MES bulbs), it is more appropriate in the 21st Century to use LEDs, as they offer safer use - no glass and no blown bulbs.

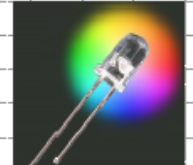
LEDs offer a range of features that filament bulbs cannot, such as a wide range of colours and flashing, flame effects and random colour (Rainbow) changing options.



Flashing LED



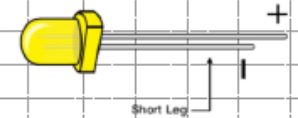
Flame LED



Rainbow LED

LEDs are available in a range of sizes, we would recommend 5 mm or 10 mm diameter types as they are the easiest to handle.

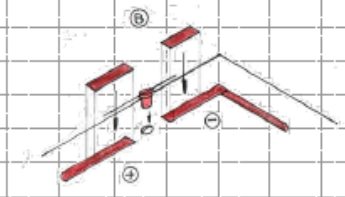
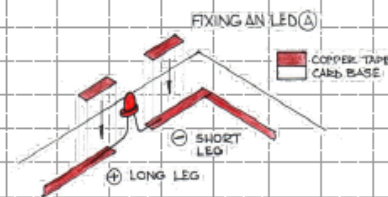
To correctly use an LED it has to be connected the correct way around, the long leg is connected to the positive connection of your battery pack and the short leg goes to the negative connection.



Another consideration is the voltage you are going to use, we would recommend 3V in all cases and is the easiest to create using 2 x AA or 2 x AAA battery packs or using a 3V 2032 coin cell. Using 3V to power LEDs requires you to use a series protection resistor.

! Using 2032 coin cell with on/off switches and screened closely. Using 3V to power LEDs requires you to use a series protection resistor.

The Paper Circuits method of mounting and using LEDs is shown below, **type A** is when you want the LED on the same side as the copper tape. **Type B** is when you want the LED pointing through the card as in a greetings card for example.



APPENDIX 2.3 BUG HOTEL

Description

This learning project can be linked to Science and mini beasts. It involves the making of a Bug Hotel, using the same construction method used for the Plant pot holder, and the addition of a roof. A Bug Hotel is a place for bugs to hide, sleep and hibernate. The correct name for bugs is **invertebrates**. In one hotel it is difficult to cater for all invertebrates as bees, beetles, butterflies, ladybirds and spiders all have different requirements.

3S's

It is useful to think that you are designing:

Something for...	The product
Someone for...	The end user
Some purpose	The product function

Context

Here in the UK we have one of the least animal and insect friendly environments. We need to improve our gardens to be more insect friendly by using appropriate plants and flowers along with providing places for animals and insects to live.

S the product	A Bug Hotel
S for someone	Garden invertebrates
S for some purpose	To provide shelter

Task

Your task is to make a bug hotel, suitable for use in the garden, that will be helpful to useful garden insects.

New learning

- You will learn how to measure the wood to length and how to cut the wood with a Junior hacksaw.
- You will also learn how to hold the wood whilst you are cutting and how to remove any splinters after cutting.
- You will also learn how to build your Bug Hotel using PVA wood glue.
- You will draw on the experience gained when building the plant pot holder. The Bug Hotel is best built on its back.

Materials you will need

- 10 mm square section hardwood
- 5 mm thick Plywood sheet
- Roofing material which could be aluminium foil.



Equipment you will need

- Junior hacksaw
- Cutting jig
- Gluing jig
- PVA glue



APPENDIX 2.6 MECHANICAL TOY

Description

This learning project involves the development of a Mechanical Toy, which can use simple gears, pinions and levers to create a moving pull toy. It has been found to deliver better outcomes if a well defined theme is such as Mr Men & Little Misses or a variation such as the Vegetables. Not only will this allow the learners to do some creative design work, but also lead into some creative writing for example making a small story book about their character.

3S's

It is useful to think that you are designing:

Something for...	The product
Someone for...	The end user
Some purpose	The product function

Context

Mechanisms are common place in learners everyday experience and have been the basis for toys for many centuries. Using some simple mechanisms learners can develop new toys with a range of movements, linked to an exciting theme.

S the product	Mechanical toy
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S for someone	You
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S for some purpose	To play with and tell a story
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Task

Your task is to design a character (Mr Men & Little Misses, The Vegetables etc) then to make a Mechanical Toy, so that you can write an illustrated story about your characters adventures. Your character should not be a copy of any existing characters.

New learning

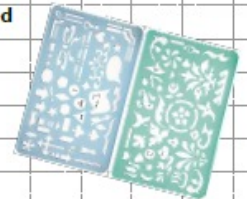
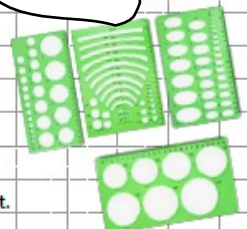
- You will learn draw using templates.
- You will also learn how to use gears, levers and/or sliders to create movement.
- You will also learn how to finish a product using paint and marking pens, to match a design.

Materials you will need

- Grey board or cardboard
- Paper fasteners
- Cord
- Paint (Emulsion type eg. match pots)

Equipment you will need

- Drawing templates
- Scissors
- Paint brushes
- Masking tape
- PVA glue
- Die-cut parts - arms, gears, sliders / pinions
- Die cutting machine if using die-cutting forme



Sample pages