

Introduction

This themes and contexts photocopiable book is designed to provide a *flexible* resource for design and technology teaching. It presents a wide range of ideas for starting points but at the same time emphasizes the need for *structure* in introducing younger children to design activities. Each theme or context can be edited to provide a tighter or looser structure (see below), and each can be supplied with more or less of the pump-priming materials given under the heading of "Starting Places".

The book contains materials for 24 different activities, grouped in pairs. It is anticipated that only one activity from each pair would be selected for a particular group, and that the choice would be determined by the overall picture of resource availability, the previous experience of the group, etc.

Each activity is structured in a similar way:

- The scene is set with an illustrated introduction to the theme
- Pupils are asked to identify needs and opportunities.
- General prompting questions are asked.
- Pupils are assisted in locating needs and opportunities and are provided with reminders for practical starting places, methods of design realization, etc.

If deemed appropriate, the activities might be used in their unedited form. At the other extreme, an initial photocopy might be entirely reassembled as a new master to include additional materials and instructions – or fewer. Alternatively, smaller changes might be made to the activities themselves: for example, by blanking out one or more of the possible contexts (top of page) and/or by editing out some of the "Starting Places" material.

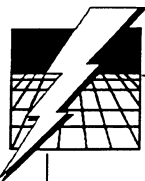
Each activity can be adapted and edited if necessary for quite prescribed and focused teaching – concentrating, perhaps, on an overall programme of study or specific attainment targets. The activities on signalling and games, for example, might be seen as an opportunity to incorporate specific teaching about simple switching methods and circuitry. Similarly, the activities under the heading of 'Getting the Message Across' could be adapted as the vehicle for a specific graphics input for younger students.

The 'Starting Places' may be considered pre-emptive, but parts or all of it may be removed, perhaps to be used as a *teacher resource only* in introducing a topic. It is worth remembering, though, that in the world of design originality stems as much from progressive evolution as from entirely new perceptions of needs or opportunities.

In using the package, pupils are likely to require further resource back-up, and each activity uses specific books in the Starting Design & Technology series (as indicated in the Contents list). The fact that these are divided into small free-standing units, each with a subject focus, means that they can be conveniently drawn on as and when specific enquiries are made by pupils. The titles are suggestions only; others might be added to support the focus of an edited activity.

The cards are, of course, a starting point only for developing technological capability. Pupils need to be encouraged to work systematically on any task and to get into the habit of using design tools such as flow diagrams and spider charts. In particular, they must address certain questions and issues whatever the task – hence the similar general prompting questions throughout (not, of course, exclusive).

Finally, unless persuasively directed, pupils will tend not to record design thinking in a form that allows it to be inspected and assessed against statements of attainment. At least two of the Starting Design & Technology books – *Graphics* and *Modelling* – emphasize the need and provide the means for expressing ideas through the distinctive language of design and technology.



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UNIT 1 Is There Anybody There?

- THEME A: Theft Prevention
[EL. MOD. MAT. COM.]
- THEME B: Sending Signals
[EL. MOD. MAT. MIC.]

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- THEME A: Product Evaluation
[GR. MOD. BUS.]
- THEME B: Designing a Test
[GR. MOD. MEC.]

UNIT 3 A Helping Hand

- THEME A: Helping Out
[MEC. MAT. STR. MOD.]
- THEME B: A Third Hand
[MEC. MAT. STR. MOD.]

UNIT 4 Taking the Strain

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[STR. MAT.]
- THEME B: Materials
[STR. MAT. BUS.]

UNIT 5 Child's Play

- THEME A: Toys
[E/C. EL. MOD. MIC.]
- THEME B: Games
[E/C. MIC. EL. MOD. COM.]

UNIT 6 Save It!

- THEME A: Insulation
[E/C. MAT. BUS.]
- THEME B: Saving Energy
[E/C. MAT. BUS. COM.]

UNIT 7 Everything in Its Place

- THEME A: Storage
[STR. MOD. MEC. GR.]
- THEME B: Storage
[STR. MOD. COM. GR.]

UNIT 8 Wrapping It Up

- THEME A: Packaging for Special Protection
[STR. MOD. GR. BUS.]
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[STR. MOD. GR. BUS.]

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- THEME A: Designing Information
[GR. BUS. MAT.]
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[GR. BUS.]

UNIT 10 Playing Safe

- THEME A: Safety
[MEC. MAT. STR.]
- THEME B: Safety
[MEC. MAT. STR.]

UNIT 11 Second Time Around

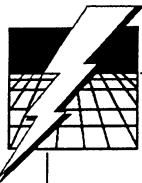
- THEME A: Recycling Materials
[MAT. E/C. BUS. GR.]
- THEME B: New Uses for Old
[MAT. E/C. BUS. GR.]

UNIT 12 Give or Take a Bit

- THEME A: Estimating Length
[MEC. MAT. GR. MOD.]
- THEME B: Estimating Weight or Volume
[MEC. MAT. GR. MOD.]

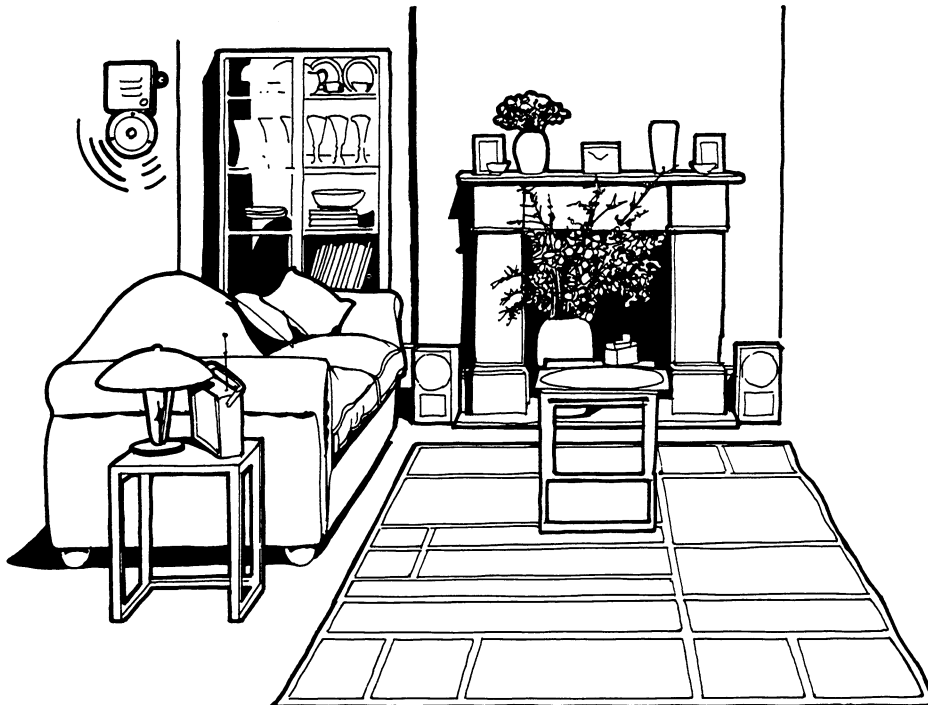
Note: References are made here to titles in the Starting Design & Technology series which may be consulted for further resource material. They are abbreviated as follows:

- BUS = *Business and Enterprise* (Bill Nicholl and Peter Stensel)
- COM = *Computer Control* (Henry Hawes and David Parry)
- EL = *Electronics* (John Cave)
- E/C = *Energy and Control* (Margaret Fennell)
- GR = *Graphics* (Bill Nicholl)
- MAT = *Materials* (Peter Taylor)
- MEC = *Mechanisms* (Martin Chandler and Vijay Oza)
- MIC = *Microelectronics* (John Lynch)
- MOD = *Modelling* (Peter Stensel)
- STR = *Structures* (Roger Bull)



UNIT 1 Is There Anybody There?

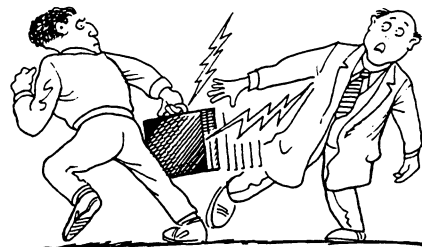
THEME A: Theft Prevention



Context:

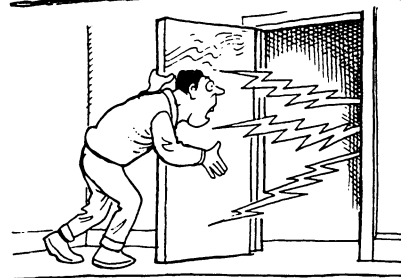
Home, school, community, business

On average, a home is broken into every three minutes – and insurance costs are rising every year. Valuable goods are stolen from houses and cars, at work and from many other places.



Your task is to:

Identify a security problem and design an alarm to give extra protection.



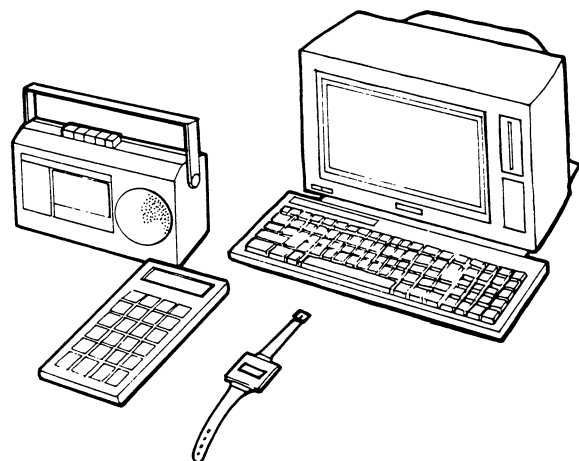
Questions to think about

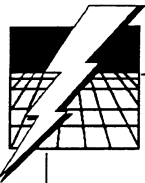
- What property gets stolen? (Make a list.)
- Where does theft take place?
- What should an alarm do?
- What resources will you need?
- How will you test your alarm?

Starting places

It is not difficult to think of things a thief might wish to steal. Computers, calculators, watches and cameras come to mind and are probably on your list.

They might be protected by being in a room or other place with an alarm, or they might have a small alarm actually attached to them. A briefcase containing valuable papers could have an alarm built into it. What about your own?!

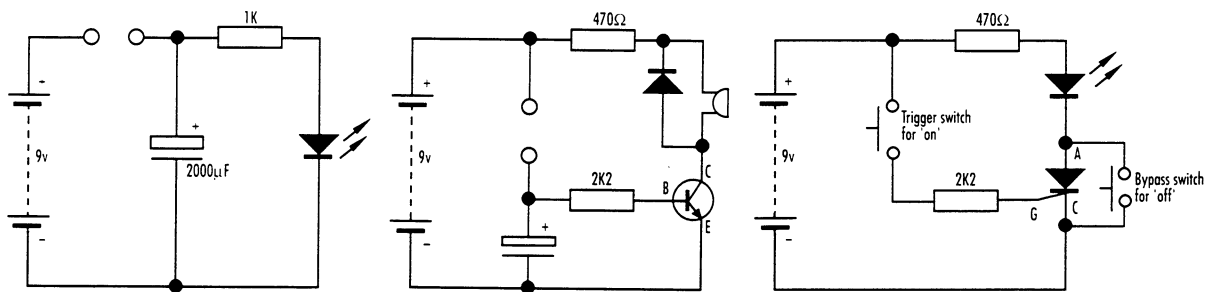




UNIT 1 Is There Anybody There?

THEME A: Theft Prevention

A good alarm normally needs to give out a warning for a few minutes (or even just seconds) and then turn off. The first two circuits shown below do this. The capacitor-delay circuit will only work, though, with an LED or low-current buzzer.

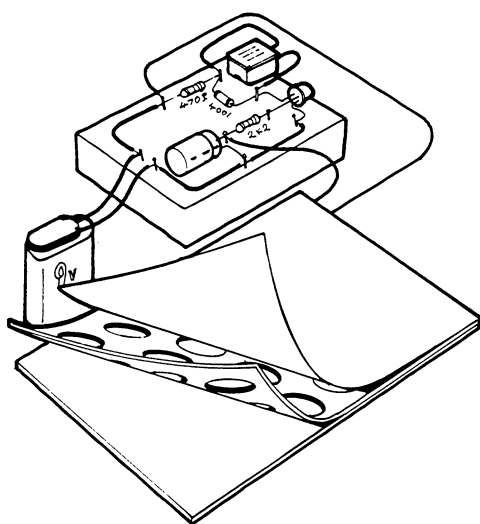
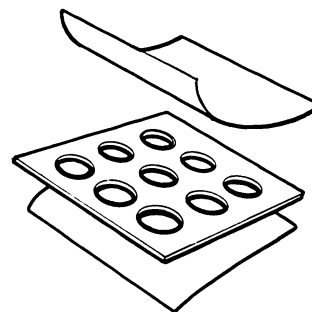


Circuit diagram of capacitor delay

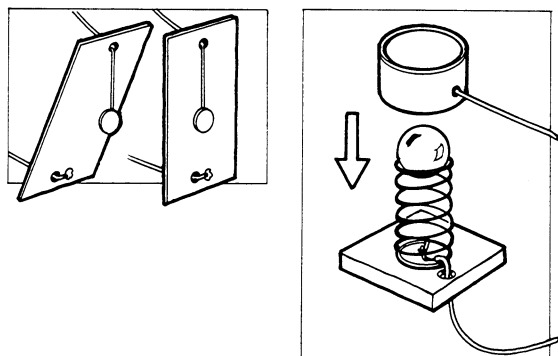
The third circuit, using a thyristor, will continue lighting up an LED or sounding a buzzer until it is turned off.

(**Note:** With certain types of buzzer you may have problems with this circuit. A 1000 μF connected in parallel with the buzzer will normally cure them.)

The alarm circuits need to be triggered in some way, and this can be done with switches that you can make up. Three types are shown. The membrane panel, made from card and foil, can be placed under a carpet.



The pendulum switch can be hidden in a container like a case.



The third switch can be hidden in a similar way and will respond to small movements. (The tube at the top is fixed to the base and any movement will cause the ball-bearing to touch it.)