

Plastics Project: Bedroom Door Buzzer

Objectives

Students will develop their D&T capability by designing and making an original product of good quality that satisfies the requirements of the design brief.

By the end of the assignment, students will know that:

- shapes can be formed by bending
- thermoplastics soften and may be bent when heated
- thermoplastics remain bent / deformed after cooling
- a strip heater / line bender is used to heat thermoplastic sheet materials along a straight line
- a vacuum former is used to draw a heated thermoplastic sheet around a pattern
- jigs may be used to aid bending thermoplastics
- jigs may be used to hold heated thermoplastics after line bending
- hot parts of strip heaters, vacuum formers and heated plastics will burn skin so:
 - risk assessments of the hazards should be carried out
 - safe working practices should be adopted.

Success criteria

Each student:

- has designed and made an original product that satisfies the given design brief and specification
- has used tools safely and has strived to achieve quality in marking out, cutting, shaping, finishing and joining their chosen materials
- knows that thermoplastics can be softened by heating
- knows that line benders are used to heat (relatively) narrow areas of thermoplastic sheet materials
- knows that a vacuum former is used to draw a heated thermoplastic sheet around a pattern
- knows that thermoplastics soften and can be bent when heated and become rigid again when cooled.
- knows that jigs may be used to:
 - aid bending thermoplastics
 - hold heated thermoplastics after line bending until the plastic is cool
- has assessed the risks associated with working with strip heaters, vacuum formers and hot thermoplastics and has worked safely throughout the assignment
- shows evidence of having evaluated his/her work.

Situation

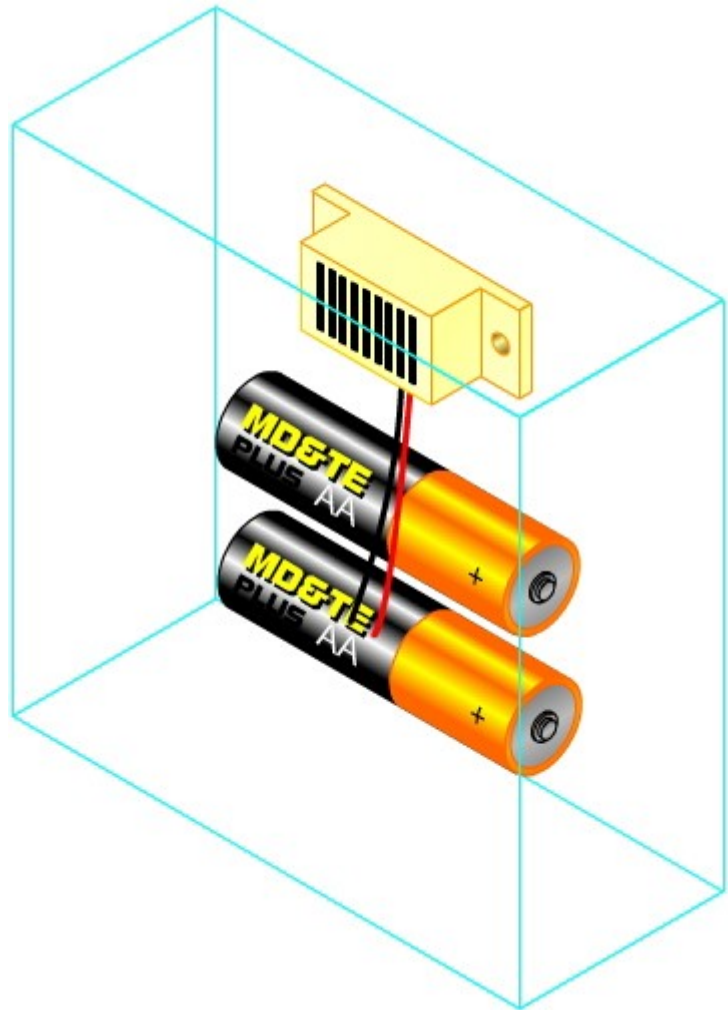
Once upon a time, a group of parents held a meeting to discuss a problem that they all shared.

Their problem was that they had difficulty waking their children early enough for their children to prepare for the day ahead.

They decided that what was needed was a nice loud buzzer fixed to the bedroom door, inside the bedroom, with a switch on the door, outside the bedroom.

Some parents thought a push switch would be enough, others thought that the buzzer should be switched on and left on until their child got out of bed to switch it off.

They didn't know much about circuits but they knew that they needed a loud buzzer and some batteries.



Design Brief

Design a circuit for a bedroom door buzzer, a circuit holder and a cover for the circuit and holder.

Specification

The bedroom door buzzer circuit holder and cover must:

- be made from plastic sheet materials
- include at least one part that will be formed by line bending
- include at least one part that will be vacuum formed
- hold the buzzer circuit and battery/batteries
- allow the cover to be removed so that the battery/batteries may be changed
- protect the circuit from dust
- have a method of fixing it to the bedroom door
- be stylish and demonstrate quality in design and manufacture.

The bedroom door buzzer must not:

- fall apart in use
- be dangerous to use
- have unsightly joints.

What you must do

- Analyse the design brief and specification and pick out the essential requirements
- Analyse ways that thermoplastic sheet materials may be used to make the door buzzer
- Research the size of the various circuit components
- Use the information to plan your design
- Use notes and sketches to illustrate designs for the circuit, circuit holder, circuit cover and switch
- Make sure that your designs meet the requirements of the design brief and specification
- Develop your best idea into a final design. Your design should have sufficient detail so that it can be clearly understood and made by someone other than yourself
- Prepare a cutting list of the materials that are required to make your product
- Prepare a Risk Assessment of the hazards involved with making and using your product
- Make a jig that will enable the plastic sheet to be bent accurately and to be held until cool
- Make a pattern for vacuum forming the buzzer cover.
- Make your design
- Evaluate the final product, e.g.:
 - how good the design looks
 - how well the design works
 - discover what others think about your product
- Work safely and complete the assignment on time.