# FPT: Making a ball bearing game by compression moulding

## Objectives

Students develop their D&T capability by learning about compression moulding and using the process to make an original product of good quality.

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

- heated and softened thermoplastics can be formed by compression moulding
- thermoplastics remain bent / deformed after cooling
- a plug and yoke is used to form thermoplastics by compression moulding
- 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 made product by compression moulding a thermoplastic sheet
- has used tools safely and has strived to achieve quality in marking out, cutting, shaping, finishing and joining their chosen materials
- knows that thermoplastics soften and can be bent when heated and become rigid again when cooled.
- knows that a plug and yoke are used in compression moulding thermoplastic sheets
- has assessed the risks associated with working with strip heaters and hot thermoplastics and has worked safely throughout the assignment
- shows evidence of having evaluated his/her work.

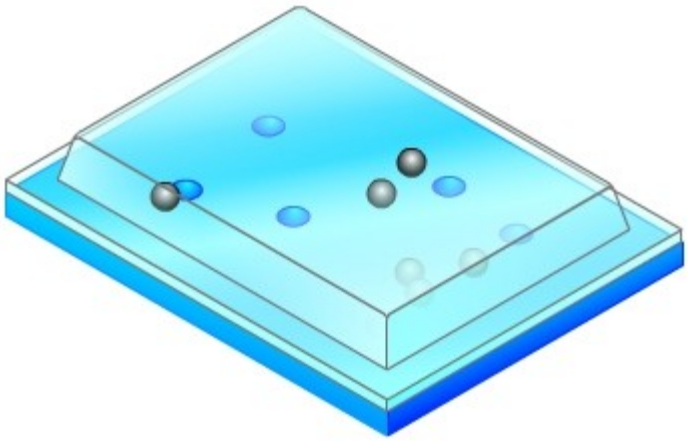
## Resources required to make the ball bearing game

Each student will need:

- acrylic for the base and for the cover, size to be determined by the teacher
- 6 ball bearings
- 6 snap head rivets, with slightly larger heads than the diameter of the ball bearings
- a piece of 18mm thick MDF for the plug that will be used to form the base of the game
- acess to an oven to heat the acrylic base and cover
- access to a plug and yoke (prepared by the teacher / technician) that will be used to form the cover for the game
- access to a fly press or a vice to force the plug into the yoke
- access to adhesive - for permanently fixing the cover to the base.

# Focused Practical Task

Make the base and cover of a ball bearing game by compression moulding thermoplastic sheet materials.



## Design brief

Design the layout of the depressions in the base of the ball bearing game, then make the game.

## Specification

The ball bearing game must:

- have a compression moulded thermoplastic base and cover
- have a cover made from clear thermoplastic sheet
- have a base made from coloured thermoplastic sheet.

## What you must do

1. Watch the Flash animation that describes how to make a ball bearing game by compression moulding thermoplastic sheet.
2. Design the layout of the depressions in the base of the ball bearing game.
3. Make the plug that you will use to form the acrylic sheet for the ball bearing game base (or use a drill to create the depressions, as shown in the animation).
4. Make the base using your plug or by drilling the depressions
5. Use the plug and yoke prepared by your teacher to form the cover of the game.
6. Insert the ball bearings, then use adhesive to join the cover to the base.
7. File the edges so that they are smooth and even.
8. Evaluate the final product, e.g.:
    1. how good the design looks
    2. how well the design works
    3. discover what others think about your product.
9. Work safely and complete the assignment on time.

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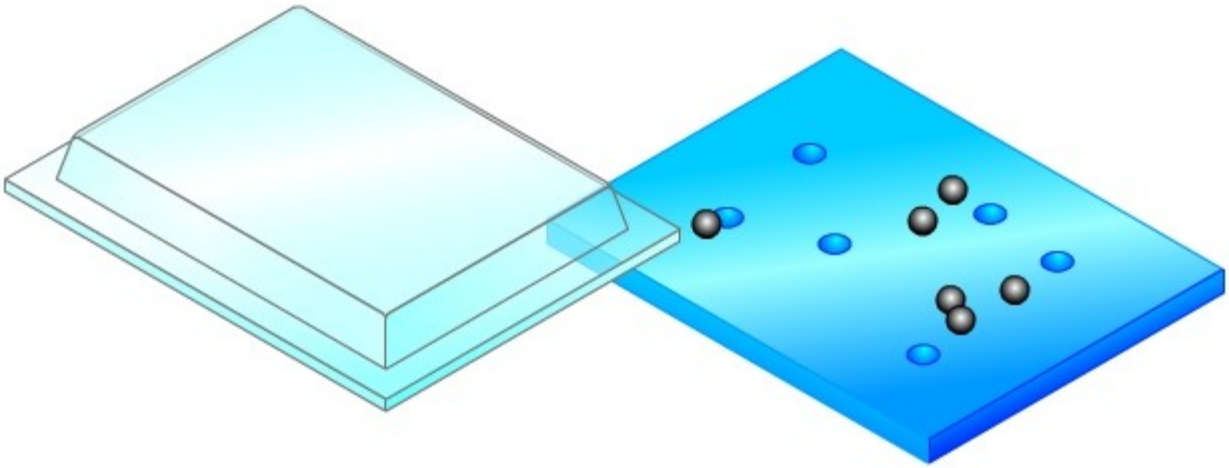
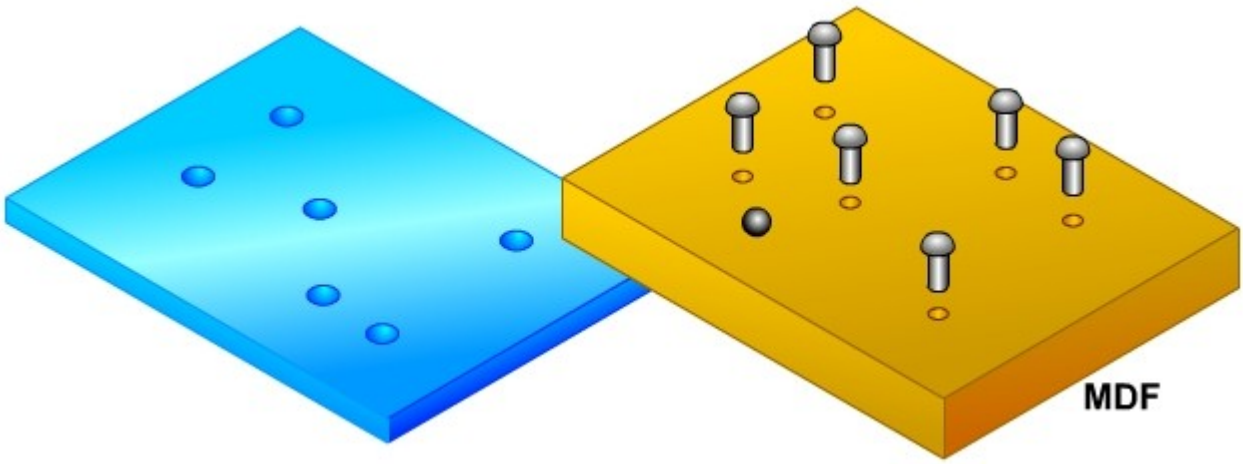
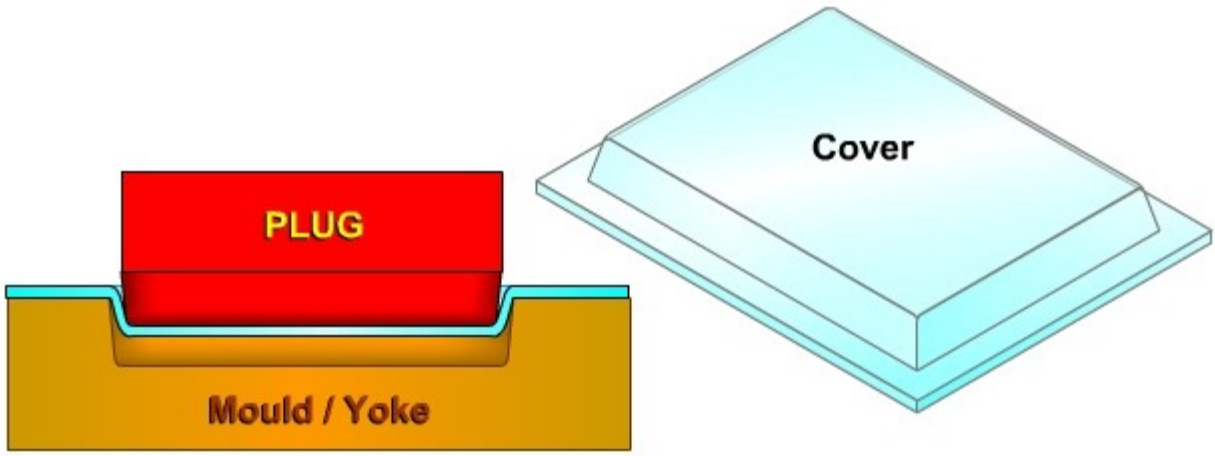
The clear top and the coloured base of the ball bearing game are made by compression moulding acrylic.



Make the plug (that you will use to form the acrylic sheet for the ball bearing game base) out of Medium Density Fibreboard (MDF). Drill 3mm diameter holes in the MDF then place 3mm diameter snap head rivets into the holes. Make the base using your plug. Alternatively, lightly drill the base to form the depressions for the ball bearings.




Use the plug and yoke prepared by your teacher to form the cover of the game.




Insert the ball bearings, then use adhesive to join the cover to the base. File the edges so that they are smooth and even.