

Milling
Projects
- Introductory
- Keystage 3

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Denford

Computer Aided Design
and
Computer Aided Manufacturing
Project.

Maze Ball Game

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Design Situation

Small children can often become bored and restless when waiting in hotel, holiday village or hospital reception areas. One way to entertain children is to play games with them. However, if parents are busy at reception, this is not always possible. The children could play small hand held games but they often have loose parts that could get lost. Electronic games can be noisy and distract other people, they are also expensive!

Ideally a self contained game in the form of a maze, with a ball to show the progress through the maze, would be good in this situation. These games can be given away free to the children.

A little Background...

Mazes were introduced as garden features in stately homes. You would walk in and then try to find your way out. They would be in the form of tall hedges which you could not see over. Quite often, people would have to be rescued!

Maze Ball Game



Design Brief

Design and make a hand held maze and ball game using 5 millimetre thick acrylic.

The size of the game should not exceed 88 mm by 88 mm. The grooves can be cut accurately using a CNC (Computer Numerically Controlled) milling machine.

Analysis:

You will need to think about:

- The size of ball bearing you could use.
- The depth of the grooves.
- Where to put the start and finish e.g. outside to middle, whether they need to be clearly indicated, and if so how?
- Preventing the ball bearing being lost.
- The appearance of your ball game e.g. colours, shape or maybe based on a theme.
- Safety of the player.

Specification:

List the important requirements of your maze - i.e. What it must do by referring to your analysis.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

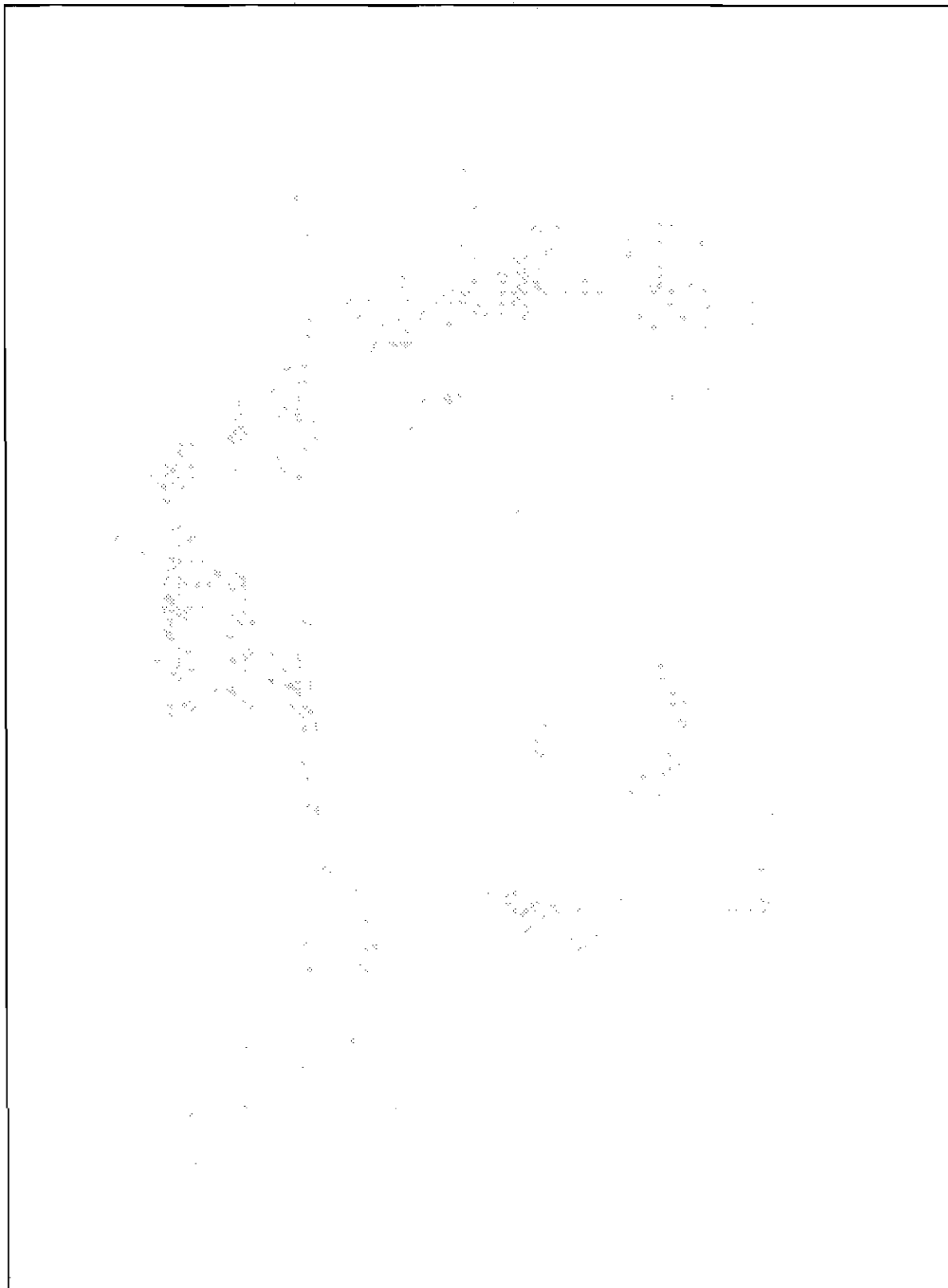
Maze Ball Game



Name _____ Form _____ Date _____

Use this sheet to (a) 'brainstorm' a range of possible ideas for the maze and (b) start to make rough sketches of your ideas. (Use extra sheets if necessary).

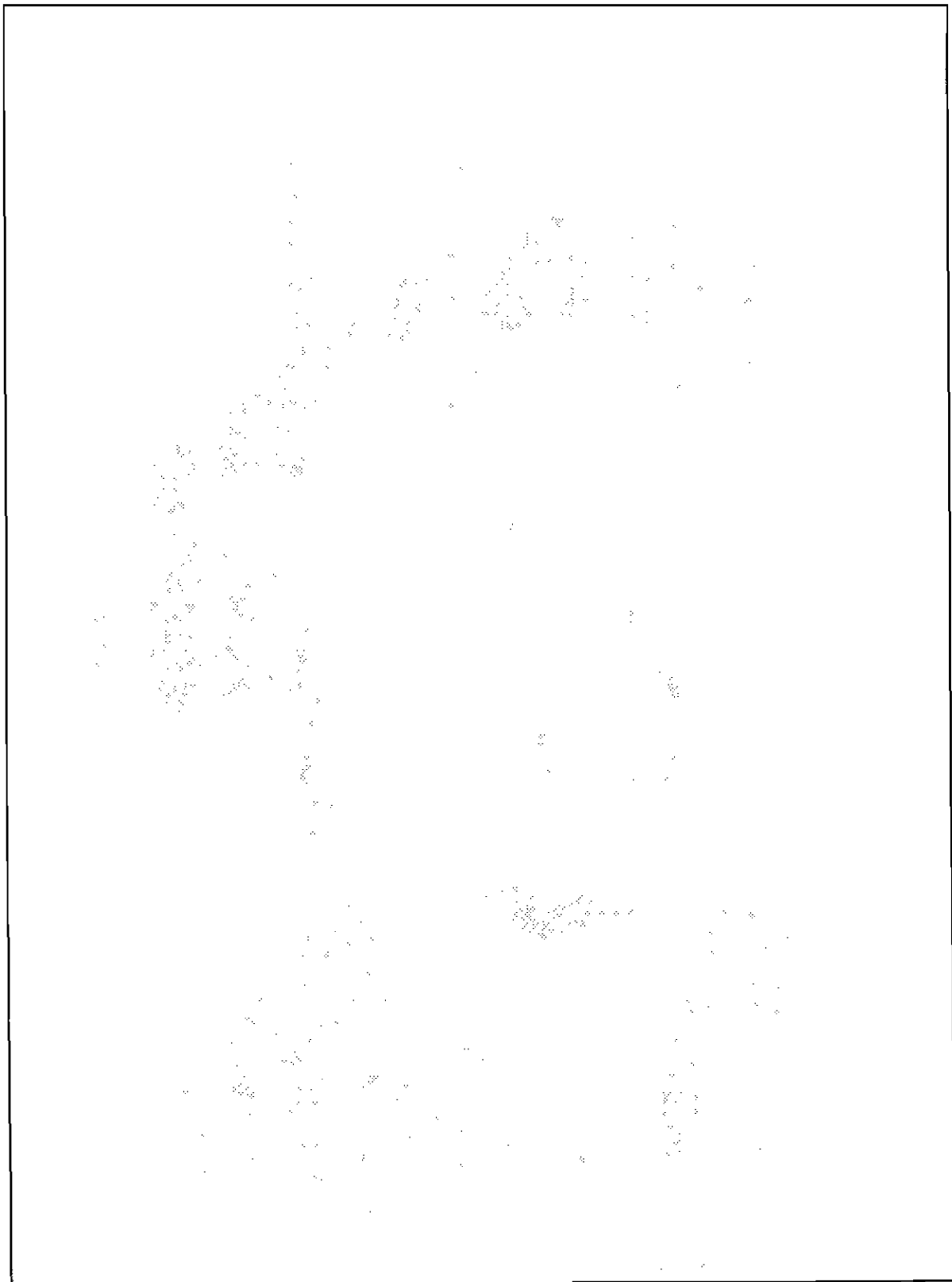
Maze Ball Game



Name _____ Form _____ Date _____

Use this sheet to (a) 'brainstorm' a range of possible ideas for the maze and (b) start to make rough sketches of your ideas. (Use extra sheets if necessary).

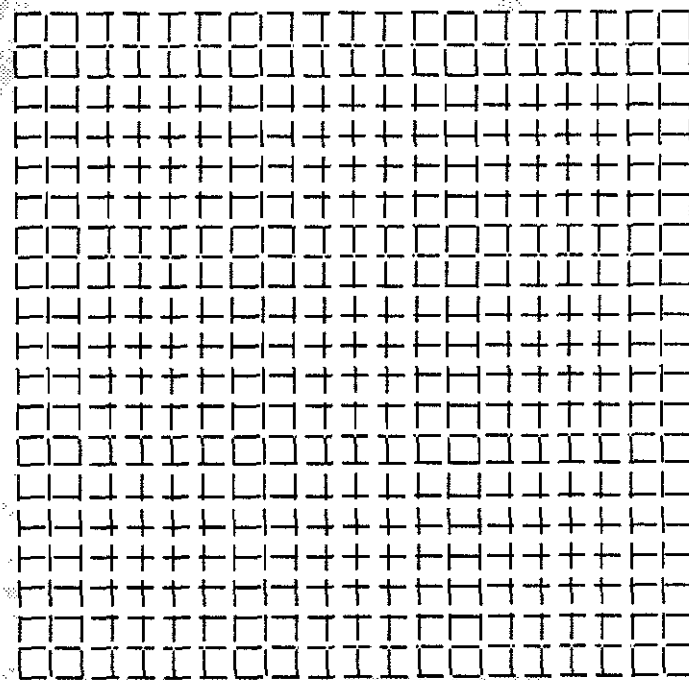
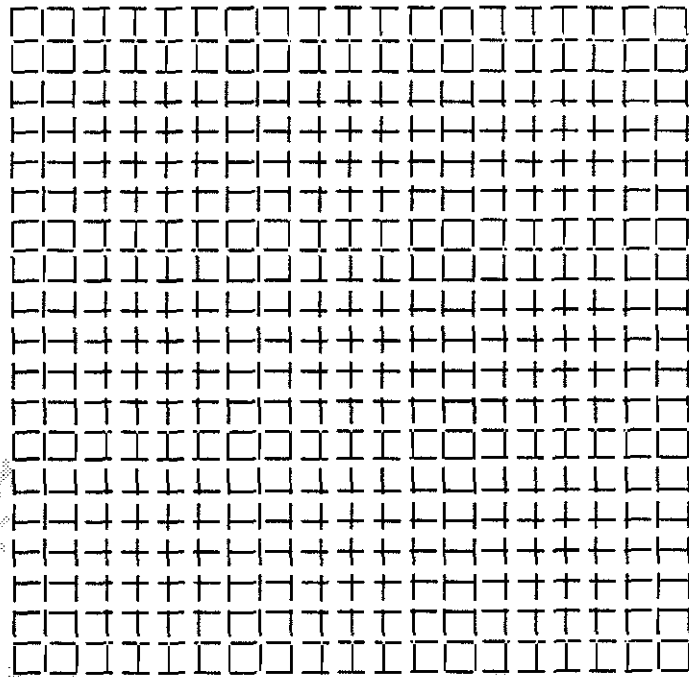
Maze Ball Game



Name _____ Form _____ Date _____

On the grids below, make an accurate FULL SIZE drawing of your proposed maze design. Include all the detail and extra parts. Use black pen for the outline shape.

4mm GRID



Produce a full size card model of your design. Make the walls by gluing straws to the card.

Maze Ball Game



Name _____ Form _____ Date _____

Complete the cutting list below for your maze design.

| Part | No. | Description | L | W | T | Material | Cost |
|------|-----|-------------|---|---|---|----------|------|
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| | | | | | | | |

Make a list of the steps (in the correct order) you should go through to successfully manufacture your maze.

1. _____ 9. _____
2. _____ 10. _____
3. _____ 11. _____
4. _____ 12. _____
5. _____ 13. _____
6. _____ 14. _____
7. _____ 15. _____
8. _____ 16. _____

Maze Ball Game



Name _____ Form _____ Date _____

Once your teacher has given you permission you should go ahead and manufacture your maze.

List below any new equipment, materials, processes or tools you have used during this project.

Maze Ball Game

Having completed your maze try it out yourself and ask other people to use it, preferably some young children.

Now write a short 'Evaluation Report'. You should comment on:

- How well your solution satisfies the brief.
- How well the ball moves.
- How attractive the appearance is.
- Does it incorporate good safety features.
- Is it difficult to use. Consider the age range of person who will use it.
- Were any manufacturing difficulties encountered? If so, list them and state how you overcame them.



Maze Ball Game



Teacher's Notes

General Aims:

The students should:

- Gain experience in the use of computer aided design.
- Gain experience in the use of computer aided manufacture.
- Be aware of the advantages and limitations of using CAD\CAM.

Organisation:

The organisation of this project is very much up to the individual teacher, their experience and more importantly the resources available. The one factor that will influence everyone undertaking this project, is that only one student can use the CNC milling machine at a time. Each student will probably require about fifteen minutes of machining time and this will obviously cause a bottle neck.

The project has been designed to give a lot of scope for extension work that can be carried out before or after the manufacturing stage. Some of these extensions are documented later in the teacher's notes, they again have been organised depending upon facilities and resources available. It may also be possible to run the project with a very small number of students (2 or 3) along side a larger group project that does not require the CNC element. Each small set of students can then be rotated through the CAD\CAM project during the longer task.

Maze Ball Game



Teacher's Notes

Equipment Required:

It is essential that a least one CNC milling machine is available. It is also desirable to have at least two computers available for the computer aided design element of the project. Ideally one computer per student would allow a lot of scope for extension work. We do not live in an ideal world, therefore there are alternative organisational strategies and various extension tasks suggested to compensate.

Material Required:

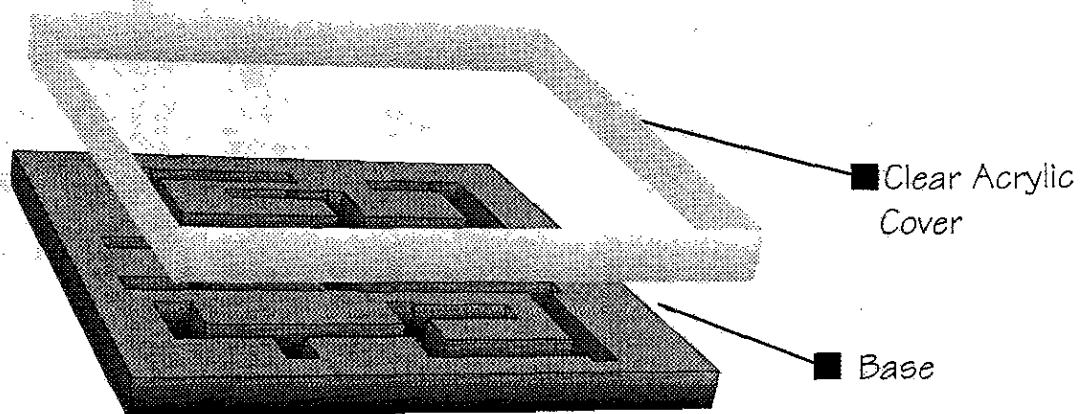
One piece of MDF at least 12mm thick and the size of the maximum CUTTING AREA of your CNC milling machine. (This has been found to be the best media for sticking plastic to.)

A roll of 15mm wide double sided sticky tape.

A sheet of 5 mm thick acrylic cut to a suitable size, no smaller than 88mm by 88mm though.

Expected Outcomes:

It is envisaged that each student should produce a maze cut in 5 mm acrylic with a clear top glued in place. (see the picture below.)



Maze Ball Game



Teacher's Notes

Extension Activities:

Resources

Computers

Students to produce designs for alternative mazes using CAD.

Students to produce advertising for maze using CAD.

Workshop

Design & produce card/styrene presentation box with a logo.

Graphics Room

Students produce advertising logo for their maze.

Produce a pictorial story - line relating to the theme of the maze e.g. damsel in distress

General Teaching Room

Research history of mazes, and equivalents in other cultures.

Maze Ball Game



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Design Situation

A company that produces a range of simple hand held electronic toys, aimed at the 2-5 age group, wish to update the appearance of their products.

Most of the products feature a vacuum formed housing in rigid polystyrene which contains all the necessary components.

The company is aware the milling department of their machine shop is under used at the present and would like to develop some alternative designs that would utilize this facility.

Your design consultancy has been asked to produce a series of prototype moulds that would be suitable for one of their more simple products. The electronic element of the project consists of:

- 'A-A' Battery holder.
- Battery clip.
- 5mm LED,
- 680K Resistor,
- Simple pressure switch.

For this project you will be required to produce the following work:

- Research shapes and images that will attract the 2-5's
- Analyse the design brief and generate your ideas.
- Develop one of your ideas.
- Generate your chosen idea using a CAD package.
- Produce the mould on a CNC milling machine.
- Vacuum form the housing and install the circuit.
- Evaluate the finished product.

Electronic Toy



Design Brief

You are to design and make a prototype child's toy. The mould blank is an M.D.F. block 100mm X 75mm X 30mm which is to be detailed on the CNC milling machine, but may require in order to apply a draft angle. A suitable polystyrene base is to be fitted which must be removable to gain access to the batteries and electronic circuit.

You will need to think about:

- Shapes and images that will attract 2-5 year old's,
- The position of the pressure switch and LED (Remember that the button will need to be larger than the hole!)
- Will you use text on the design?
- Will you need an allowance for the draft angle?
- Which milling cutters are available and what shape are they?
- What methods can you use to attach the base securely?
- Will you need to apply any other colours to the surface?

Electronic Toy

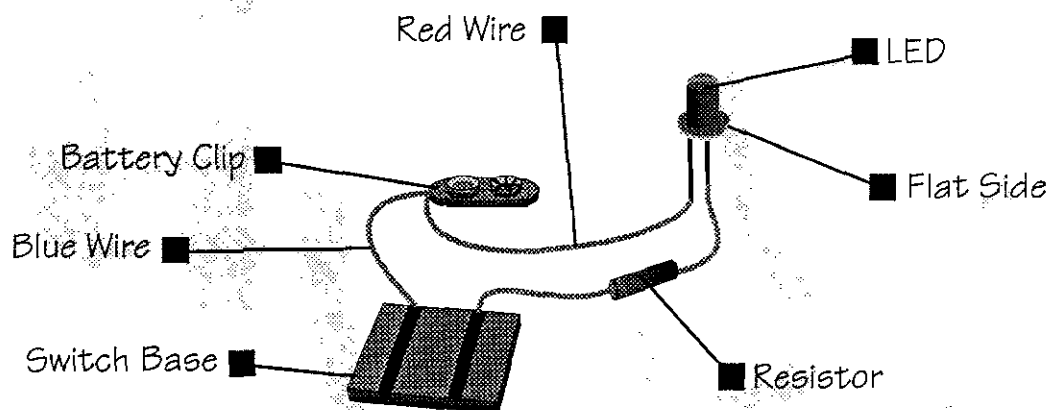


Electronics

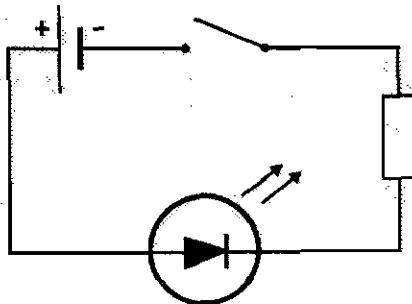
The electronic circuit consists of the following components:

- One 'A-A' Battery holder.
- Battery clip.
- 5mm LED,
- 680K Resistor,
- Pressure switch, base constructed from a 30mm square piece of polystyrene and two strips of self adhesive copper foil. Button constructed from 'plasticard' sheet and foil.

Components are assembled as per the pictorial diagram below. Each component MUST be soldered together in the correct position for the circuit to work. Make sure that you get the LED the right way round!



Shown below is a formal circuit diagram which indicates the layout of the individual components. Label each component on the diagram.

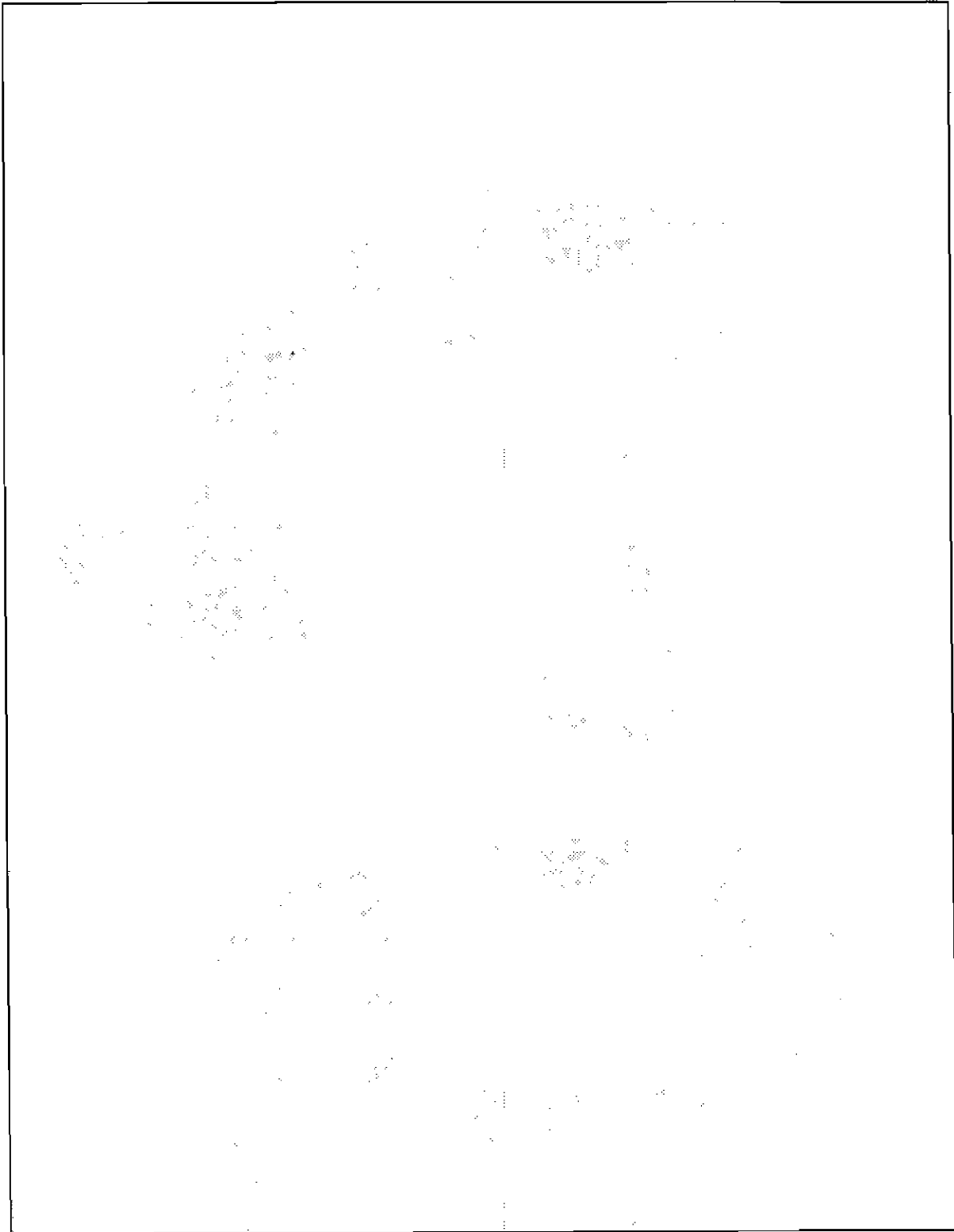


Electronic Toy



Name _____ Form _____ Date _____

Use this sheet to RESEARCH the problem. Sketch and draw a selection of shapes and images that 2-5 year olds may find attractive. Use colour to enhance your sketches!
(Use extra sheets if necessary).



Electronic Toy



Name _____ Form _____ Date _____

Use this sheet to produce FOUR ideas for the design of the moulds. Make sure that your designs touch the sides of the rectangles so that you do not waste valuable space within the housing.

Electronic Toy



Name _____ Form _____ Date _____

Use this sheet to DEVELOP your chosen idea. Using the grid below draw your design indicating all the relevant details. Use black pen for the outline shape.

[illegible]

Electronic Toy



Name _____ Form _____ Date _____

Make a list of the steps (in the correct order) you should go through to successfully manufacture your maze.

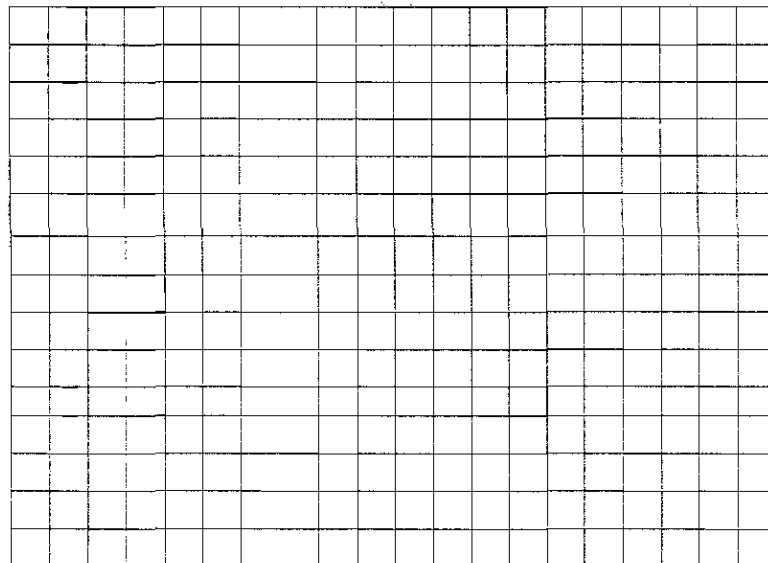
Electronic Toy

1. _____ 9. _____
2. _____ 10. _____
3. _____ 11. _____
4. _____ 12. _____
5. _____ 13. _____
6. _____ 14. _____
7. _____ 15. _____
8. _____ 16. _____

On the grid below, make an accurate FULL SIZE drawing of your proposed mould design. Include all the necessary detail including the position of the button and the LED.

Make sure that the detail does not cover the allowance necessary for the draft angle. Use black pen for the outline shape.

5mm Grid



Name _____ Form _____ Date _____

Once your teacher has given you permission you should go ahead and manufacture your mould.

List below any new equipment, materials, processes or tools you have used during this project.

Electronic Toy

Once you have completed your project write a short 'Evaluation Report'. You should comment on the following points.

- Is the finished product attractive to the 'Target Group'?
- Does it operate well?
- Is it well finished? Does it look good?
- How easy has it been to make; explain any problems you encountered or things you found difficult.
- If you were to start again, what would you change and why?



Teacher's Notes

General Aims:

The students should:

- Gain experience in the use of computer aided design.
- Gain experience in the use of computer aided manufacture.
- Be aware of the advantages and limitations of using CAD\CAM.
- Be aware that CAD\CAM can be a useful tool for use within a project situation.
- Gain experience of the processes involved in the project. e.g. Vacuum forming, soldering, suitable fixings etc.

Organisation:

The organisation of this project is very much up to the individual teacher, their experience and more importantly the resources available. The one factor that will influence everyone undertaking this project, is that only one student can use the CNC milling machine at a time. Each student will probably require about fifteen minutes of machining time and this will obviously cause a bottle neck.

The project has been designed to give a lot of scope for extension work that can be carried out before or after the manufacturing stage. Some of these extensions are documented later in the teacher's notes, they again have been organised depending upon facilities and resources available. It may also be possible to run the project with a very small number of students (2 or 3) along side a larger group project that does not require the CNC element. Each small set of students can then be rotated through the CAD\CAM project during the longer task.

Electronic Toy



Teacher's Notes

Equipment Required:

It is essential that at least one CNC milling machine is available. Two computers would be desirable but it should be possible to run the project with only one, on a rotational basis. Normal multimedia workshop facilities are required for the majority of the project, with access to a vacuum forming machine. If access to this specific equipment should become a problem then extension activities have been suggested on the following page.

Material Required:

One piece of MDF at least 12mm thick and the size of the maximum CUTTING AREA of your CNC milling machine. (This has been found to be the best media for sticking work to.)

A roll of 15mm wide double sided sticky tape.

An MDF mould blank 100x75x30mm (This may be a composite of thinner sheets glued together with PVA). High density polystyrene sheet cut to suit the vacuum former. Various High density polystyrene scraps for the switch base, button and housing base. Self adhesive copper strip. Small self tapping screws for fixing the housing base. The appropriate electronic components and soldering facilities.

Expected Outcomes:

Each student should produce a simple prototype hand held electronic toy. This will feature a circuit with a switch, a vacuum formed housing (mould detailed using CAD/CAM) with a detachable base. Appropriate surface decoration may be applied if required.

Electronic Toy



Teacher's Notes

Electronic Toy

Extension Activities:

Resources

Computers

Students to produce alternative mould designs using CAD.

Students to produce advertising and packaging graphics using CAD

Workshop

Produce suitable packaging for product e.g. card box vac formed bubble pack.

Produce advertising material.

Research and produce more complicated circuits.

Graphics Room

Research alternative hand held toys.

Devise alternative uses for vac formed housing

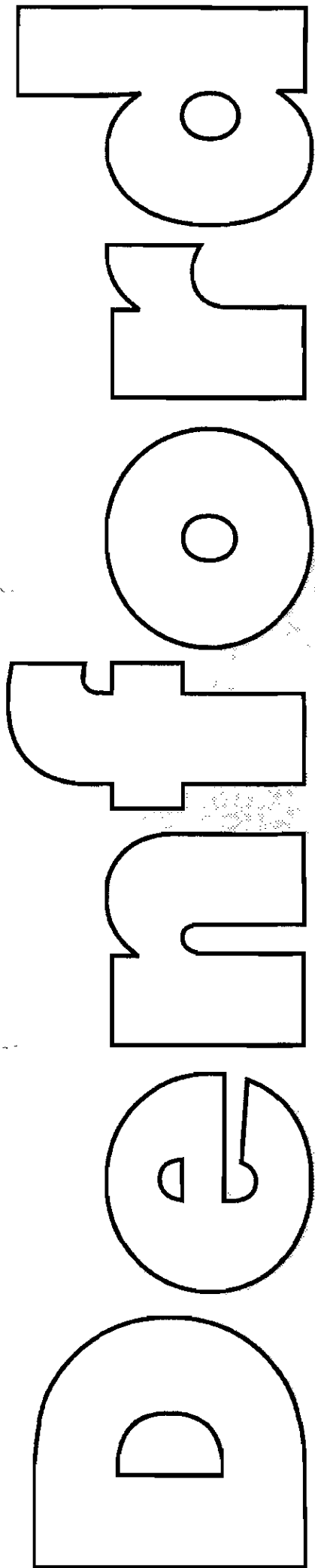
Ideas for adapting existing toy for older age groups.

General Teaching Room

Students to research existing clips and any changes in history.

Students to produce display of existing paper clips.





Computer Aided Design
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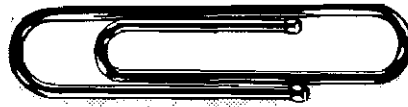
Crazy Clips

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Design Situation

Market researchers have identified a potential niche in the paper clip market. The traditional small 'steel-wire-clip', painted in various colours to improve appearance, is functional but not very exciting.



There will continue to be a demand for these, so the 'Clippit Stationary Company Limited' has decided to continue to make and sell them. However it also wants to introduce a more exciting type of clip to its range. The idea is to produce a larger 'novel' clip suitable for holding notes/paper together in the home, school, office etc... The company has spare manufacturing capacity in its plastics machining centre. It is envisaged that the new clip could be made in this area. Plans have already been made by the enthusiastic advertising department to market the clips under the brand name "Crazy Clips".

For this project you will be required to produce the following work:

- Analyse the design brief and generate your ideas.
- Develop one or more of these ideas and produce a full size solution in card.
- Generate your idea using a CAD package.
- Produce your idea on a CNC milling machine.
- Evaluate your product.

Crazy Clips



Design Brief

Crazy Clips

You have been commissioned to submit your ideas for the "Crazy Clips" range. The 1mm thick coloured ABS plastic sheet is to be used as the main material. The plastic can be cut out to form an accurate outline shape quite easily using a CNC milling machine.

You will need to think about:

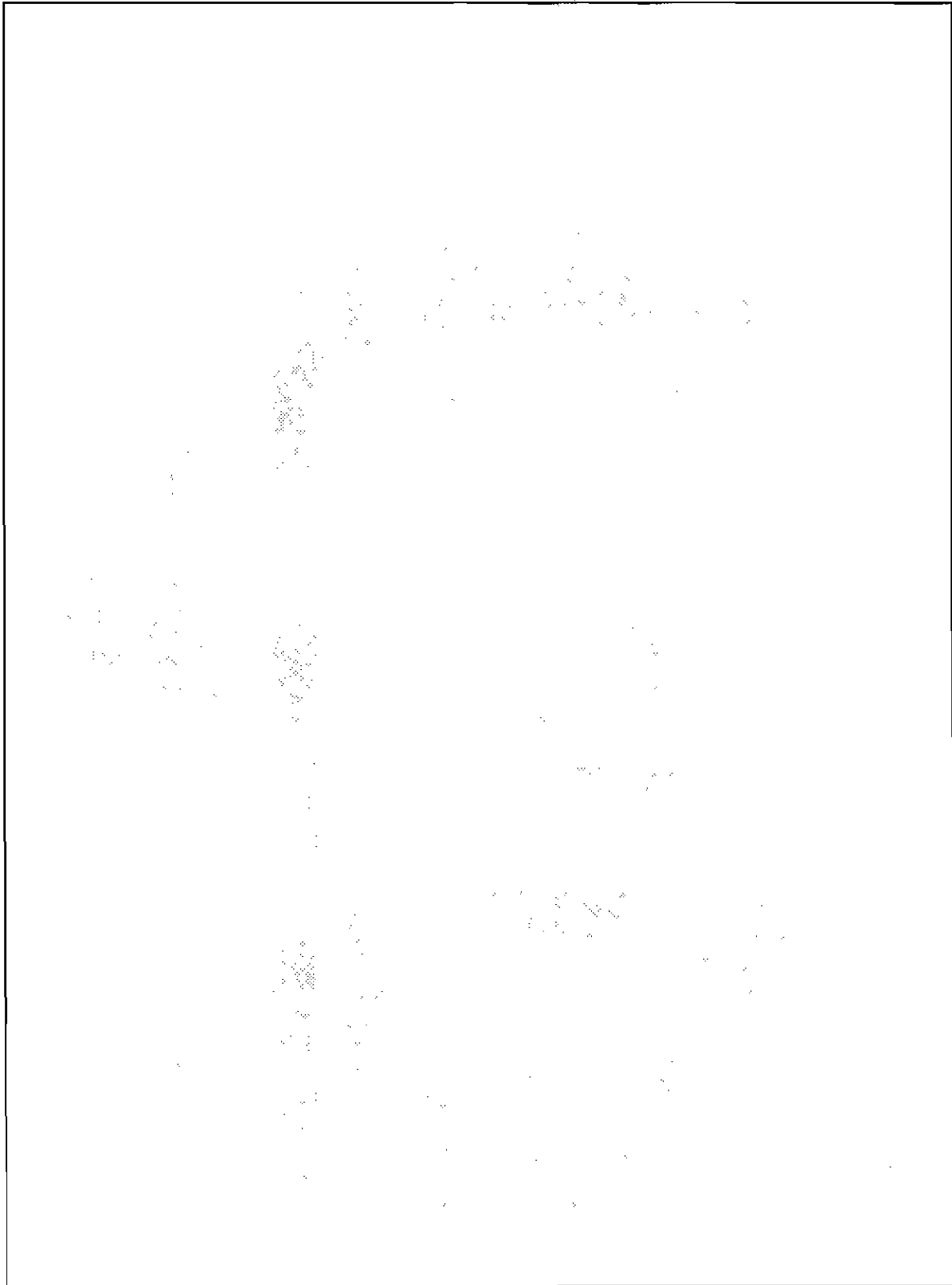
- Shapes that will successfully grip and clip the paper.
- Shapes that will be interesting, remember your are creating a 'novel' clip.
- Could a theme be used for the clip shapes (eg. cartoon characters)?
- Will the 1mm thick plastic be strong enough for the clip design?
- Will the plastic bend sufficiently to obtain the maximum grip?
- Will any extra parts be required (eg. extra plastic parts, stick-on-eyes, card, felt, fur-fabrics or plastic letters) to create the finished clip?
- How will any extra parts be attached to the main clip?
- Are your clips able to be mass produced economically?



Name _____ Form _____ Date _____

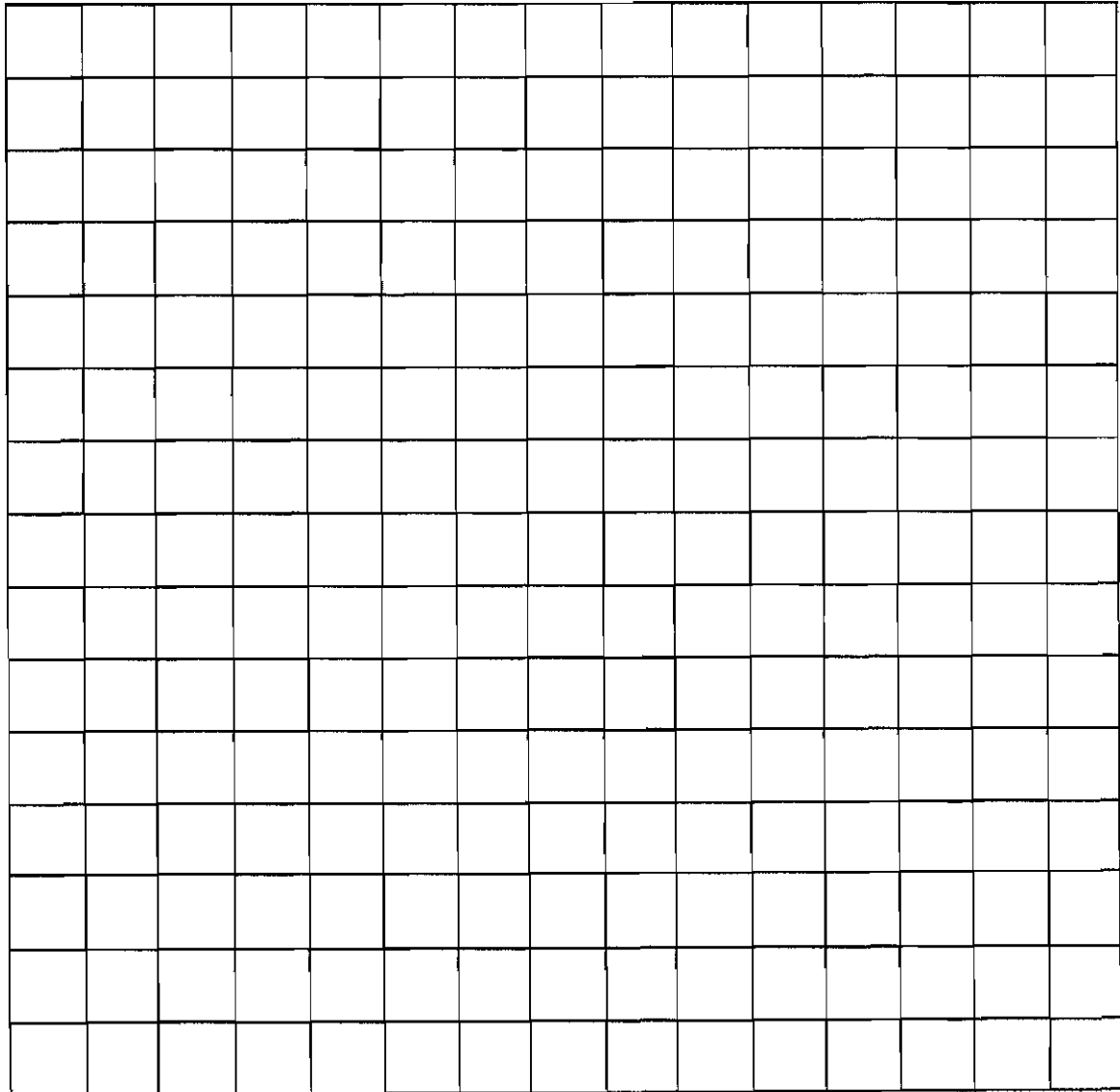
Use this sheet to (a) 'brainstorm' a range of possible ideas for the clip shapes and (b) start to make rough sketches of your ideas. (Use extra sheets if necessary).

Crazy Clips



Name _____ Form _____ Date _____

Now select your best idea and using the grid below draw them out. Use black pen for the outline shape.



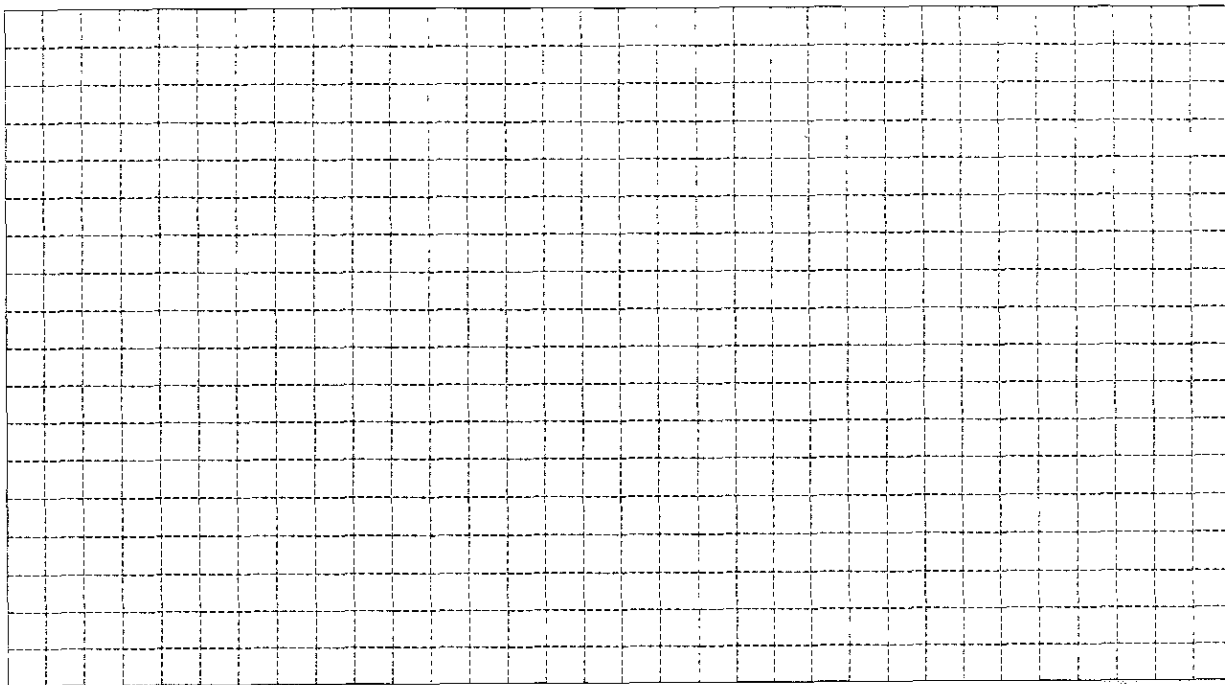
Crazy Clips



Name _____ Form _____ Date _____

On the grid below, make an accurate FULL SIZE drawing of your proposed clip design. Include all the detail and extra parts. Use black pen for the outline shape.

5mm GRID



Crazy Clips

Using approx. 1mm thick card, make a FULL SIZE model of your design.

Test it out to see if it will perform satisfactorily.

Write a brief paragraph about the results of your tests on the model.



Name _____ Form _____ Date _____

Complete the cutting list below for your clip design.

| Part | No. | Description | L | W | T | Material | Cost |
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Crazy Clips

Make a list of the steps (in the correct order) you should go through to successfully manufacture your clip.

1. _____ 9. _____
2. _____ 10. _____
3. _____ 11. _____
4. _____ 12. _____
5. _____ 13. _____
6. _____ 14. _____
7. _____ 15. _____
8. _____ 16. _____



Name _____ Form _____ Date _____

Once your teacher has given you permission you should go ahead and manufacture your clip.

List below any new equipment, materials, processes or tools you have used during this project.

Crazy Clips

Having completed your clip try it out yourself and ask other people to use it.

Now write a short 'Evaluation Report'. You should comment on:

- How well the clip does its job of gripping paper.
- Whether it really is attractive and 'novel' to look at.
- How easy it has been to make; explain any problems you encountered or things you found difficult.
- Why YOU think YOUR clip should be a serious candidate for inclusion in the "Crazy Clips" range of novelty paperclips!



Name _____ Form _____ Date _____

Evaluation Report:

Crazy Clips



Teacher's Notes

General Aims:

The students should:

- Gain experience in the use of computer aided design.
- Gain experience in the use of computer aided manufacture.
- Be aware of the advantages and limitations of using CAD\CAM.

Organisation:

The organisation of this project is very much up to the individual teacher, their experience and more importantly the resources available. The one factor that will influence everyone undertaking this project, is that only one student can use the CNC milling machine at a time. Each student will probably require about fifteen minutes of machining time and this will obviously cause a bottle neck.

The project has been designed to give a lot of scope for extension work that can be carried out before or after the manufacturing stage. Some of these extensions are documented later in the teacher's notes, they again have been organised depending upon facilities and resources available. It may also be possible to run the project with a very small number of students (2 or 3) along side a larger group project that does not require the CNC element. Each small set of students can then be rotated through the CAD\CAM project during the longer task.

Crazy Clips



Teacher's Notes

Equipment Required:

It is essential that a least one CNC milling machine is available. It is also desirable to have at least two computers available for the computer aided design element of the project. Ideally one computer per student would allow a lot of scope for extension work. We do not live in an ideal world, therefore there are 1 alternative organisational strategies and various extension tasks suggested to compensate.

Material Required:

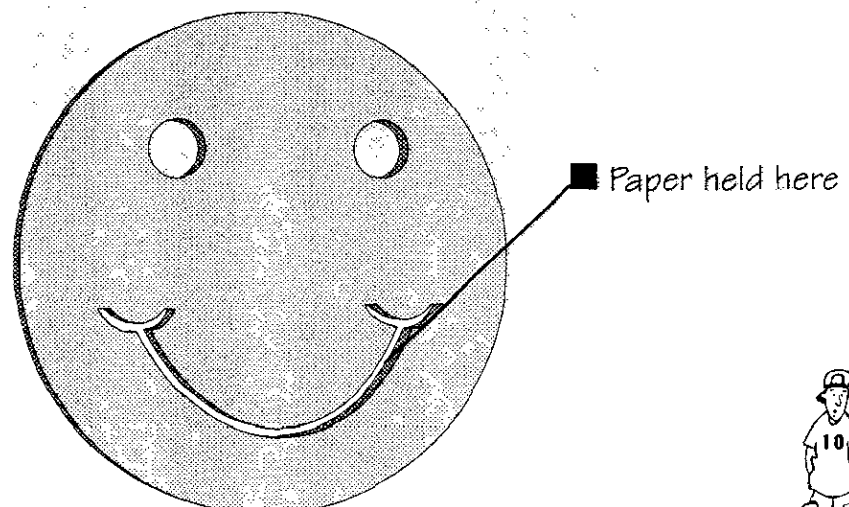
One piece of MDF at least 12mm thick and the size of the maximum CUTTING AREA of your CNC milling machine. (This has been found to be the best media for sticking plastic to.)

A roll of 15mm wide double sided sticky tape.

A sheet of 1 mm thick plastic (ABS or High density polystyrene) cut to a suitable size, no smaller than 80mm by 80mm though.

Expected Outcomes:

It is envisaged that each student should produce a flat sheet of thin plastic with their own paper clip design cut out of it, this may be decorated in some way. (see the picture below.)



Crazy Clips



Teacher's Notes

Crazy Clips

Extension Activities:

Resources

Computers

Students to produce designs for alternative clips using CAD.

Students to produce advertising for clip using CAD.

Workshop

Produce vac. formed presentation tray for clip.

Graphics Room

Students produce advertising for their clip.

Students to produce 3D graphics of their clip design.

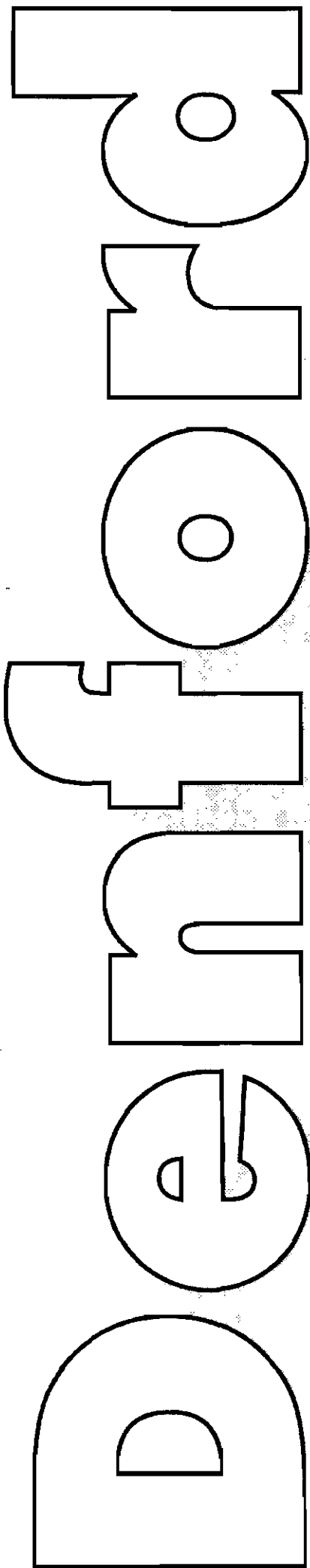
Students to produce a header card for the point of sale.

General Teaching Room

Students to research existing clips and any changes in history.

Students to produce display of existing paper clips.





Computer Aided Design
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Clocks

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Design Situation

Clocks

Living in a modern society requires everyone to make full use of time and to do this we use a clock or watch to keep track of the passing hours, minutes and seconds. There are many companies involved in manufacturing clocks and watches and it is important for these companies to keep coming up with new designs to be ahead of the opposition in this competitive market.

Your company 'Tempest Fugit' has given you the responsibility to design a clock that will attract young people and teenagers to buy it. You have been instructed to limit the size of the clock which should be free standing and should be made from acrylic or non-ferrous metal sheet (e.g. aluminium, copper, brass.) or any combination of these.

For this project you will be required to produce the following work:

- Investigate clocks presently on the market and make a report using sketches and pictures which are relevant to the present problem.
- Analyse your investigation and the design brief and generate your ideas.
- Develop one of these ideas and produce a full size model in card.
- Produce a pictorial and an orthographic working drawing. One of these should be produce on a CAD package.
- Produce your idea on a CNC milling machine.
- Evaluate your product.



Design Brief

Your company has given you the responsibility to produce a clock to fill a niche in the market for young people and teenagers. The major part of the clock should be produced using a CNC milling machine as these machines are at present under utilised in the production line. The materials to be used should be of coloured acrylic, sheet aluminium, brass and copper or any combination of two materials. You are restricted to two pieces of material measuring 160x90mm for the face and stand. You are allowed a small amount of other materials for added design features or embellishment.

Clocks

Analysis:

You will need to think about:

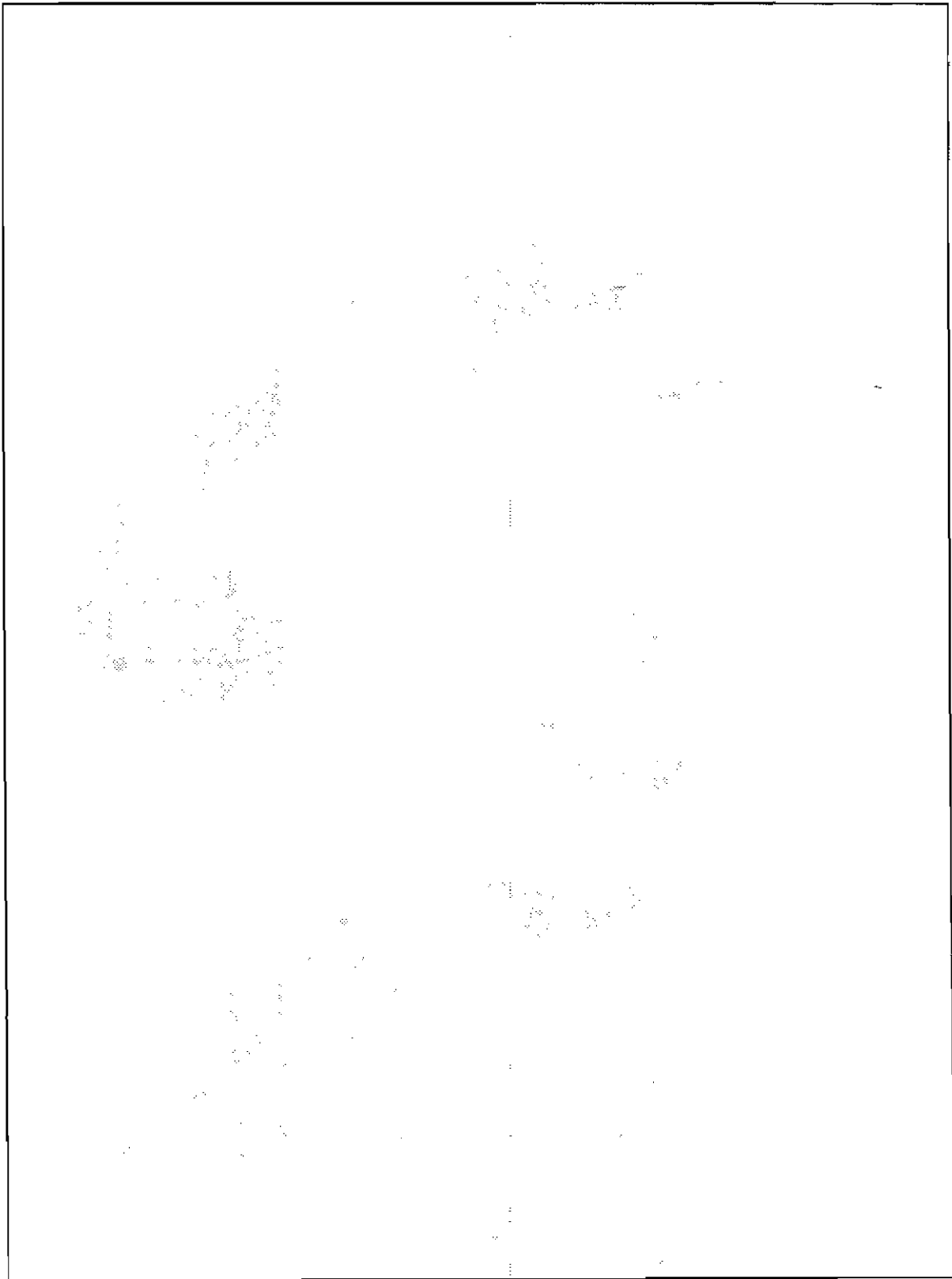
- Interesting shapes for the clock.
- Combinations of colour and material.
- Could a theme be used for your clock that could be developed in a range of clocks for the future?
- How will the different materials of the clock be assembled?
- Are you able to mass produce your design? Or does your design need to be modified.
- Will any other material or parts be required?



Name _____ Form _____ Date _____

Use this sheet to (a) 'brainstorm' a range of possible ideas for the clock face and (b) start to make sketches of your ideas.
(Use extra sheets if necessary).

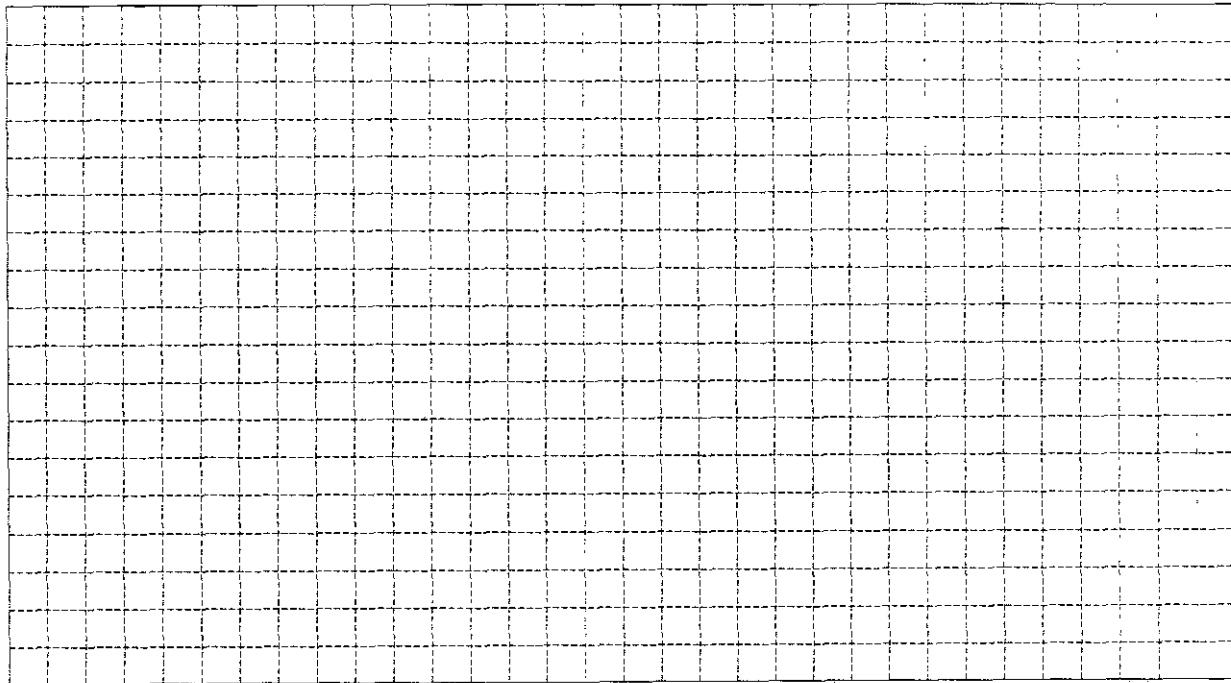
Clocks



Name _____ Form _____ Date _____

Select your best idea and using the grid below draw them out using a black pen for the outline shape.

5mm GRID



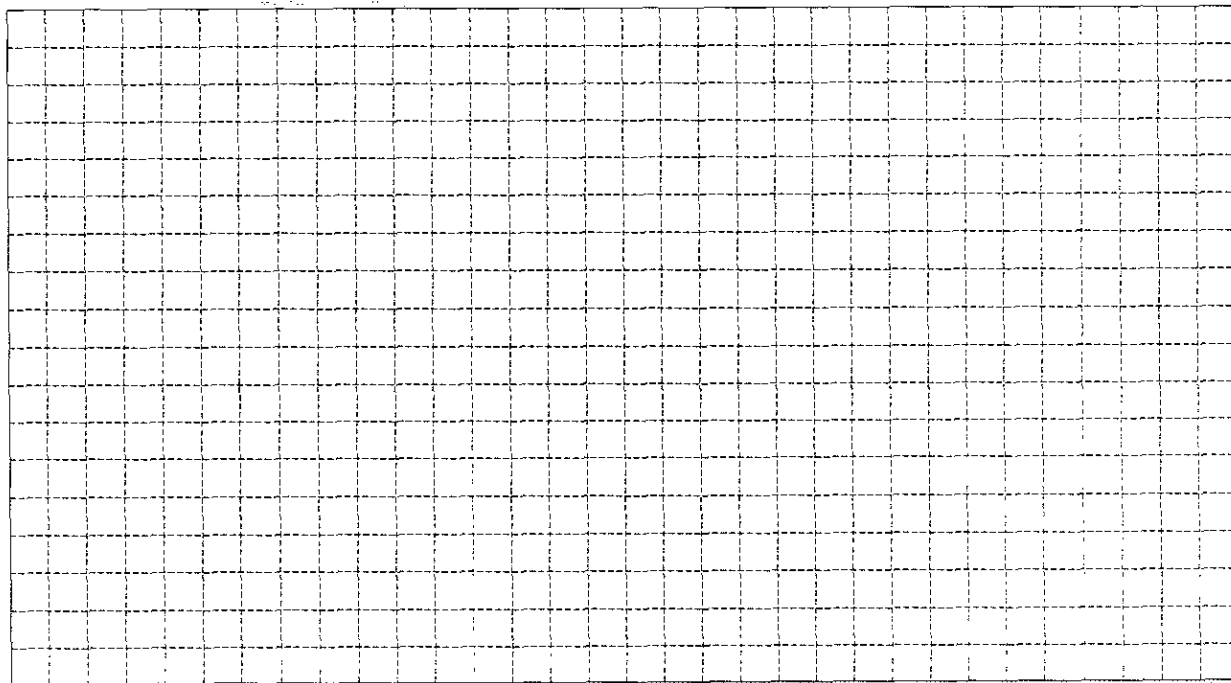
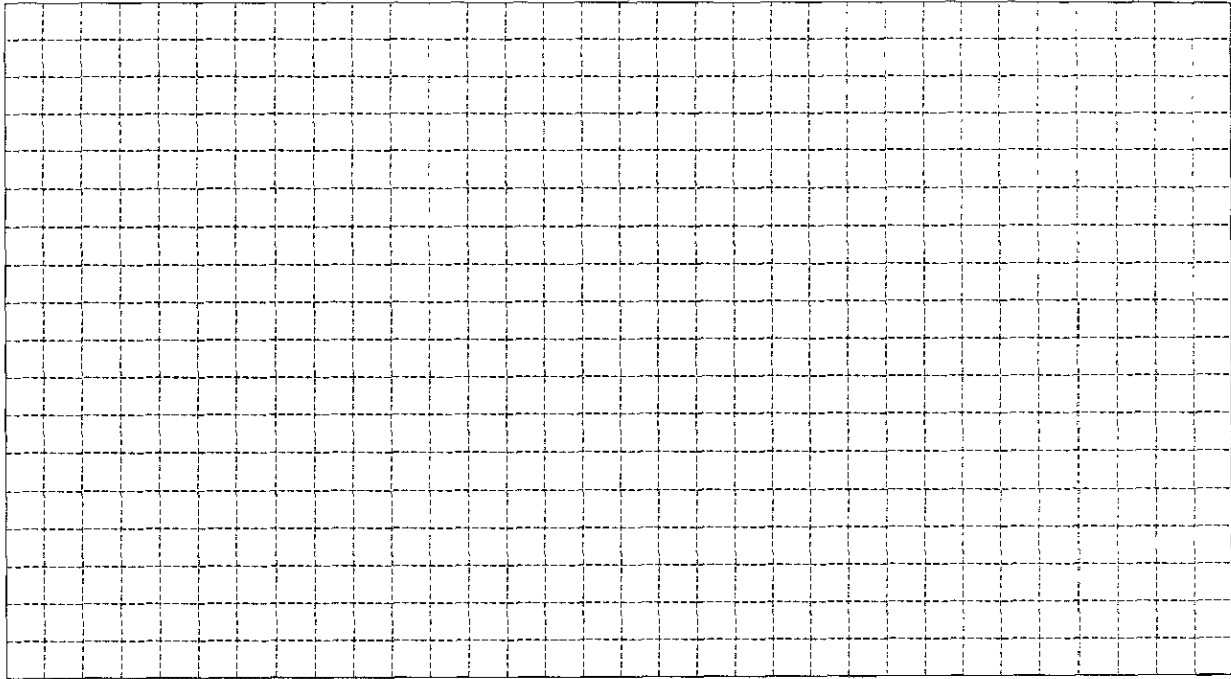
Clocks



Name _____ Form _____ Date _____

On the grid below, make a FULL SIZE drawing of your proposed clock design. You will need two grids, one for the clock face and one for the clock stand. Include all detail. Use a black pen for the outline shape.

5mm GRID



Clocks

Using thick card (2mm) make a FULL SIZE model of your design. Write a brief paragraph on the outcome of your model.



Name _____ Form _____ Date _____

Complete the cutting list below for your clock design.

Clocks

| Part | No. | Description | L | W | T | Material | Cost |
|------|-----|-------------|---|---|---|----------|------|
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Make a list of the steps (in the correct order) you should go through to successfully manufacture your clock.

1. _____ 9. _____
2. _____ 10. _____
3. _____ 11. _____
4. _____ 12. _____
5. _____ 13. _____
6. _____ 14. _____
7. _____ 15. _____
8. _____ 16. _____



Name _____ Form _____ Date _____

Once your teacher has given you permission you should go ahead and manufacture your clock.

List below any new equipment, materials, processes or tools you have used during this project.

Clocks

Now write a short 'Evaluation Report'. You should comment on:

- Did your design turn out as you had first planned? If not what changes have been made to your original design.
- Record the comments, of at least five people in your group, on your clock design.
- Did you feel the project was 1) too easy, 2) too difficult, 3) just right. Explain your answer.
- If you were to do this project again is there anything you would do different to the design of your clock? If not, why not?



Name _____ Form _____ Date _____

Evaluation Report:

Clocks



Teacher's Notes

General Aims:

The students should:

- Gain experience in the use of computer aided design.
- Gain experience in the use of computer aided manufacture.
- Be aware of the advantages and limitations of using CAD\CAM.
- Experience machining different materials on a milling machine.
- Produce a three dimensional item from two dimensional material.

Organisation:

The organisation of this project is very much up to the individual teacher, their experience and more importantly the resources available. The one factor that will influence everyone undertaking this project, is that only one student can use the CNC milling machine at a time. Each student will probably require about fifteen minutes of machining time and this will obviously cause a bottle neck.

The project has been designed to give a lot of scope for extension work that can be carried out before or after the manufacturing stage. Some of these extensions are documented later in the teacher's notes, they again have been organised depending upon facilities and resources available. It may also be possible to run the project with a very small number of students (2 or 3) along side a larger group project that does not require the CNC element. Each small set of students can then be rotated through the CAD\CAM project during the longer task.

Clocks



Teacher's Notes

Clocks

Equipment Required:

It is essential that at least one CNC milling machine is available. It is also desirable to have at least two computers available for the computer aided design element of the project. Ideally one computer per student would allow a lot of scope for extension work. We do not live in an ideal world, therefore there are alternative organisational strategies and various extension tasks suggested to compensate.

Material Required:

One piece of MDF at least 12mm thick and the size of the maximum CUTTING AREA of your CNC milling machine. (This has been found to be the best media for sticking plastic to.)

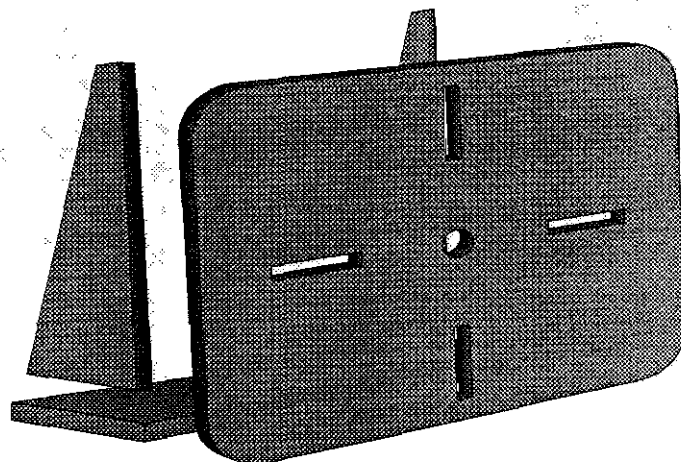
A roll of 15mm wide double sided sticky tape.

Sheet of acrylic, aluminium, copper and brass cut to a suitable size 160x90mm.

Expected Outcomes:

It is envisaged that each student should produce a clock cut from the set materials.

A very simple example is shown below. These pieces could be glued or slotted together.



Teacher's Notes

Clocks

Extension Activities:

Resources

Computers

Students to produce designs for alternative clocks using CAD.

Students to produce advertising for clock using CAD.

Workshop

Design & produce a vac formed package for the clock.

Produce a box into which the vac formed package will fit.

Graphics Room

Students produce advertising logo for their clock.

Design the exterior graphics of the box that is to be made in the workshop.

General Teaching Room

Students to research the different kinds of clock through the

Produce a display of a range of different kinds of clocks for the class room.



Denford

Computer Aided Design
and
Computer Aided Manufacturing
Project.

Personal Logo

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Design Brief

Often, during work in Design and Technology you will produce design sheets. You will always have to put your name on your work, so that it can be identified as yours. Simply writing your name on a well laid out design sheet can spoil it. Many designers and companies use simple text, graphics or pictures to show other people that it is their work.



You are required to:

- Research into existing logo designs.
- Complete the worksheets provided, these will help you get started thinking about your own designs.
- Produce a small folio of your designs for your logo.
- Produce a thin plastic template for your design, so that you can produce the same design over and over again.
- The template will be produced on a CNC milling machine, this will require you to keep your template simple. You will have to transfer your designs onto a computer, so that a program can be made to drive the milling machine.

Personal Logo



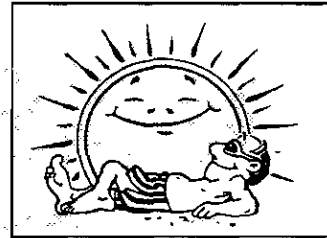
Name _____ Form _____ Date _____

Fill in this sheet with as many answers as possible

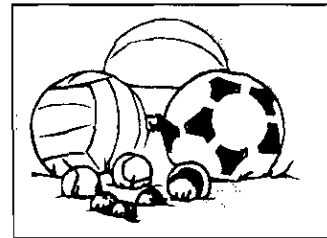
Things you like...



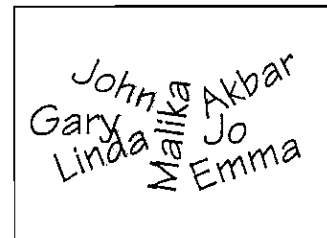
Things you do...



Sports you like...



What makes you individual...



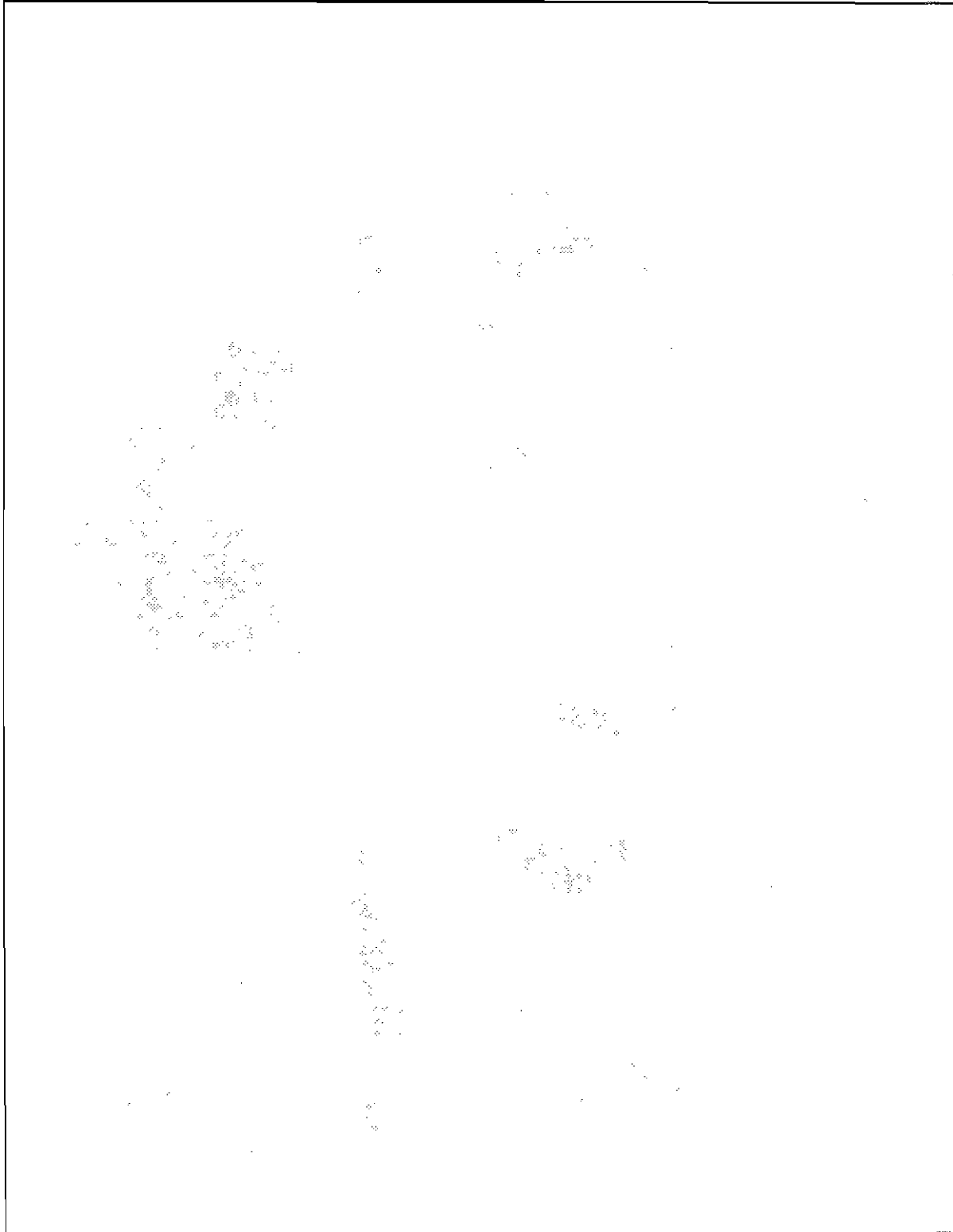
Anything else...

Personal Logo



Name _____ Form _____ Date _____

Using the lists you have written, decide which area most represents you as an individual. Think of a simple picture that represents your ideas. (These are called logos or icons.)



Personal Logo

Remember to keep things simple...



Name _____ Form _____ Date _____

Now you have your idea for a logo see what your friends think of it.

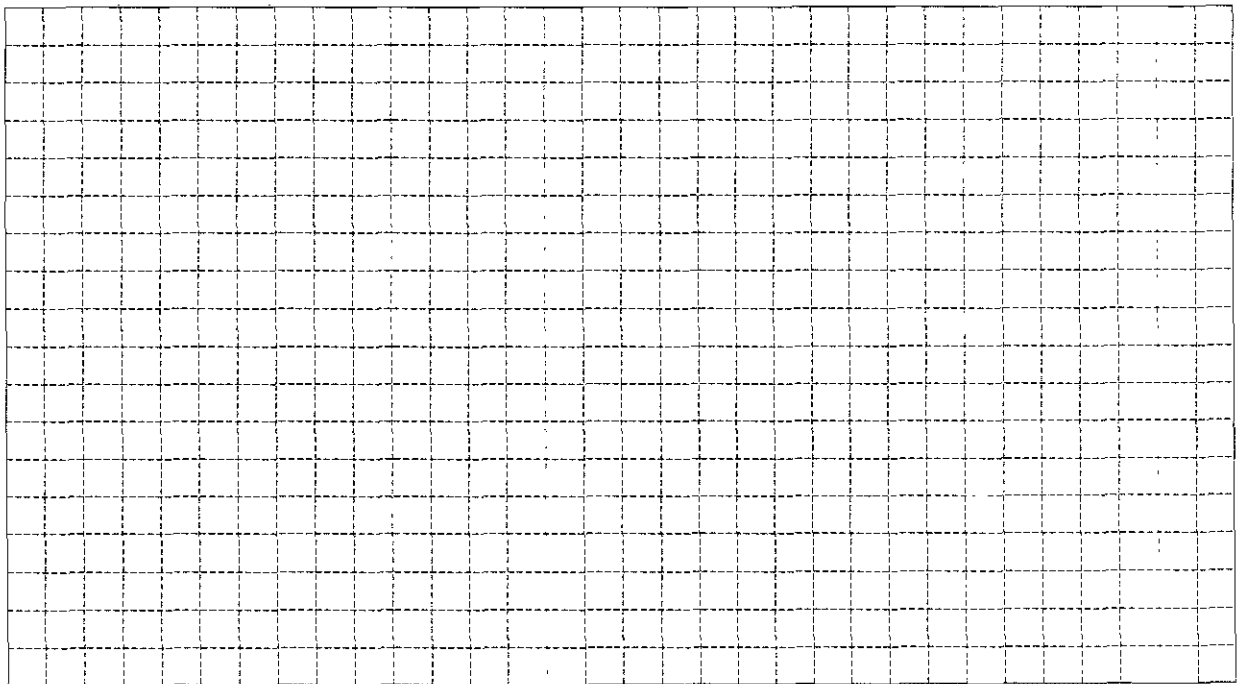
Alter your idea if you wish, but keep it simple.

You are now going to make your idea into a template. The template will let you draw your idea accurately, many times.

The template will be made from 1 mm thick polystyrene sheet.

Draw your template design within the grid below

5mm GRID



Remember that parts will drop out if you cut all the way around them...

Personal Logo



Name _____ Form _____ Date _____

Using approx. 1mm thick card, make a FULL SIZE model of your design.

Test it out to see if it will perform satisfactorily.

Write a brief paragraph about the results of your tests on the model.

Make a list of the steps (in the correct order) you should go through to successfully manufacture your logo template.

- | | |
|----------|-----------|
| 1. _____ | 9. _____ |
| 2. _____ | 10. _____ |
| 3. _____ | 11. _____ |
| 4. _____ | 12. _____ |
| 5. _____ | 13. _____ |
| 6. _____ | 14. _____ |
| 7. _____ | 15. _____ |
| 8. _____ | 16. _____ |

Personal Logo



Name _____ Form _____ Date _____

Once your teacher has given you permission you should go ahead and manufacture your logo template.

List below any new equipment, materials, processes or tools you have used during this project.

Personal Logo

Having completed your logo template take a good look at it and show it to other people.

Now write a short 'Evaluation Report'. You should comment on:

- How attractive is it.
- Is it easy to use as a template?
- Is your logo personal to you, is it easily recognisable?
- How easy has it been to make? Explain any problems you encountered or things you found difficult.



Name _____ Form _____ Date _____

Evaluation Report:

Personal Logo



Teacher's Notes

General Aims:

The students should:

- Gain experience in the use of computer aided design.
- Gain experience in the use of computer aided manufacture.
- Be aware of the advantages and limitations of using CAD/CAM.
- Understand the purpose of logos.

Organisation:

The organisation of this project is very much up to the individual teacher, their experience and more importantly the resources available. The one factor that will influence everyone undertaking this project, is that only one student can use the CNC milling machine at a time. Each student will probably require about fifteen minutes of machining time and this will obviously cause a bottle neck.

The project has been designed to give a lot of scope for extension work that can be carried out before or after the manufacturing stage. Some of these extensions are documented later in the teacher's notes, they again have been organised depending upon facilities and resources available. It may also be possible to run the project with a very small number of students (2 or 3) alongside a larger group project that does not require the CNC element. Each small set of students can then be rotated through the CAD/CAM project during the longer task.

Personal Logo



Teacher's Notes

Equipment Required:

It is essential that a least one CNC milling machine is available. It is also desirable to have at least two computers available for the computer aided design element of the project. Ideally one computer per student would allow a lot of scope for extension work. We do not live in an ideal world, therefore there are alternative organisational strategies and various extension tasks suggested to compensate.

Material Required:

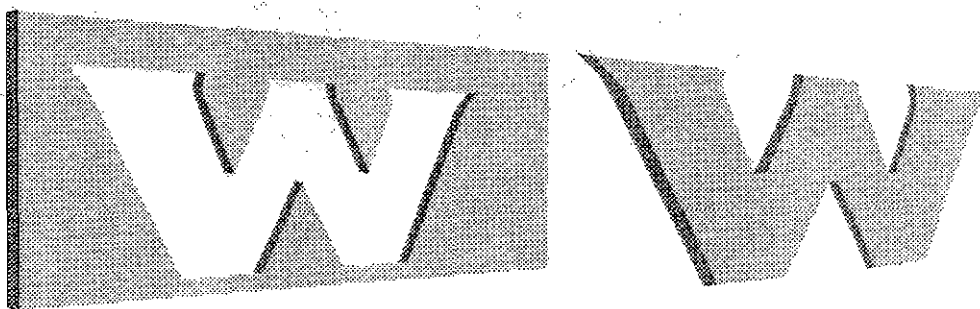
One piece of MDF at least 12mm thick and the size of the maximum CUTTING AREA of your CNC milling machine. (This has been found to be the best media for sticking plastic to.)

A roll of 15mm wide double sided sticky tape.

A sheet of 1 mm thick plastic (ABS or High density polystyrene) cut to a suitable size, no smaller than 80mm by 80mm though.

Expected Outcomes:

It is envisaged that each student should produce a flat sheet of thin plastic with their own logo design cut out of it. The students have two choices of how they produce their design see the picture below.



Personal Logo



Teacher's Notes

Personal Logo

Extension Activities:

Resources

Computers

Students to produce designs for alternative logos, using CAD.

Students to produce business card using logo design.

Workshop

Students to produce 3D model of their logo design.

Students to produce 3D jigsaw of their logo.

Graphics Room

Produce worksheets for future projects incorporating their logo.

Students to produce 3D graphics of a logo design.

Students to redesign an existing well known logo.

General Teaching Room

Students to research existing logos and any changes in history.

Students to produce display of existing logos.



Denford

Computer Aided Design
and
Computer Aided Manufacturing
Project.

Mobiles

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Design Situation

Mobiles

It is often important that designers are aware of production techniques and methods when designing a product. Computer controlled machinery is very often faster and more accurate than manual machined or hand produced items. However computer manufactured goods always require more planning and thought at the design stage.

For this project you will be required to produce the following work:

- Analyse the design brief and generate your ideas in the bubble charts.
- Explore a range of ideas using a theme as a starting basis.
- Develop one or more of these ideas and produce a full size solution in card.
- Generate your idea using a CAD package.
- Produce your idea on a CNC milling machine.
- Evaluate your product.



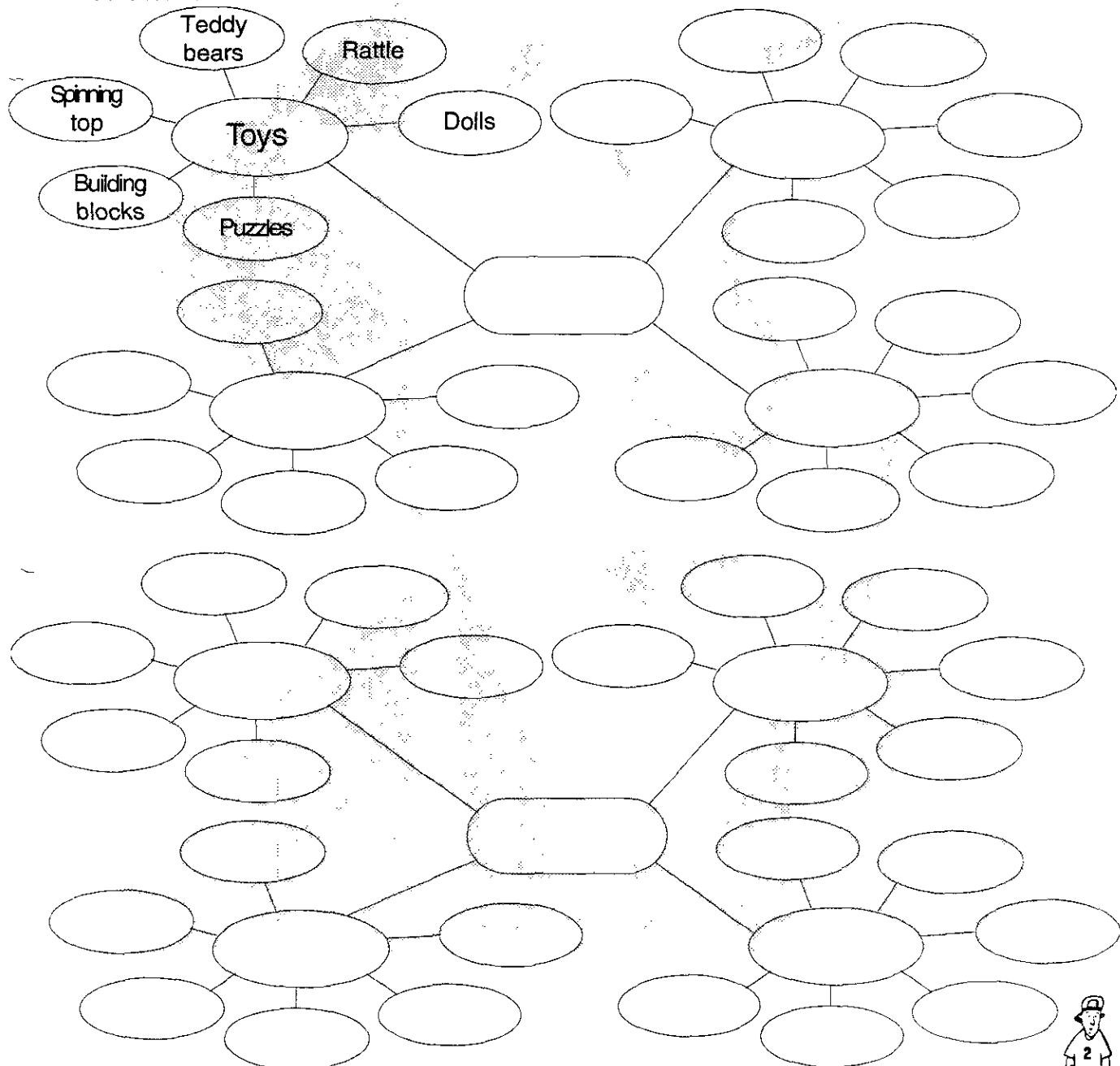
Name _____ Form _____ Date _____

Based on thin sheet material you are required to design and make a mobile. The mobile is to be sold:

- a) as an ornament to amuse a baby.
- b) as a promotional gift from a sports club.

The idea should be based upon a common theme and must contain at least 5 individual elements.

Use the bubble charts below to generate ideas in groups or themes.



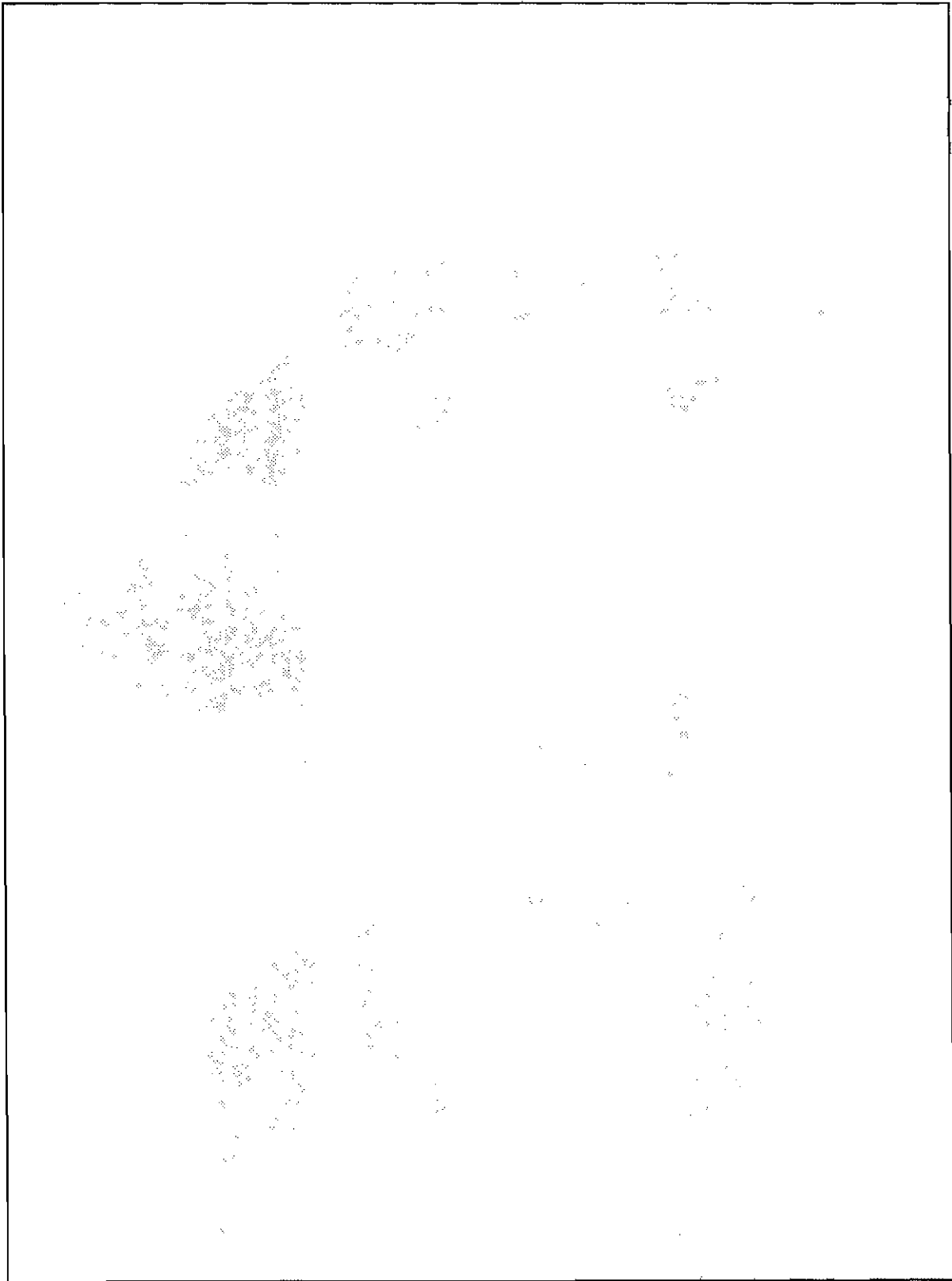
Mobiles



Name _____ Form _____ Date _____

Select what you think is the best theme idea and draw simple shapes that represent the words you have used.

Mobiles

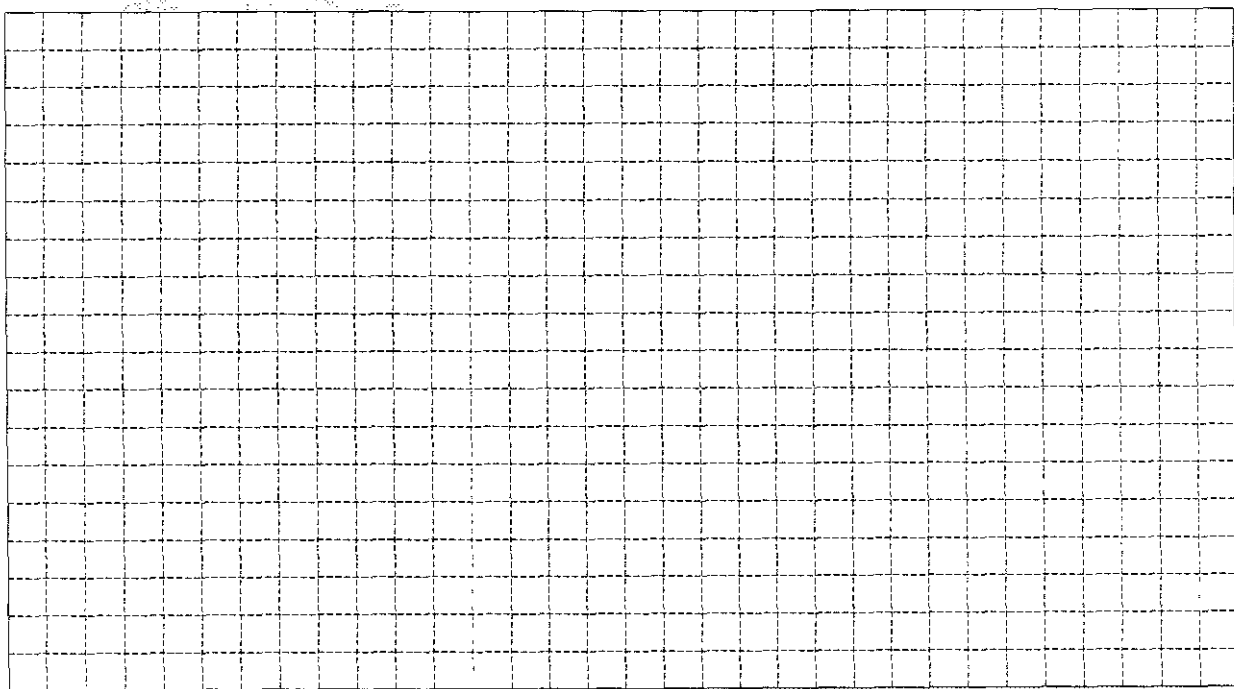
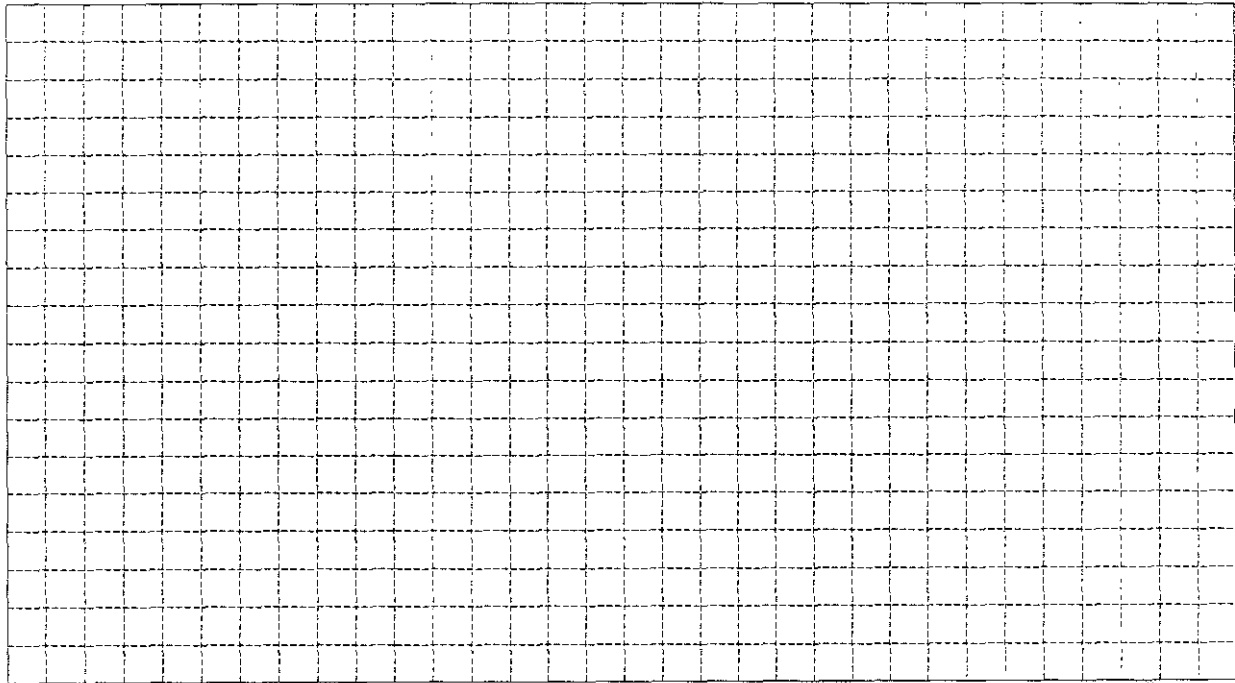


Name _____ Form _____ Date _____

You will now have to ensure your simple shapes fit onto the plastic provided. Transfer your ideas onto the grids below.

5mm GRID

Mobiles



Remember that parts will drop out if you cut all the way around them..



Name _____ Form _____ Date _____

Using approx. 1mm thick card, make a FULL SIZE model of your design.

Test it out to see if it will perform satisfactorily.

Write a brief paragraph about the results of your tests on the model.

Make a list of the steps (in the correct order) you should go through to successfully manufacture your mobile.

- | | |
|----------|-----------|
| 1. _____ | 9. _____ |
| 2. _____ | 10. _____ |
| 3. _____ | 11. _____ |
| 4. _____ | 12. _____ |
| 5. _____ | 13. _____ |
| 6. _____ | 14. _____ |
| 7. _____ | 15. _____ |
| 8. _____ | 16. _____ |

Mobiles



Name _____ Form _____ Date _____

Once your teacher has given you permission you should go ahead and manufacture your mobile.

List below any new equipment, materials, processes or tools you have used during this project.

Mobiles

Having completed your mobile take a good look at it and show it to other people.

Now write a short 'Evaluation Report'. you should comment on:

- How attractive it is.
- If you think it would either entertain a baby or sell well at a sports club.
- How easy it has been to make; explain any problems you encountered or things you found difficult.



Evaluation Report:

Mobiles



Teacher's General Aims:

notes

The students should:

- Gain experience in the use of computer aided design.
- Gain experience in the use of computer aided manufacture.
- Be aware of the advantages and limitations of using CAD\CAM.

Organisation:

The organisation of this project is very much up to the individual teacher, their experience and more importantly the resources available. The one factor that will influence everyone undertaking this project, is that only one student can use the CNC milling machine at a time. Each student will probably require about fifteen minutes of machining time and this will obviously cause a bottle neck.

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Teacher's notes

Equipment Required:

It is essential that a least one CNC milling machine is available. It is also desirable to have at least two computers available for the computer aided design element of the project. Ideally one computer per student would allow a lot of scope for extension work. We do not live in an ideal world, therefore there alternative organisational strategies and various extension tasks suggested to compensate.

Mobiles

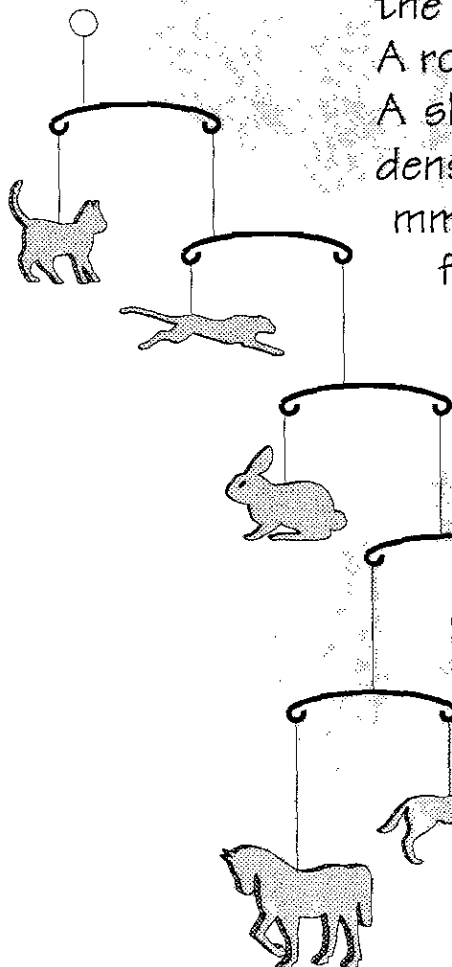
Material Required:

One piece of MDF at least 12mm thick and the size of the maximum CUTTING AREA of your CNC milling machine. (This has been found to be the best media for sticking plastic to.)

A roll of 15mm wide double sided sticky tape.

A sheet of 1 mm thick plastic (ABS or High density polystyrene) cut to a suitable size.

1 mm diameter welding rod to make hangers from. It is possible for students to cut hangers from the flat sheet though.



Expected Outcomes:

It is envisaged that each student should produce a mobile consisting of at least six cut out shapes, see example to the left. Another option might be to design a character in different parts, like Mickey Mouse, with separated head body, legs, feet and hands.



Teacher's Notes

Mobiles

Extension Activities:

Resources

Computers

Students to produce designs for alternative mobiles, using CAD.

Students to produce advertising for mobile.

Workshop

Students to produce wire hangers for mobile.

Students to assemble the whole mobile.

Graphics Room

Students to produce advertising for mobile.

Students to produce presentation graphics for design.

General Teaching Room

Students to assemble the whole mobile.

