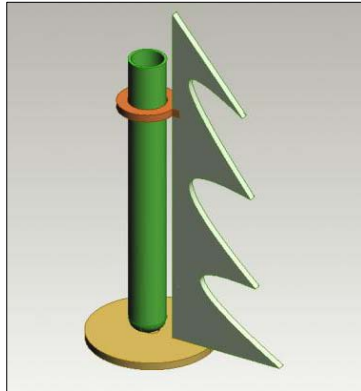
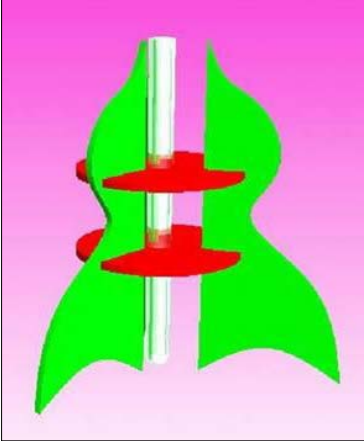


Key Stage 3 Design & Technology: Pro/DESKTOP Project

Suggested Year Group: Year 8

Exemplar Project Title: Flower Holder



Brief:

Flower holders are to be designed to hold and to display a single flower. The designs are made in acrylic sheet, using a given sized test tube and must be assembled without any glue.

Scheme overview:

This project is envisaged as a possible introduction to computer-aided design and manufacture. Pupils work collaboratively to sketch initial ideas for a flower holder based on a standard 16 mm diameter plastic test tube. Using the sketch ideas, students will create models in Pro/DESKTOP by assembling several components made from flat sheet. The test tube is made available as a ready-made component. The final designs will then be transferred to TechSoft 2D Design software and then cut out on the CAMM2 machine.

Using Pro/DESKTOP, the pupils/students can be encouraged to:

- Experiment with a range of different 2D shapes
- Create simple 3D models
- Develop concept model(s) by assembly
- Experiment with a range of colours and textures
- Transfer the parts to TechSoft 2D
- Arrange the parts economically for manufacture
- Use appropriate CNC machinery to manufacture the parts

Learning Objectives:

- to introduce pupils to Pro/DESKTOP solid modelling software
- to enable pupils to produce a simple, high quality product using computer-aided manufacturing
- to give pupils the ability to use virtual modelling in CAD to visualise and modify the appearance of products
- to introduce pupils to the development of products for batch production
- to enable pupils to manufacture, assemble and evaluate their chosen design

Learning Outcomes:

By the end of this project activity pupils will be able to:

- draw and edit 2D shapes
- assemble parts for evaluation and possible re-design
- explore a range of finishes to enhance models
- transfer models for CNC manufacture using appropriate software
- assemble the product and evaluate it

Software specific outcomes – pupils/students will be able to use some or all of the following features in Pro/DESKTOP:

- 2D sketching and editing
- Extrude profiles
- Using the browser and error correction
- Assembly of parts with mate, align and centre axes
- Using the album to apply colours and textures
- Using engineering drawing to export dxf

Essential Vocabulary:

Sketch, edit, profile, extrude, part, component, assembly, alignment, presentation view, acrylic (PMMA), toolpath, offset

Resources:

1. Hardware:

- Roland CAMM2 or similar modelling machine

2. Software:

- Pro/DESKTOP with Standard test-tube design file
- TechSoft 2D Design Tools

3. Other resources:

- Examples of flower holders and real or artificial flowers
- 18mm diameter x 150mm long test-tubes polystyrene or similar
- Modelling clay or Blu-Tack
- CAD/CAM in Practice CD, DATA

4. Tutorials:

- Drawing and editing 2D profiles
- Assembly of parts
- Applying colours and textures in the album
- Exporting dxf from the drawing interface
- Setting up the CAMM2

5. Useful websites:

<http://www.techsoftuk.co.uk>

<http://lr010.k12.sd.us/Bud%20vases.ppt>

<http://www.essentialscountry.co.uk/Floristry%20Supplies.html>

<http://www.wedding-favours.com/Contemporary%20Vases.htm>

<http://www.schoolsnetwork.org.uk/Article.aspx?PageId=218497> (product analysis sheets)

6. Suppliers of resources

Technology Supplies Ltd, Phoenix House, Tern Hill, Market Drayton, Shropshire TF9 3PX

Tel: 01630 637300 Email: sales@technologysupplies.co.uk Website: <http://www.technologysupplies.co.uk>

Disposable polystyrene Test Tubes PK100 Ref: 620-191 £8.06(Excluding: VAT at 17.5%)

The Essentials Company, April House, Davey Lane, Charsfield, Woodbridge, Suffolk IP13 7QG UK.

Tel/Fax: 01473 737567 email info@theessentialscountry.co.uk

Web <http://www.essentialscountry.co.uk/index.htm>

Flower tubes - Plastic tapered tube 11cm long, diameter 2cm at the top, Soft removable cap with hole for a single stem Hold 24cc of water. £2.90 for 30.

Seawhite of Brighton Ltd. Star Road Trading Estate, Partridge Green, West Sussex RH13 8RA

Phone: 01403 711633 Fax: 01403 711258

Email: info@seawhite.co.uk Web: <http://www.seawhite.co.uk>

Acrylic and other plastic sheet

Trylon, Unit J, Higham Business Park, Bury Close, Higham Ferrers, Northants, NN10 8HQ
Tel: 01933 411724 Fax: 01933 350357
email: info@trylon.co.uk Web: <http://www.trylon.co.uk>
Acrylic and other plastic sheet

Suggested Introductory Lesson Activities:

- **Starter (10 min – whole class)**

Product analysis: use the Similarities/Differences worksheet from “maDe smarT” (<http://www.schoolsnetwork.org.uk/content/articles/3766/productanalysisblank1.pdf>) to compare a number of different flower holders.

Develop criteria for product specification.

“In the style of” – slide show to identify design styles.

- **Main Activity (50 minutes each)**

1. Generate ideas: Use 4x4 method to produce four ideas in 4 minutes each.

Give each pupil a sheet of A4 paper. Ask them to draw a rectangle, about 6 cm by 8 cm, in the centre and then use vertical and horizontal lines to divide the area around the rectangle into four regions.

Allow 4 minutes for pupils to draw and annotate one of their design ideas in the centre space.

Ask them to pass their sheet to the next pupil in the group.

Allow them 1 minute to read the drawing they have just received and then 3 minutes to develop the idea in the top left-hand space on the sheet. Remind them to consider materials and construction.

After 4 minutes the sheets should be passed around to the next member of the group and the process is repeated, with pupils drawing in the top right-hand space.

This should continue until the sheet arrives back at the originator, complete with four developments of the initial idea.

The originator could then review the four developments and select or reject the suggestions.

(KS3 Strategy Materials: Module 4 Appendices and handouts (PDF))

2. Develop and model ideas: Use Pro/DESKTOP

Model 2D shapes, extrude them and save as parts.

Assemble parts with the given test tube part.

Evaluate designs against specification given.

3. Manufacture designs: Use CNC

Transfer designs to TechSoft 2D and arrange to minimise use of material.

Manufacture on CNC from acrylic sheet (depending on number and type of CNC machines this may have to be a demonstration and then the rest of the manufacture done by the technician).

4. Assemble designs:

Assemble parts with test tube and test for stability etc. with a flower.

Evaluate against criteria.

- **Plenary (5 min – group work)**

List 5 advantages for using CAD/CAM.

Write an advertising slogan for your product.

What was easy, what was difficult?

Assessment: Key Stage 3 Criteria covered

Developing, planning and communicating ideas

Pupils should be taught to:

use graphic techniques and ICT, including computer-aided design (CAD), to explore, develop, model and communicate design proposals.

Working with tools, equipment, materials and components to produce quality products

Pupils should be taught to: to select and use tools, equipment and processes, including computer-aided design and manufacture (CAD/CAM), to shape and form materials safely and accurately and finish them appropriately

to join and combine materials and ready-made components accurately to achieve functional results

to make single products and products in quantity, using a range of techniques, including CAD/CAM to ensure consistency and accuracy

Evaluating processes and products

Pupils should be taught to:

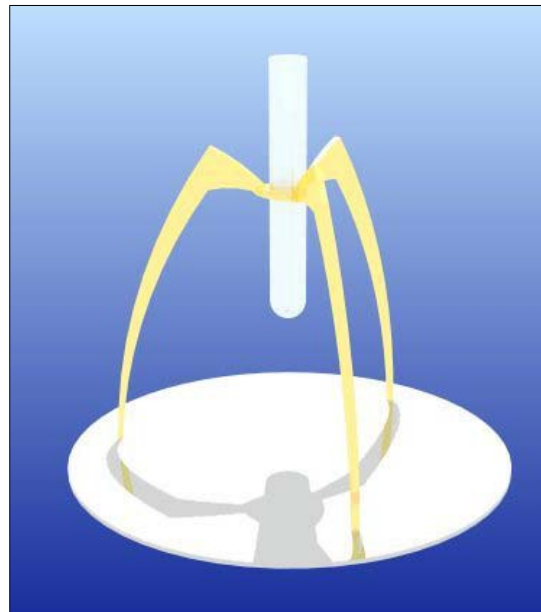
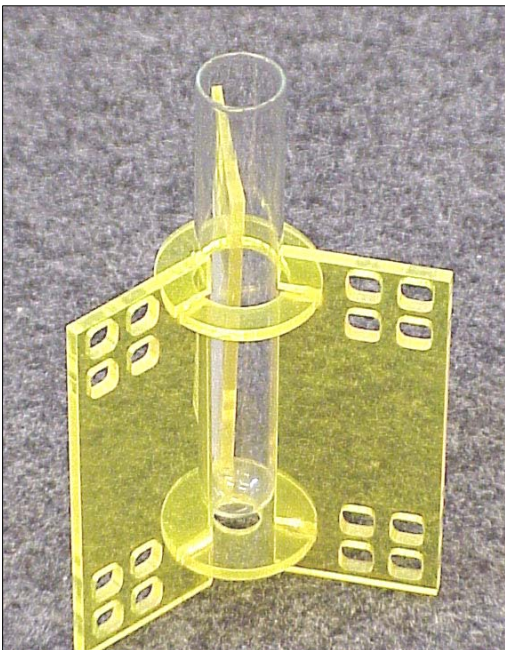
test how well their products work, then evaluate them

Knowledge and understanding of materials and components

Pupils should be taught:

how multiple copies can be made of the same product.

Gallery:



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Author: John Myerson

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