



Wall Clock

Completion time: 2-3 Lessons

Materials and Resources: Project Outline:

- Pencil, paper, ruler
- Sheet MDF material - 2cm thickness
- A range of machine and hand tools to shape MDF material
- Additional craft materials e.g. glue, string, acrylic paint, card etc.
- Battery powered clock mechanism
- Drill and appropriate drill bit
- Formech vacuum forming machine and suitable vacuum forming plastic material (ABS or HIPS is recommended)
- <http://formech.com/case-studies/workshop-wisdom-college-creative-studies-ccs/>

Skills at a glance:

Mathematics

Measurement, scale

Language

Reading, listening

Thinking skills

Research and development, expression, design, interpreting a given brief, material and tool selection, justification of chosen materials, independent thought, problem solving

Science

Heating plastics and effects, plastic/polymer material knowledge, understanding the workings of a battery powered clock mechanism

Students can get creative, designing their very own clock for use within the classroom or at home. Due to its simple nature it can be executed relatively quickly, with students moving from the design to production stage in just 2 lessons. Other than the clock being a conventional circular shape, students can enjoy full creative freedom in how they might choose to design their clock face, drawing upon a range of materials and tooling methods, both selecting and justifying the use of materials. This project will require a simple battery powered clock mechanism to be installed and housed on the reverse of the finished product.

Method:

Using a pencil and paper, students can begin by designing their clock, considering what the numbers may look like, what 3D elements it might have, or if a theme or style will be followed.

Students will have key considerations to remember when designing their clock; how big is the clock mechanism and how thick will the clock need to be to house it appropriately? How high and what clearance will the clock hands have above the clock face surface, and how will this affect the size of 3D detail of the clock face?

Dimensions of the clock design must conform to the forming area of the available Formech vacuum forming machine.

Students can now begin making their vacuum forming mould. Using sheet MDF material and a range of cutting and sanding methods, students can craft their clock design shape. Draft angles will need to be applied to its outer edges, and any substantial 3D detail within the clock face.

Students may wish to add detail by gluing additional material to the MDF mould, or by cutting into the material using appropriate tooling.

Venting holes might be drilled around any area where there are recesses or fine detail, like around any 3D numbers or number markers.

The completed mould can now be vacuum formed using any suitable plastic material, although HIPS or ABS is recommended. Any excess material can be trimmed off.

A hole can be drilled ready to receive the clock mechanism.

Acrylic paint is a fast and easy way for students to add any desired colour or detail to their clocks.

The clock mechanism can be secured, and the clock can be hung and used either at home or in school.

Homework Tasks:

Vacuum forming can be used to make many kinds of plastic casing for all manner of items, acting as a body or protective covering. In order to further develop student's understanding of the wider application of the technology, they might be tasked with observing the world around them, and listing a whole host of products that may have had vacuum forming as a principal production technique at their hearts. For example, remote control cars, or bicycle helmets.

Students may also be asked to conduct research, development, and observe other clock designs at home, in preparation for the lesson, to greatly reduce the in class completion time for this project.

Optional Extras:

MDF is wonderful material for the production of vacuum forming moulds, although students might explore others within this simple clock project. Sheet foam is a cheap and accessible alternative to MDF, which draws upon similar tooling methods, whilst requiring careful consideration and preparation before the vacuum forming process.

Student Accomplishments:

- The production of a professional and fully functional battery powered clock
- Demonstrating capabilities with wood saws, sanders, and other small hand tools
- Utilise and demonstrate a variety of different skills and tools within the workshop
- Free selection and justification of mould materials
- Practical hands on experience using a vacuum forming machine, and understanding its wider application
- Interpret a design brief accurately and creatively

Teachers notes:

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