

# Project Ideas

## For

# New Technology

## Junior Certificate 2003

The following are brief descriptions of the solutions to the practical design briefs for the Junior Certificate Examination in New Technology 2003. These solutions are at present being developed by the students of St. Columba's Comprehensive School. The photographs of the finished projects will be posted when available.

### **Project (a) *Design and make a Weighing Scales.*** (possibly up to 2 Kg.)

Three different types of scales are being investigated. The first is the beam balance type, with a 300mm X 120mm base made from 20mm MDF. The upright is made from 50mm X 3mm aluminium attached to the base with wood screws. The balance beam is made from 20mm X 3mm aluminium tapered towards the ends. The pan supports are made from 15mm X 2mm brass attached to the balance beam with M3 machine screws. The pans are made from 1mm copper and have scalloped edges.

The next type of scales is a spring balance. A 20mm diameter brass tube slides freely in a 22mm diameter aluminium tube. The tubes are 130mm in length. There is a tension spring inside the tubes attached at the ends to two machined conical end pieces which were made in the lathe. The conical end of the top tube has a ring for holding by hand or for hanging up. The bottom conical end has a hook. The bottom tube will be calibrated to read the weight.

The 3<sup>rd</sup> type is a counterbalance type scales. The base is similar in size and shape to type 1. There is a short upright to give a height of 150mm the pan, made from 1mm copper is hung from one end about 100mm from the upright. The other end of the beam is a 10mm diameter brass bar with a 40mm x 25mm diameter steel counterbalance that can slide along the brass bar which will be calibrated to read the weights.

### **Project (b) *Design and make a model hovercraft.***

There are three different shapes of the same basic construction and layout. The models consist of a 0.7mm vacuum formed body measuring 240mm X 120mm overall. Into this will be fitted a small electric motor driving directly a 110mm diameter propeller. A battery holder for 2 AA batteries and a small toggle switch will be used.

This structure has been tested and will hover with 4 AA batteries.

### **Project (c) *Design and make an educational toy for a small child.***

The first type of toy is a truck measuring 300mm X 250mm with diameter 120mm turned MDF wheels attached to diameter 5mm axles. There is a handle to push it along. Inside are 9 ABC blocks.

The next type of educational toy is a clock. The body is made from two pieces of trovicel plastic with the sides bent with the strip bender. A coloured clock face was printed out using Microsoft Paint on the computer and attached with adhesive. The hands were made from coloured acrylic and attached using a M5 screw and two hex nuts.

Another educational toy is a vacuum formed car with 20mm diameter rollers on the axles and another just below the roof. A continuous fabric strip moves on the rollers as the toy is pushed forwards or backwards showing shapes like apple, dog, cat etc. on the fabric which can be seen one at a time through an opening cut in the roof.

**Project (d) *Design and make a model motorised sliding door with automatic stops.***

Various shapes are used but the basic principle of operation is the same. A base, wall and door is constructed from MDF. A strip of 20mm X 2mm aluminium is bent to form a runner at the top. Two plastic pulleys are used as wheels to support the door. A diameter 3mm pin projecting from the bottom of the door slides in a groove cut in the base. A small electric motor driving a worm wheel and 60mm diameter gear is used to wind and unwind a string to move the door. The motor is operated with a DPDT switch and two limit switches.

More project ideas may follow later.