Technology Department- A Level Design Engineering

Staff members

- -A King
- -A Snell

Supported by D. Lambert

Saint Benedict Catholic Voluntary Academy-Sixth Form

Y12 content

Autumn

- Exploring 2D and 3D drawing skills, develop knowledge of industry use of graphical communication
Introduction to Design Engineering.
Design context and links to existing product
Challenge task used to develop communication
Materials and material properties/qualities. Understand how factors influence material choice in Design Engineering
CAM Project
Machatronics and Smart Materials
Health &Safety – Manipulating materials and production methods

Spring

-Machatronics and Smart Materials-continued
Mechatronic Test rig
Health &Safety – Manipulating materials and production methods - continued
Materials Science and structural integrity

Summer

-Product Analysis and skills leading to the iterative design process
Up- cycling Project

Y13 content

Autumn

- -Interitive Design Project
- -Exam Revision Skills

Spring

- - Interitive Design Project
- - Exam Revision Skills

Summer

- - Exam Revision Skills

Course Overview

Total time – 360hrs	Teacher A	Teacher B
Term 1 (13 weeks)	Acquisition of Knowledge *(mainly Classroom based)*	Application of Knowledge *(mainly Workshop based)*
Term 2 (11 weeks)		
½ Term 3 (5 weeks)		
½ Term 3 (5 weeks)	Iterative Design Project	
Term 4 (13 weeks)		
Term 5 (11 weeks)		
Term 6 (10 weeks)	Revision and Exams	

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Sample of student work. Functional performances of materials used for a jug kettle

Component	Label	Material	Function
Main body kettle	A	Brushed and lacquered stainless steel	The high chromium content of stainless steel provides the unique stainless and corrosion resisting properties and helps to resist scaling inside the kettle. Durability and hardness make it resistant to knocks and dents
Handle	B	Low Density polyethylene (LDPE)	Heat resistant Thermal insulator
Water Filter	C	Polypropylene (PP)	Polypropylene is used in water filters as it has good chemical resistance, durable and contains good barrier properties.
External Base	D	Polypropylene (PP) Decorative brushed steel band around perimeter	Able to withstand boiling water and has a glossy scratch resistant surface.
Internal Base	E	Anodised stainless steel comprising of two sections that are stamped out and punch pressed to contain the heating element	The stainless steel has properties that make it resistance to rust and is a good retainer for heat.
Heating Element	F	Nichrome, 80% nickel and 20% chromium, wire, ribbon or strip Outer copper housing that is chrome plated	Good at conducting heat and also is resistant to heat.
Thermostat	G	Bimetallic strip made from brass and iron	Used to convert temperature change into mechanical displacement
Rubber Feet	H	Rubber	Insolation and repels water.
Water Level Clear Window	I	Low-density polypropylene (PP)	Heat and chemical resistant plastic
On/Off Switch	J	LED light in polycarbonate	Only transparent plastic that offers light transmission and thermal stability.Heat resistant.

Sample of student work.

Functional performances of materials used for a jug kettle

Task 2: Extension task

Examine the development of a product of your choice over the last 20-30 years and explain how the selection of materials and components for the product has changed from when the product was first introduced to now, with reference to:

Functional performance
Aesthetics
Cost and availability
Properties and characteristics
Environmental considerations
Social, cultural and ethical factors

Microwave

The first commercial microwave was made in 1947 and looks different to what we are used to today. The Radarange was 1.8m tall and weighed 340kg. Back then, the Radarange had to be water-cooled. This meant that it required plumbing. It was made of metals that could conduct heat which meant it was not safe to touch while it was heating up food. It also had other hazards. One of them was that it was not good at evenly heating the food inside. Also, the people near the working microwave were exposed to the radiation from the microwave.

The Radarange had to use a lot of electricity for it to work properly. This meant the wires used were inefficient at giving heat to the Radarange. The production of the Radarange was not considerate to the environment as they polluted the earth.

However, today, the microwave is very different. It is much smaller and portable and is also energy efficient. It is more aesthetically pleasing and performs better than the Radarange. Since the microwave is smaller, it uses up less materials and is not dependant on water cooling. This makes it more environmentally friendly in production.

It is made out of stainless steel as the material is corrosion resistant, ductile. The cooking surface is made out of either ceramic or glass. This is because glass is heat resistant, pressure and breakage resistant, and is also chemical resistant.

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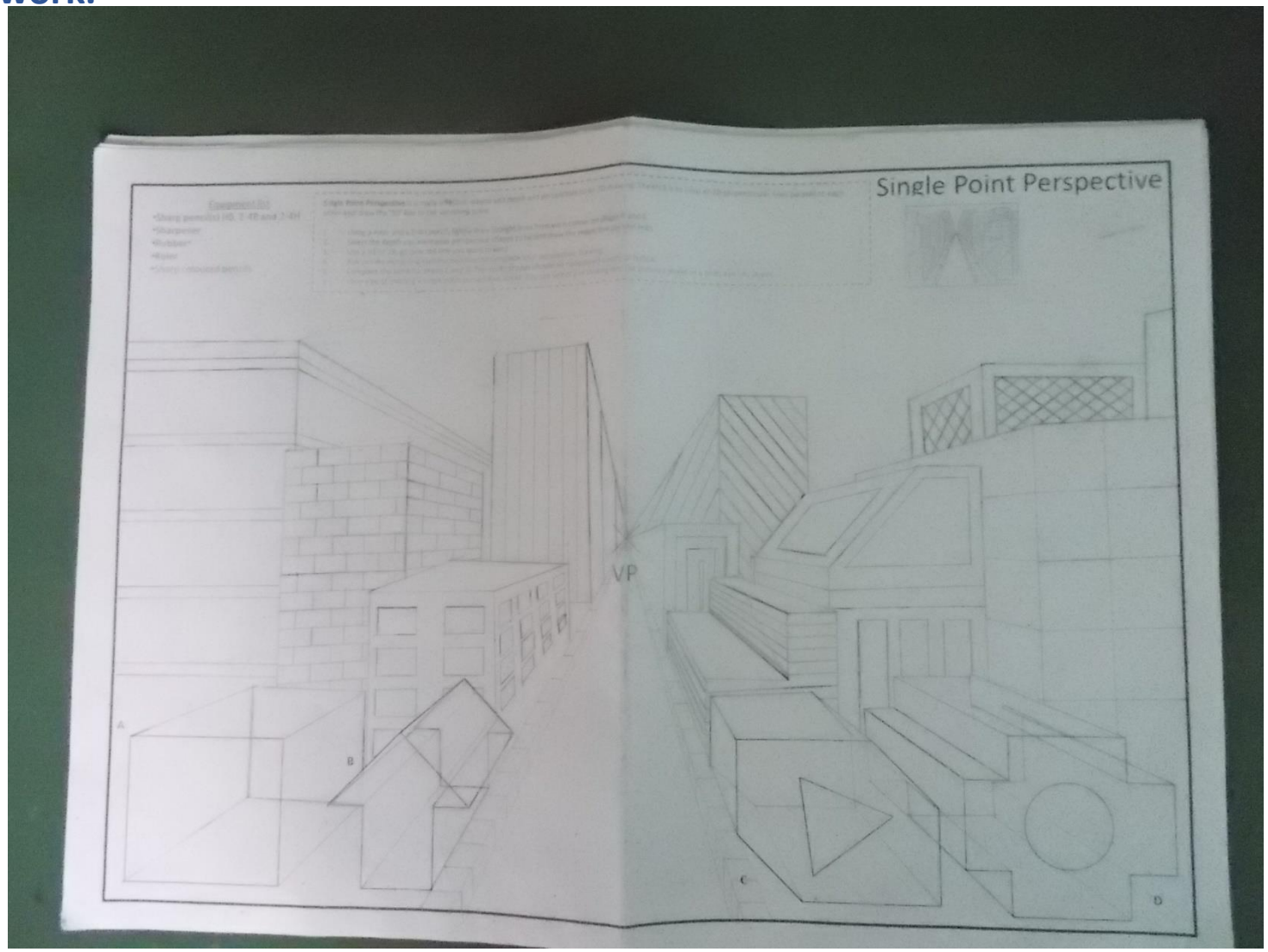
Sample of student work.



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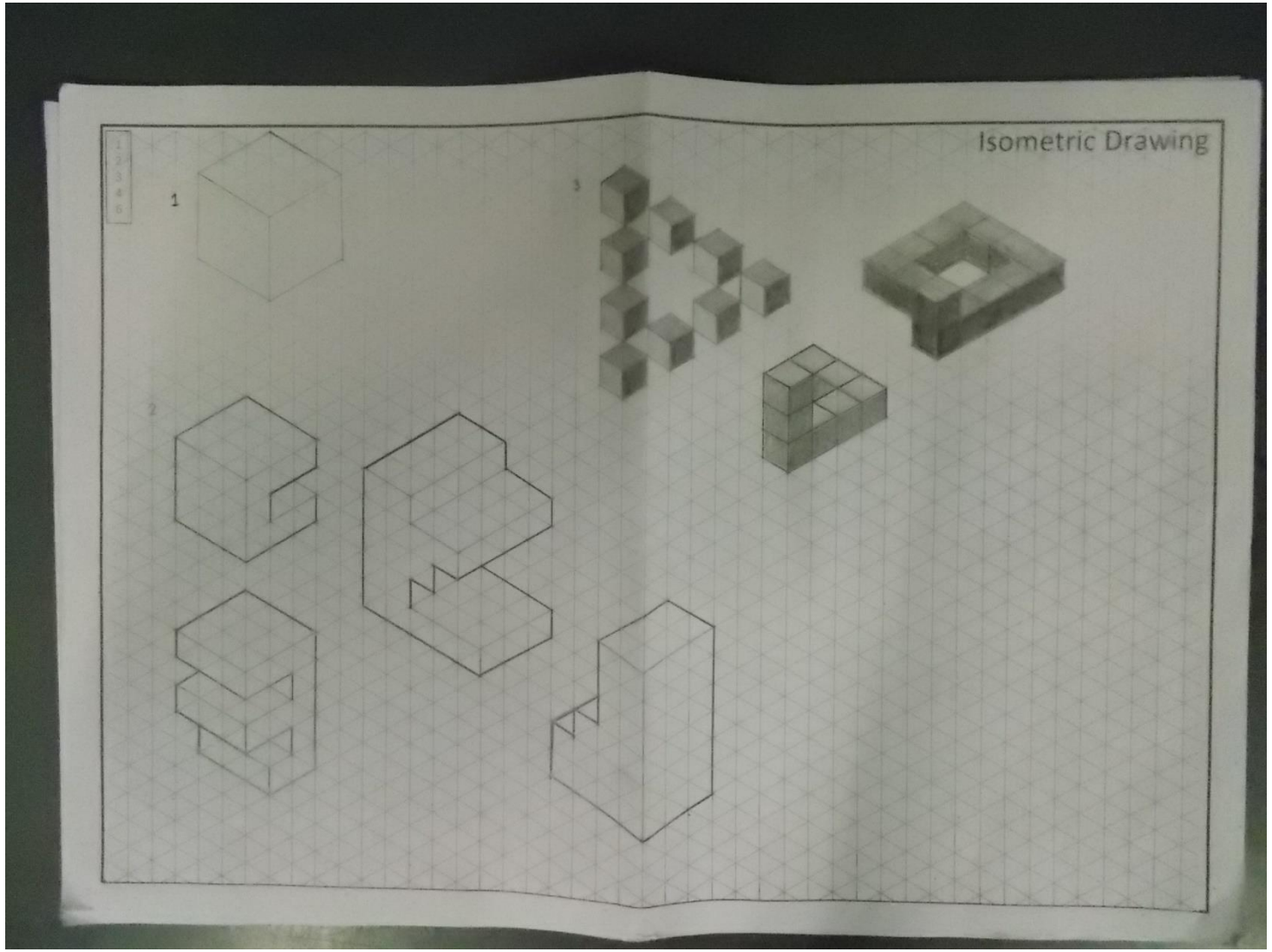

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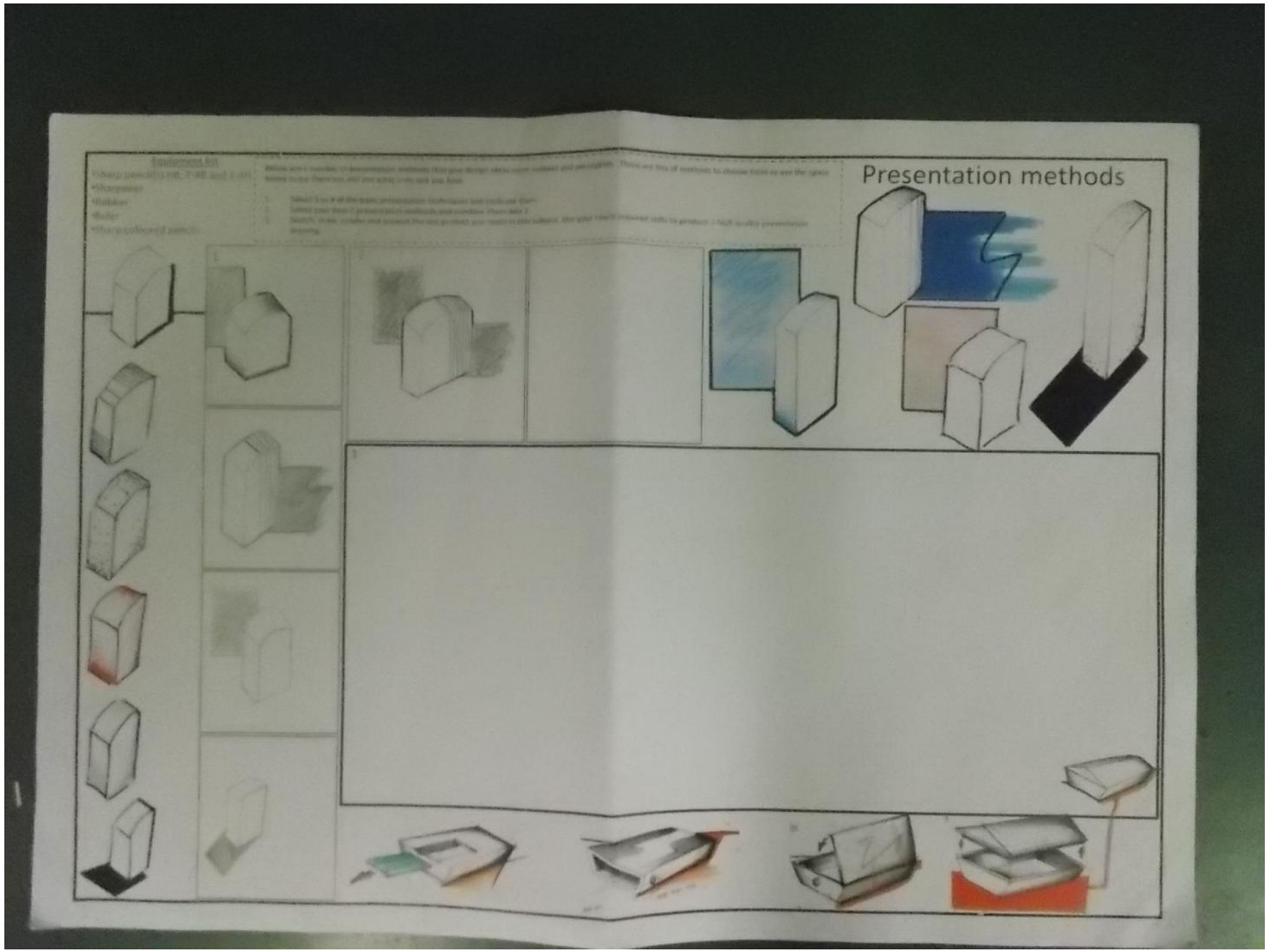
Sample of student work.



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Exam board: OCR

Exam specifics
Design and Technology: Design Engineering (H404)

Component 1: Principles of.. (80 marks)
1 Hour 30 minutes written paper
26.7% of total A level

Component 2: Problem Solving.. (70 marks)
1 hour 45 minutes written paper
23.3% of total A Level

Component 3: Iterative Design project..(100 marks, weighted up to 150 marks)
Approximately 65 hours.
Non-exam assessment
50% of total A Level

Entry requirements

The entry requirements for this course are:

Maths – Level 6 or above

Science – Level 6 or above (combined Science or Physics/Chemistry)

Career pathway link

Successful completion of this qualification can lead to:

A degree course in Design Engineering/Engineering Higher Engineering Apprenticeship

Thank you for visiting our subject.
If you have any questions, please contact

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