

KS4Project Scheme of Work 2018-19

Subject	Topic	Year Group	Length
WJEC Product Design	Metal Bottle openers.	10	4-5 weeks.

<u>Target Grade</u> A-C

Investigating the design context	Development of the design proposal Generate ideas of feasible shapes for the bottle opener.	Testing and evaluation Evaluate the shape for it's ergonomic quality.	Communication Use drawing and writing skills to communicate your work effectively.
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ICT SKILLS
Use of pro-desktop to draw bottle opener.

Making
Learn how to mark out, cut and shape steel. Learn about case hardening, and plastic powder coating.

HEALTH AND SAFETY
Risks– Cuts from burs on edges of metal.
Burns in heat treatment room.
Use of pillar drills is a potential hazard when using thick steel.

EXTENTION WORK
Make a 10mm spanner using the same principle.

Learning ACTIVITY
Designing and making a Bottle opener from mild steel.

SKILLS AND KNOWLEDGE
Develop pro-desktop skills.
Gain an understanding of how to design and make using metal.
Gain an understanding of how to use heat treatment to change the properties of a material.

TECHNICAL LANGUAGE
Ferrous and Non-ferrous. Alloy, Heat treatment, Case hardening, Mild steel, Plastic powder coating.

Lesson No	Learning Objective We are Learning to (WALTS)	Specification Focus	Teaching Activity	Outcomes Plenary (WILFs) Assessment	Health and Safety	Resources
1	Re-cap british standard dimensioning. Marking out Drilling steel	Communication Making	Make a folder. Guide pupils to produce a 2D scale drawing of the bottle opener design. Use engineers blue, scribes and try squares to mark out. Drill hole—4mm and then 11mm. Hwk– Metals homework.	Neat presentation Accurate drawings. Precise marking out and drilling.	Machine vices used.	110mm by 25mm by 4mm mild steel per pupil.
2	Different metals and alloys Using ergonomics to form a design. Cutting steel And shaping steel	Exam theory Making Investigating the task and Developing a solution. Communication	Discuss Ferrous, Non Ferrous element metals and Alloys. Discuss properties. Cut opener end to the required shape. Design handle shape on paper. Come up with 3 shapes using ergonomics as a focus for the design criteria. H/wk- Write up the making process using the key words from the practical lessons.	A developing knowledge and understanding of metals. Precise cutting. Original and feasible ideas. Correct terms and names with good presentation.	Hazardous burred edges.	Fully stocked metal work area. Fully functioning heat treatment area. Casinite
3	Shaping steel. Heat treatment.	Making Exam theory Making Communication	Continue to shape the handle and finish the end using emery cloth in oil. Discuss and demonstrate case hardening. Supervise while pupils case harden using casnite– Two pupils at a time in the heat treatment area. Hwk- Write up the heat treatment process and provide one case study.	Precise shaping Safe use of equipment Good grasp of terms and theory of the process.	Wash hands after lesson. Supervision and Demonstration of all heat treatment.	Plastic powder coating machine.
4	An appreciation of wider case studies. Finishing steel.	Exam theory Making Communication	Discuss the case studies identified. Case harden in pairs. Supervision at all times. Guide pupils to produce a highly polished finish on the case hardened portion of the bottle opener. Hwk– Continue with process write up.	A wider knowledge. High quality finish on metal. Good use of drawings to communicate process.	Supervision of heat treatment.	
5	An understanding of metal coating techniques	Making Communication	Demonstrate Plastic powder coating and discuss other coatings for metals. Guide pupils when they dip coat plastic. Pupils to work on shaping and dip coating. Hwk– Complete project write up.	Safe use of all equipment. An interesting/comfortable shaped bottle opener. Well finished and plastic coated well.	Supervision of powder coating.	
6	Completing main project and using the same techniques to make a spanner.	Making	Introduce making the spanner. Set pupils on task if they complete Bottle opener. Remaining pupils to finish Bottle openers.	An interesting/comfortable shaped bottle opener. Well finished and plastic coated well.		

Assessment

Grade	Investigating the design context	Development of the design proposal	Making	Testing and evaluation	Communication
A		Three designs which are original, well presented and take into account ergonomic needs.	Use of a range of tools and equipment correctly, safely and accurately. Product finished to a high standard.		High quality presentation. Use of a range of communication techniques.
C		Produce designs which are well presented and show some thought about comfort in use.	Use of a range of tools and equipment with the need for help. Safely and correctly used. Product finish is in fitting with its function.		Good presentation with different techniques used.
E		Basic drawings of handle shapes which little quality of presentation and little thought of comfort.	Some tools and equipment used at a basic level. Help needed often. Bottle opener rushed and poorly finished.		Low level presentation. Limited range of techniques used.

Addition all assessment