USB Fe-Male Light

SOC

Unit of Work Overview: **Fe-Male USB Light** **Year 10** **Time**: **5-6 weeks**

Description of Unit

This project provides pupils with the opportunity to work with sheet metal, wasting, bending and joining. The design is a predetermined outcome in the form of gender shaped USB powered LED desk light. Pupils will sketch design details and develop card models to understand scale and proportion before manufacturing.

Knowledge, Understanding and Skills	Key Elements	Thinking Skills & Personal Capabilities
Developing pupils' Knowledge understanding and skills; **Developing creative thinking and problem solving skills through:** • **Design –** identifying problems; investigating, generating, developing, modelling and evaluating design proposals; giving consideration to form, function and safety; • **Communication –** use of free-hand sketching and formal drawing techniques; • **Manufacture-** safe use of a range of tools and processes appropriate to materials, demonstrating accuracy and quality of outcome.	**Personal understanding –** exposure to good exemplars of product designs in relation to personal lifestyle. **Moral character –** Demonstrate cooperation and respect for others. To tolerate errors and set-backs and to learn from these experiences. Demonstrate tenacity to meet design challenges, using failure as a learning experience. **Mutual understanding** – agreeing criteria to evaluate their own work and that of others **Education for sustainable development –** encouraging pupils to trade spare cut-offs to reduce waste of materials. **Personal health –** Abide by health and safety rules when using tools, machines and equipment.	**Thinking, Problem Solving and Decision Making** Generate a range of possible solutions. Examine options and weigh up pros and cons. **Working with Others:** Working effectively in group work tasks. **Self management:** Plan how to go about a task. Focus, sustain attention and persist with tasks. **Manufacturing**: Selecting and using materials fit for purpose; safe use of a range of tools and processes appropriate to materials, demonstrating accuracy and quality of outcome;

Learning Outcomes	Possible Links with other Areas of Learning/Subject strands:
• **demonstrate practical skills in the safe use of a range of tools, machines and equipment,** • **work methodically through the design processes;** • **communicate effectively in oral, visual (including graphic), written,;** • **work independently, managing evaluating and improving own learning;** • **work effectively with others;** • **demonstrate creativity and initiative when developing ideas and following them through;**	**Maths -** • Symmetry • Scale drawing • Measurement • Evaluating and appreciating their own and others' work through discussion and reflection

Lessons

Learning Intentions Pupils are learning	**Learning and teaching activities**	**Opportunities for Thinking Skills and Personal Capabilities / development** *(Including Communication, Using Mathematics and Using ICT))*	**Opportunities for assessment** *(For and of Learning)*	**Resources**
1. Pupils will identify aspects to be considered when solving a problem. **2. Pupils will be able to mark out a sheet metal design accurately in preparation for wasting and bending.** **3. The pupils will be able to use card as an effective way to model/trial an idea.**	This task allows pupils to break the problem down by identifying aspects to be addressed, making it easier to manage/more attainable. This task allows pupils to generate their own version of the Male/Female concept. Using the front elevation template they will draw out one side of the symmetrical shape identifying waste and bend lines. Emphasis on accuracy. *Appropriate teacher demonstration* This task demonstrates how card can be used as a low cost, quick method of modelling and realising a concept. This process is to be repeated until pupils produced a highly developed outcome. Follow up task requires pupils to generate a 3D sketch of this model *Appropriate teacher demonstration*	Select a focal point or area as to which the project is aimed at. Generate possible solutions, try out alternative approaches, and evaluate outcomes. Make ideas real by experimenting with different designs, actions, outcomes See opportunities in mistakes and failures.		**All of the activity sheets come with teacher guidance material.** Activity sheet – Design Brief Activity sheet – Design page Sheet metal Activity sheet – Design page Card model

4. Pupil will get the opportunity to design a system in the form of a PCB layout.	This task encourages pupils to develop their skills in system design and design their own PCB layout. *Appropriate teacher demonstration*	Generate possible solutions, try out alternative approaches, and evaluate outcomes.		Activity sheet – Design page PCB layout
5. Pupils will plan their manufacture of their product.	This task allows pupils to develop a production plan. This allows pupils to clarify the process and the steps involved. This should encouraging them to: - follow step by step instructions - work more independently/self reliant (less dependency on the teacher for instruction) - have a clearer understand the processes	Organise and plan how to go about a task		Activity sheet – Manufacture sheet, production plan.
6. Manufacture Pupils should be able to: **(a) Understand the process of manufacturing the Light.** **(b) Develop the skills required to produce a high quality product.** **(c) Understand the health and safety implications of manufacturing when in the workshop.**	The teacher will demonstrate the correct and safe use of workshop tools and equipment. Pupils will manufacture their product using a range of workshop skills and techniques with a focus on accuracy and finish. *Teacher explanation* Theory on bending sheet metal techniques, product examples of these and permanent joining techniques (cold riveting).	Take personal responsibility for practical work. Focus, sustain attention and persist with tasks Seek advice when necessary Make ideas real by experimenting with different designs, actions, outcomes		Theory sheet – Bending See teacher guidance booklet for manufacturing resource list

5. Pupils should be able to objectively evaluate of the outcome.	Teacher and pupil review of the outcome, this can take place in peer groups or as a whole class group. Followed up with teacher/pupil individual assessment. Note: Pupils should be made aware of the respective assessment criteria at the start of the design assignment and manufacturing assignment. **Debrief** – • Pupils will be asked to feedback on the activity: • What was difficult about this exercise? • Did you find it useful in helping to clarify design thinking?	Take personal responsibility for work with others and evaluate own contribution to the group. Respect the views and opinions of others. Learn from and value other people's ideas.		