STEAM Year 7 Controlled Light

Unit overview

- Learn about concept design.
- Develop hand drawing skills.
- Learn how to use Computer Aided Design Software.
- Learn about materials and their properties.
- Learn how to use a computer to control external devices (LEDS).

STEAM SKILLS

- Using failure to learn and grow
- Creativity
- Understanding of tools

Lesson Overview	**Keywords**
Initial design ideas/concept design – 1 lesson Start by understanding the problem and creating your initial ideas. **Hand Drawing methods – 2 lessons** Learn how to draw detailed isometric and orthographic drawings of your Light design. **Computer Aided Design software – 2 lessons** Learn how to use computer software to create accurate models of your light. **Construction Skills – 2 lessons** Develop news hand skills in the workshop to create the lamp out of your chosen materials. **Microbit hardware programming – 2 lessons** Learn how to control LEDs by programming a MicroBit. **Independent construction and assembly – 3 lessons** Multiple lessons where you will work independently on developing your product. You may be allowed to move between IT and DT rooms with your teachers permission. **Final Presentation** As well as handing in your PowerPoint containing the story of your product development, you will also create a single page advert to sell it.	• Creativity • Accuracy • Sensor • Input • Output • Resistor • LED (Light Emitting Diode) • Short Circuit • Ground (0 volts) • Positive • Negative • Breadboard • Jump leads • Prototype • Switch • Pinouts
Suggested Reading or support available STEAM Club after school on Thursdays.	**Cross Curricular** **Maths** – ratio and proportion, logical thinking and problem solving. **Science** – Basic electronic circuits, electrical flow, sensors **SMSC:** Students are required to identify a practical problem and design a Smart Light to solve the problem whilst remaining environmentally friendly.

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	SUCCESS CRITERIA Highlight your starting point for each skill in **PINK**, at the end of the project highlight where you think you got to in **BLUE**.		
Grade Range	**Understanding of tools**	**Creativity**	**Using failure to learn and grow**
0	I presented no work.	I presented no work.	I presented no work.
1	WWW: I know which tools or software to select and can use them for basic tasks safely (with hand tools or computer software). EBI: I need to be able to choose the correct tools (hand tools or software) and understand the risks.	WWW: I can develop some ideas using existing examples and try to make my own changes to them. EBI: I need to make my designs my more my own and try to bring something new into them.	WWW: I can identify some basic errors and mistakes with my work. EBI: I need to reflect more on my mistakes and try to not repeat them.
4	WWW: I can select the correct tools (hand tools or software) and know the risks of that tool. EBI: I need to expand my knowledge and features of different tools (hand and software).	WWW: I can develop and show some fresh ideas and my examples are mostly developed by myself. EBI: I need to use other peoples examples and ideas more for inspiration than copying and develop my own style.	WWW: I can identify some issues and mistakes and overcome them. I can reflect on the causes of mistakes and see why they happened. EBI: I need to think more carefully about past experiences\mistakes so that I do not make the same mistake again.
6	WWW: I can make good choices in my selection of tools (hand tools and software) for safe and efficient use. I have a good understanding of their purpose. EBI: I need to expand my knowledge and purpose of a wider range of tools and equipment so I can work more effectively.	WWW: I use examples only as a start point and can develop numerous different options from there. My final ideas clearly show my own personality and style. EBI: I need to try and produce alternative unique ideas that accurately meet the design requirements.	WWW: I managed to independently identify and fix issues and mistakes. EBI: I should refer to my past errors (looking at my past work) and attempt to resolve potential mistakes at the design stages.
8	WWW: I know the pros and cons of different tools (hand tools and software) and can make clear decisions on which to use for safety and efficiency. I have an excellent understanding of how they work and their capabilities. EBI: I can expand my knowledge and understanding of tools (hand\machine and software tools) that are used in the real world.	WWW: I can develop multiple new ideas and options that accurately meet the design requirements. My solutions are highly innovative, unique and purposeful.	WWW: I can shown and explain, using previous issues and mistakes, why my work or solutions will be more likely to succeed than in previous efforts. EBI: When testing a problem, I need to make sure that I also try to prove something doesn't work as well as what does work to gain a better understanding.

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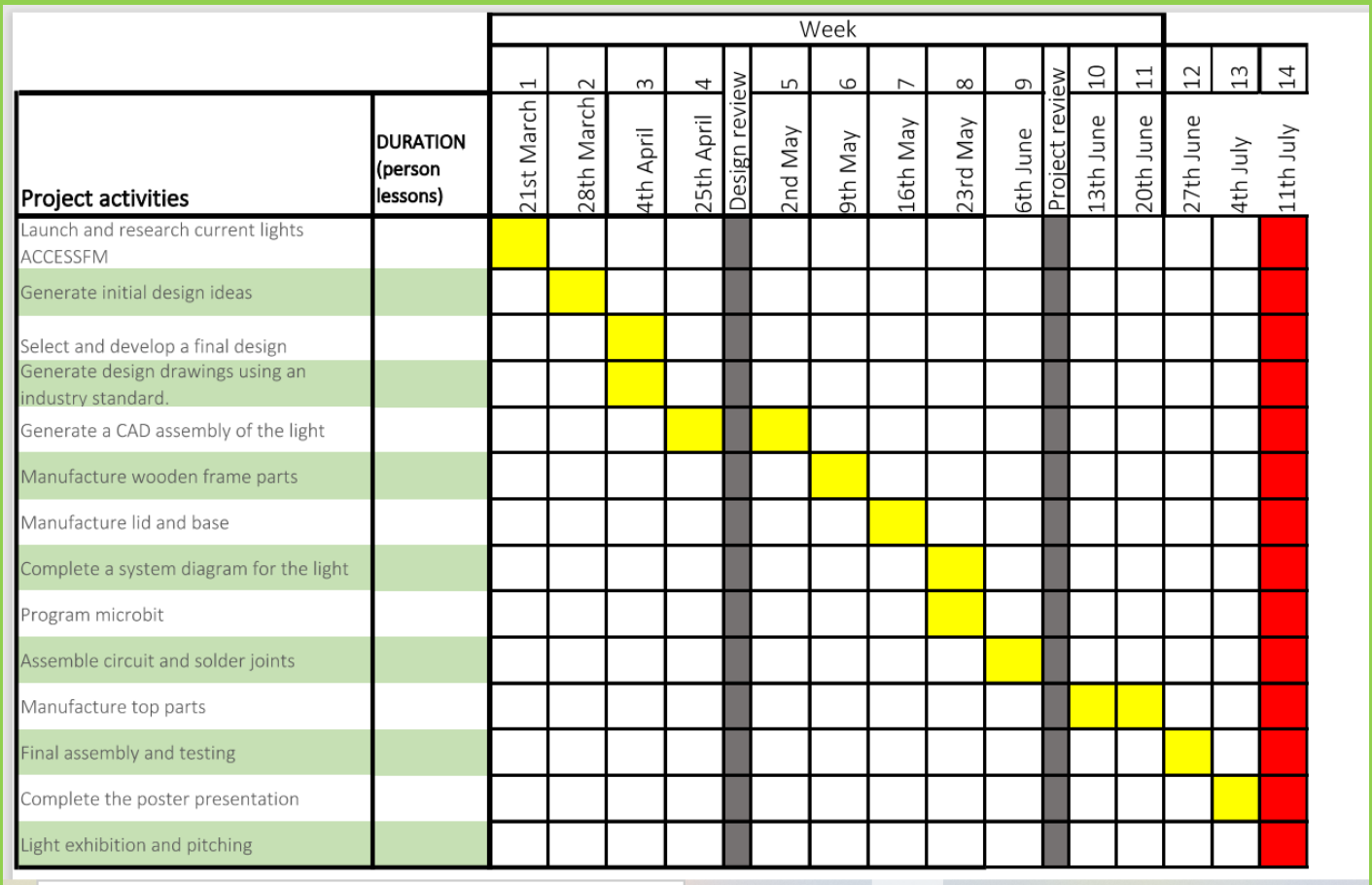

Project activities	DURATION (person lessons)	Week 1 21st March	2 28th March	3 4th April	4 25th April	Design review	5 2nd May	6 9th May	7 16th May	8 23rd May	9 6th June	Project review	10 13th June	11 20th June	12 27th June	13 4th July	14 11th July
Launch and research current lights ACCESSFM																	
Generate initial design ideas																	
Select and develop a final design																	
Generate design drawings using an industry standard.																	
Generate a CAD assembly of the light																	
Manufacture wooden frame parts																	
Manufacture lid and base																	
Complete a system diagram for the light																	
Program microbit																	
Assemble circuit and solder joints																	
Manufacture top parts																	
Final assembly and testing																	
Complete the poster presentation																	
Light exhibition and pitching																	