Meden School Curriculum Planning							
Subject	D&T	**Year Group**	8	**Sequence No.**	4	**Topic**	Electronics (Nightlight)

Retrieval	Core Knowledge	Student Thinking
What do teachers need **retrieve** from students before they start teaching **new content**?	What **specific ambitious knowledge** do teachers need teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to **development of our students thinking, encouraging them to see the inequalities around them** and 'do something about them!'
The following knowledge and understanding should be retrieved: ☐ Students will have a wide and varied experience of using electronic products. They will unwittingly have and understanding of inputs and outputs although would in all probability not use that language. Drawing out this existing understanding is important as a basis for developing further knowledge. ☐ Students will have an understanding of some electronic components, (eg speaker, microphone, switch) just from life experience, (and possibly science lessons). Many will also know what and LED is, (as an emitter of light, … rather than as a component only allowing current to pass in one direction). ☐ From science lessons students have some knowledge of the symbols for electronic components, (typically a bulb	The following ambitious knowledge needs to be taught: ☐ That electronic products invariably have Inputs, a process stage and outputs. Students should be supported to develop this knowledge until they can identify a range of the inputs and outputs from an electronic product. ☐ That the 'parts' that are put together to make an electronic circuit are collectively known as 'components'. ☐ The name, appearance, symbol and function of each of the components on the knowledge organiser. Whilst this is a homework task it should also be taught during lesson start questions. Some components should be reviewed/taught in more detail in lessons as they are foundational to the nightlight project, (see below). ☐ That a circuit board it used to hold and connect components and to avoid a tangle of easily broken wires that would otherwise be needed. ☐ That copper is used because it is an excellent conductor of electricity. ☐ How to build a 'copper track circuit board' including the need to solder across joints in the copper track. ☐ How to use a multi-metre as a continuity tester. ☐ The function of a fixed resistor, the fact that it can be positioned either way around in the circuit. ☐ How to read the colour bands on a four-band fixed resistor. The first colour is the first number, the second band is the second digit, and the third band is the number of zeros to then add. ☐ That resistance is measured in ohms, with the symbol of the Greek letter omega (Ω), and that thousands of ohms can be expressed in kilo-ohms.	☐ The contribution that electronic circuits within products makes to waste production, pollution and products becoming obsolete. - The fact that their ever-increasing complexity and miniaturisation means they cannot be repaired but are more commonly replaced, (throwaway society). - The fact that they contain a number of harmful and polluting chemicals/metals which are released as they break down. The need therefore to ensure they are correctly disposed of and sent for recycling. The environmental benefits of not always upgrading to the latest model. ☐ Electronic products can often be examples of products with planned obsolescence. - Explain what planned obsolescence is.

and a switch but possibly also others). Making a like to this when introducing further component symbols is important.
 	
☐ Students will understand that 1000m is 1km, and that 1000g is 1kg. This should be retrieved to support the understanding that 1000Ω is 1kΩ.
 	
☐ Students may be aware that a plumber uses solder when joining copper pipes. Retrieving this knowledge when teaching soldering is beneficial.
 	
☐ Students may have already experience some 2DDesign (dependent upon prior module rotations), in which case the retrieval of this knowledge will enable significantly accelerated progress
	☐ The function of an LDR, the fact that it can be positioned either way around in the circuit.
	☐ The function of an LED, the fact that it has a positive and negative polarity and so has be positioned the correct way around in the circuit. Be able to identify the negative leg by the flat edge on the body and the leg being shorter.
	☐ The function of a transistor, the fact that each leg has a specific function and so it has be positioned the correct way around in the circuit.
	☐ The function of the battery snap, the fact that it has a positive and negative polarity and so has be positioned the correct way around in the circuit. Be able to identify the negative wire as the black wire and the positive wire as the red wire.
	☐ How to solder, including the correct technique of heating the component leg and copper track for a few seconds prior to the application of the solder.
	☐ Common problems in soldering including dry joints where the solder has joined correctly to either the component leg (creating a flattened ball type appearance) or the copper track (creating a hollow around the component leg)
	☐ How to use a crocodile clip as a 'heat sink' and that this is important to stop the heat of soldering damaging more sensitive components, (the transistor and the LED)
	☐ That 2DDesign can be used in conjunction with internet images to create engraved and cut out designs.
	☐ That on 2DDesign 'fine lines' cut and 'thick lines (regardless of their thickness)' engrave.
	☐ The functions and ability of the laser cutter. (At this stage students should at least see how a 2dDesign drawing which includes both cutting and engraving outputs on the laser).
	☐ The correct use of the line bender to create straight line bends in 3mm acrylic.
	
	☐ That there are other ways to create a circuit board including using strip board and etching.
	☐ That there are other ways to form plastics, (specifically vacuum forming).
		- Explain different ways companies achieve it.
		  - Stop supporting software.
		  - Release new products with minor improvements or cosmetic changes.
		  - Design products with significantly limited durability.
		  - Design products that either can't be repaired or are too expensive to repair to make it viable, or where spare parts are no longer made available.
		- Give examples:
		  - iPhone designed to slow down.
		  - Ink cartridges that can't be refilled.
		  - Fast fashion.
		Etc.