Meden School Curriculum Planning						
Subject	GCSE D&T	**Year Group**	10	**Sequence No.**	Skills Board 4	**Topic**	3DPrint/Turn/Mill

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!'
☐ From KS3 students should have encountered Tinkercad. Review the software and any understanding of it.. ☐ Regardless of KS3 experience students will have a broader understanding that computers can control physical devices. Examples to retrieve could include: - A printer - Amazon Alexa or similar operating lights. - Turning heating on from your phone. ☐ Make a link between the points above and 'computer aided manufacture'. E.g. "If a computer can control a printer or some lights, ... it can also control a machine that makes things". ☐ A simple retrieval in order to introduce the advantages and disadvantages of designing on screen	☐ How to locate and log onto the Tinkercad software. ☐ The layout and key elements of the initial tinkercad screen. ☐ The concept of 'workplanes' and how workplanes are used in tinkercad. ☐ How to select and add blocks from the menu. ☐ How to specify and alter the dimensions of a block, (using both the mouse and by typing figures into the dimensions). ☐ How to use the view cube to navigate around the block. ☐ How to use the 'duplicate' (understanding of the word 'duplicate') tool to replicate a part. ☐ How to then drag and drop that block to a different location. Make sure they understand that when they clicked duplicate it placed the new block onto the exiting one – and that to see it they need to drag it away from the original. ☐ Using the align tool (understanding of the word 'align') to position blocks in relation to each other. ☐ Know how to create a more complex shape, or a hole/cut away (by specifying that a block is a hole rather than a solid) and by then grouping blocks. ☐ Know that the correct term for the action of making these more complex shapes by combining/subtracting simple shapes is that the actions are called 'Boolean Operations'. ☐ Know how to move the workplane onto a blocks surface in order to 'build' onto existing blocks. ☐ Changing the colour of blocks so that the design can more closely reflect the designer's intention.	☐ Look at examples of jobs and careers, (both locally and further afield) that make use of CAD and CAM. ☐ Consider in a positive way how automation, computer-controlled manufacture etc has caused changes to the workforce and the types of jobs/working conditions people now do/work in. - What has/is changing? - Who benefits from these changes? - Could there be a downside - Who may lose out from these changes? - Are there particular elements of society that are most hard hit? Development of a plan/strategy for those at risk of being 'left behind'. ☐ The need for commitment to achievement, and also 'up to date/life-long learning' in order to remain skilled for the future workforce. ☐ How the principles of computer control are being applied more and more widely in

(using CAD) could be to ask – "What are the advantages and disadvantages of word processing documents over writing them by hand?" ☐ Once delivery of the content is underway there are retrieval opportunities to use the basic tinkercad skills taught (slides 1-9) in achieving the challenges on slides 10 and 15.	☐ Using the block control tools to twist, tilt, rotate, raise and lower blocks. ☐ Be familiar with (have received a demonstration of) the 3D printing process. Be able to identify and correctly name the filament reel, the filament, the extruder and the bed. ☐ Understand the meaning of the word extrusion and how it is used in plastics manufacturing. ☐ Understand the constraints of 3D printing and how to consider the process and its constrains WHILST designing a product ☐ Be able to use the tools taught within the Tinkercad software to generate their own design with the software. Also, be able to articulate how the constraints of the 3D printing process have been considered in designing the product. ☐ Know how to convert a tinkercad file into an .stl file for use with the 3D printer. ☐ Understand that a lathe holds a piece of material and rotates it at speed so that it can be cut/shaped as it spins. Demonstrate the wood lathe to show this principle. ☐ Demonstrate the centre lathe making links/contrasts between how the wood lathe worked and how the centre lathe works. ☐ That the end of a piece of metal can be cut using a process called 'facing off'. ☐ That the diameter of a cylinder can be reduced using a process called parallel turning. ☐ That the tailstock can be used for drilling into the centre of the workpiece and that a centre drill has to be used prior to a twist drill. That the centre drill does a similar job to a centre punch in that it avoids the twist drill 'wandering'. ☐ That a vertical milling machine will allow the user:- to cut across a material to create a flat surface, to cut channels and hollow areas etc. That this is possible because the milling bit has cutting edges both at the bottom, (like a drill bit) and up the sides/along the flutes).	our daily lives. Consider/discuss the benefits (and potential pitfalls). - Companies collecting data about us and promoting products to us that we might be interested in. - Are computers always right? Do they always make the best decisions? Does this mean the technology should not be used? How can this technology be improved in the future? - Self-driving cars – how will this technology potentially benefit us in the future? ☐ The moral and legal responsibilities when something goes wrong with computer controlled equipment, (e.g. the Boeing Max8 airplane crashes. Who is responsible – the pilot flying the aircraft, the airline who own the aircraft, the manufacturer of the aircraft, the passengers who chose to fly …?).