Meden School Curriculum Planning							
Subject	D&T	**Year Group**	7	**Sequence No.**	Module 4	**Topic**	CAD/CAM

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: ☐ From KS2 students should have encountered 'computer aided design', (KS2 D&T NC). Review the term and any understanding of it. ☐ From KS2 students should have encountered designing, writing and debugging programs that accomplish specific goals. This might include controlling or simulating physical systems, (KS2 Computing NC). Examples of this might include controlling a physical or on screen 'turtle' or and on screen set of traffic lights. Review the term and any understanding of it. ☐ Regardless of KS2 experience students will have a broader understanding that computers can control physical devices. Examples to retrieve could include: - A printer	The following ambitious knowledge needs to be taught: ☐ The meaning of the terms and acronyms Computer aided design (CAD) and computer aided manufacture (CAM) with examples of each. ☐ The concept that software packages are simply 'tools' and that just like with hands on practical it is important to use the correct tool for the task. Make the analogy with types of saw being selected depending on the type of cut – and then apply to software packages. ☐ 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.	o 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

- 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 printerof some lights, (or a turtle or some traffic 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 (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 module 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. ☐ Within the graphic/blister pack element there is retrieval at slide 21/22 of the principles regarding commercial printing taught in slides 18. ☐ Within the graphic/blister pack element there is retrieval at slide 23 of the principles regarding the technical	o 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. ☐ 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. ☐ Carry out a product analysis of a range of pieces of blister pack packaging including an analysis of the 'technical elements' that are included on packaging designs. ☐ Know the key elements and terms for the practices used in commercial printing (cut offs, trim lines, artwork, blead lines, hang hole, fold line). ☐ Know that Microsoft Publisher is the optimal software 'tool' to use for creating the blister pack artwork. Be taught the key elements of the software to enable this activity, (importing and resizing images, text, word art etc. moving images/text backwards/forwards within the artwork, making selected colours transparent). ☐ Receive a demonstration of the vacuum forming process including the understanding of, and ability to correctly use the terms HIPS (High Impact	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, (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 …?).

information identified during the product analysis taught in slides 17.	Polystyrene), thermoplastic, thermoset plastic, vacuum, former/mould, draft angle, platen, gerbil.	