

Design and Technology

Year 7 Homework



Pupil:

Class:

Due Date:



Sequence		Summary
1	Drawing Skills	Follow the tutorial on Google Classroom to complete an oblique drawing.
2	Product Analysis	Analyse the work of professional designers from the past and present.
3	Programming Micro:Bits	Use the Micro:Bit 'MakeCode' Editor or the Micro:Bit 'Python Editor' to build and test a programme using the emulator (On screen Micro:Bit).
4	Risk Assessment	Complete a risk assessment of tasks carried out at home, school or somewhere else.
5	Drawing Skills	Follow the tutorial on Google Classroom to complete an Isometric drawing.
6	Wider Impact of Design	Produce a poster, presentation or write an essay that explains the impact of deforestation.
7	Tools and Materials	Identify and label the tools and materials in the pictures.
8	TinkerCAD	Use the 3D modelling tutorials within TinkerCAD to create a digital prototype.
9	Mechanical Systems	Complete the exam style question on mechanical systems.

Week 1: Drawing Skills

Follow the tutorial on Google Classroom to complete an oblique drawing in the space below.

If you do not have internet access please collect a worksheet tutorial from your teacher instead.

Week 2: Product Analysis

Complete a detailed analysis of a product of your choice that was designed by a professional from the Streamlining movement (1935-1955).

What is the products name?

Who was the products designer?

When was the product designed?

Use descriptive language to explain how it might look and feel.

Who would buy this product and why?

What is the product meant to do? Does it do it well? If not, why?

How has the designer considered the environment in the product? If they haven't at all then how could they change it to be better?

What materials is this product made from? Why do you think the designer chose these materials?

Is this product safe to use? Are there any hazards with this product? How could they be fixed?

What makes this product appealing to customers? Why? If it is unappealing, why?

Week 3: Programming Micro:Bits

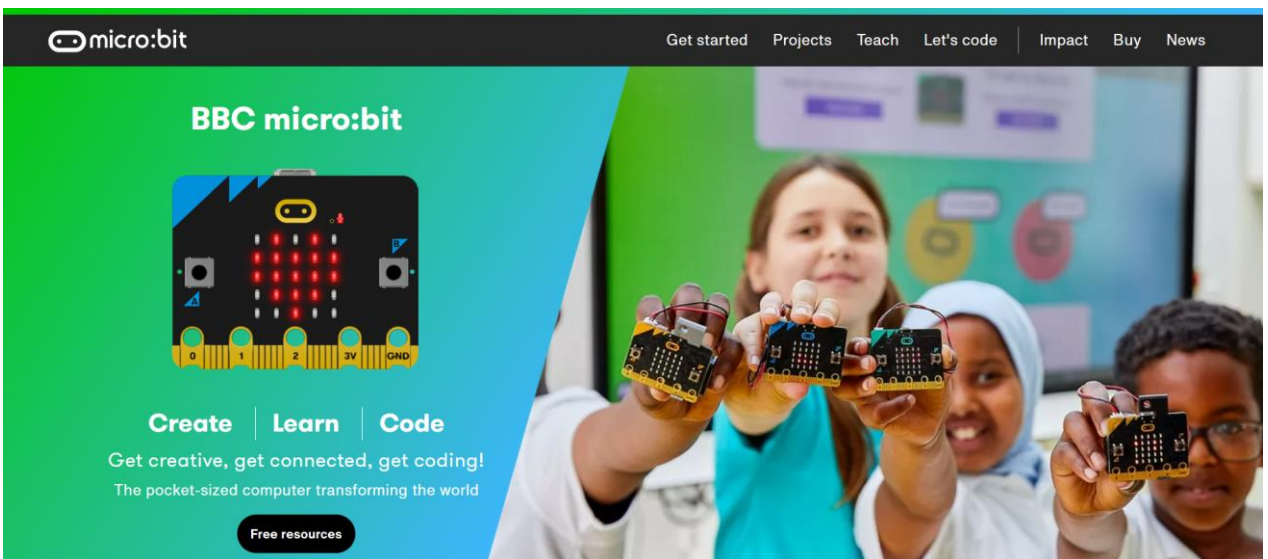
The full instructions with functioning links and other helpful resources is available on [Google Classroom](#) under the subheading Homework in the Classwork tab.

What can you do with a Micro:Bit?

Use the Micro:Bit 'MakeCode' Editor or the Micro:Bit 'Python Editor' (Links below) to build and test a programme using the emulator (On screen Micro:Bit).

- If you aren't sure what to do you do one of the projects that are available on the website.
- If you aren't that confident you can use the MakeCode editor to help you build your code before converting to Python.
- If you are looking for more of a challenge go straight for the Python Editor; you don't need to use the drag and drop code you can type your own for an even tougher challenge!

Once you are happy with your completed programme and have it working on the on-screen emulator you should screen shot/snipping tool the code and paste it into the blank document on Google Classroom for me to see!



If you enjoyed this challenge and want to do some more; take a look at the 'do your :bit | micro:bit' challenge. Test your imagination and combine creativity and technology to come up with solutions for the Global Goals by tackling the issues we're facing today. Once you have completed the lessons on the website you can enter your designs into the yearly competition and view past winners on the website! Good luck and make sure you show your work with your Design and Technology teacher!

Week 4: Risk Assessment

Complete a risk assessment of tasks carried out at home, school or somewhere else.

If you would rather use the computer for this there is a blank worksheet on [Google Classroom](#) along with other useful resources including a tutorial.

What is the task and what are the hazards?					
Who might be harmed and how?					
Severity					
Likelihood					
Risk					
How can you reduce the risk?					

Week 5: Drawing Skills

Follow the tutorial on Google Classroom to complete an Isometric drawing in the space below.

If you do not have internet access please collect a worksheet tutorial from your teacher instead.

Week 6: Wider Impact of Design

Use the space below or the documents made for you on Google Classroom to produce a poster, presentation or write an essay that explains the impact of deforestation.

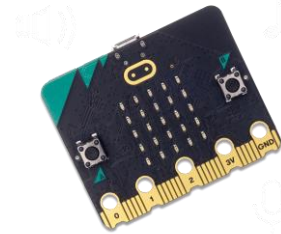
Things to consider:

- What is deforestation?
- How big an issue is deforestation? Why?
- Why do people cut down large forest areas?
- Habitat destruction and loss
- Soil erosion
- Impact of logging on remote communities

Week 7: Tools and Materials

Use the word bank to identify the tools and materials; label each image with the correct name.

Chisels, Steel Rule, Vice, Glass Paper, Pillar Drill, Coping Saw, Bench Hook, Wooden Mallet, Disk Sander, Scroll Saw, Try Square, Laser Cutter, Band Saw, Plywood, Dowel, Felt, Micro:Bit.



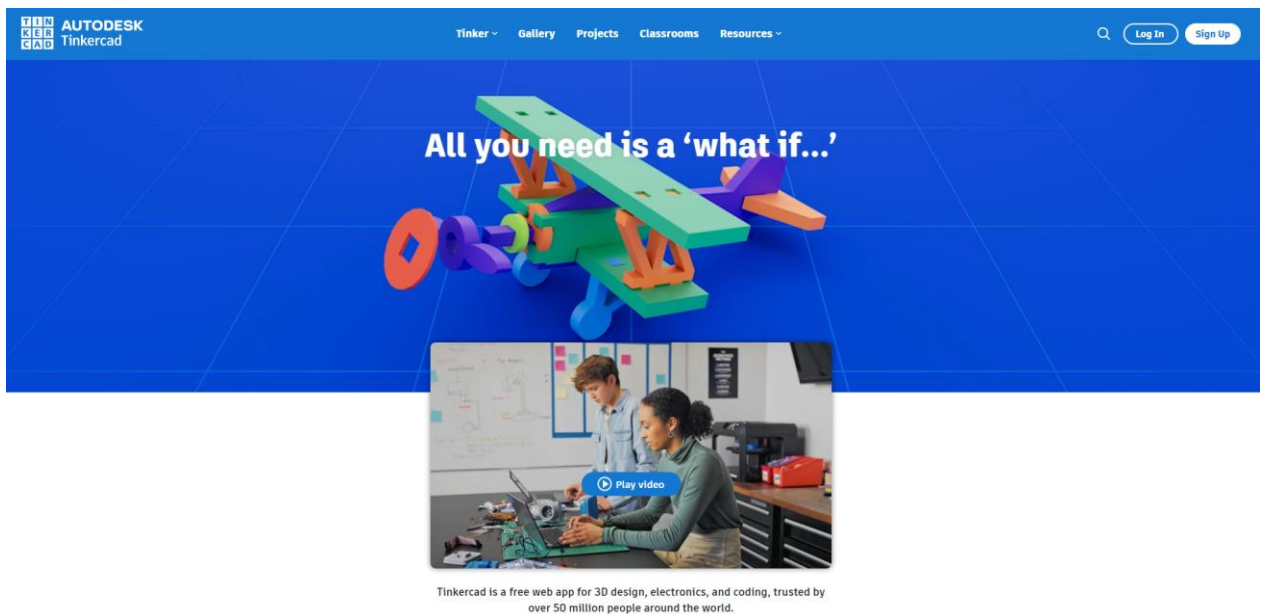
Week 8: TinkerCAD

What can you build on TinkerCAD?

Use the TinkerCAD 3D modeling tool to build any product or scene of your choice.

- If you aren't sure what to do you should do one of the projects/tutorials that are available on the website under the 'Learn 3D Design' link below.
- If you aren't that confident just keep it simple and give it a go.
- If you are looking for more of a challenge you could try and search the YouTube or Instructables websites for a more advanced tutorial, make your own creation entirely or even try Fusion360 (It is free for personal use despite what the website appears to say just look for the personal use version.) the more advanced version of TinkerCAD!

Once you are happy with your completed 3D model and have it looking great you should screen shot/snipping tool an image of the design and paste it into the blank document below for me to see!



Tinkercad is a free web app for 3D design, electronics, and coding, trusted by over 50 million people around the world.

If you loved making your product then you might want to have it made into a real thing! If this interests you Shapeways can actually 3D print your product for you from a variety of materials from plastic to metals (This is a paid service) <https://www.shapeways.com/>. The larger and more complex your product the higher the costs. Cost also varies dependent on the material chosen.

Week 9: Mechanical Systems

Complete the exam style questions on the theme of mechanical systems below. This is taken directly from a GCSE paper aimed at year 11 students; it is meant to be difficult.

Figure 7 shows a loaded wheelbarrow.

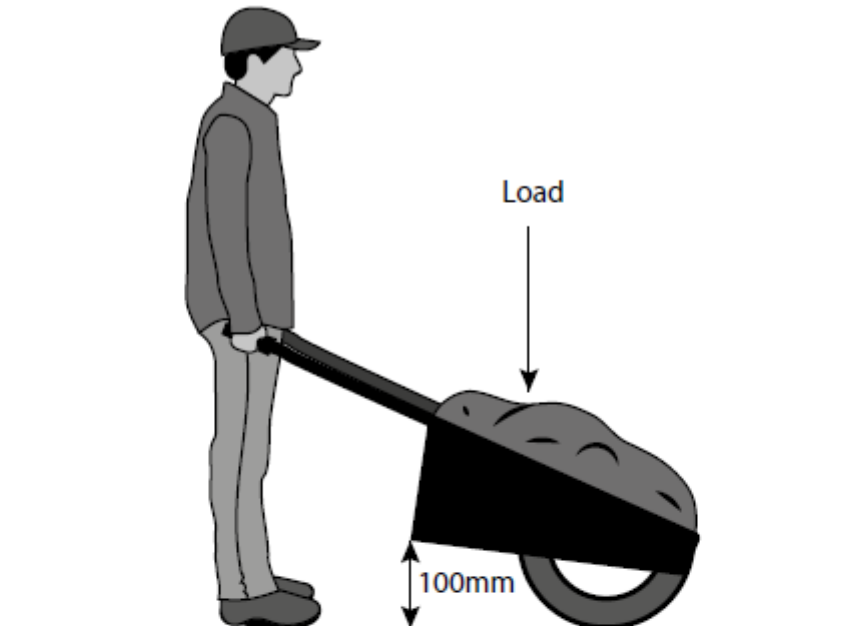


Figure 7

Mechanical advantage (MA) is calculated by:

$$\text{MA} = \frac{\text{load}}{\text{effort}}$$

The velocity ratio (VR) is 4 and the effort is 100 N.

The efficiency of the system is given by:

$$\text{Efficiency} = \frac{\text{MA}}{\text{VR}} \times 100\%$$

The system is 85% efficient.

Calculate the maximum load that can be lifted.

(3)

KS3 Marking and Assessment Criteria for Design and Technology

Your work will be marked using the grid below which is based on the National Curriculum for KS3 Design and Technology.

	Design (D)	Manufacture (M)	Evaluate (E)	Technical Knowledge (T)
1	Use research and exploration, such as the study of different cultures, to identify and understand user needs. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>	Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>	Analyse the work of past and present professionals and others to develop and broaden their understanding. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>	Understand and use the properties of materials and the performance of structural elements to achieve functioning solutions. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>
2	Identify and solve their own design problems and understand how to reformulate problems given to them. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>	Select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>	Investigate new and emerging technologies. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>	Understand how more advanced mechanical systems used in their products enable changes in movement and force. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>
3	Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>		Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>	Understand how more advanced electrical and electronic systems can be powered and used in their products. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>
4	Use a variety of approaches, to generate creative ideas and avoid stereotypical responses. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>		Understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>	Apply computing and use electronics to embed intelligence in products that respond to inputs and control outputs using programmable components. Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>
5	Develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools Trainee <input type="radio"/> Apprentice <input type="radio"/> Skilled <input type="radio"/>			