

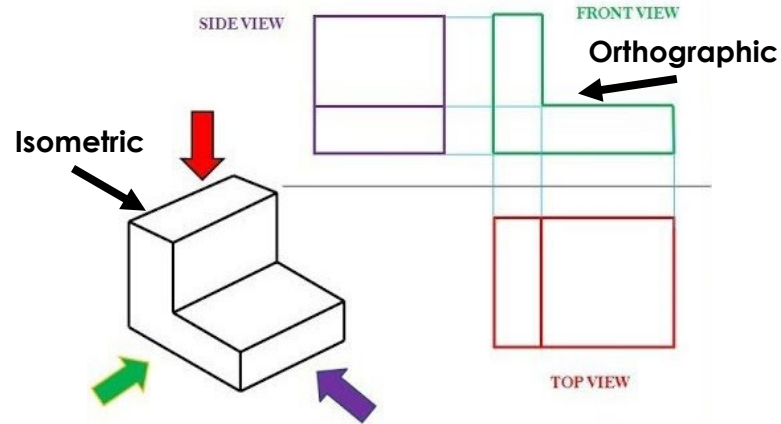
# Year 8 - Product Design - Topic: Arkitainer



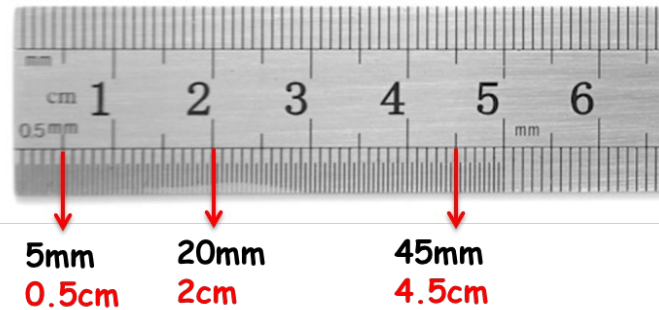
## Key Vocabulary

Papers and Boards	Wood pulp formed into sheets. Comes in a range of sizes and thicknesses.
Scale	The size of a model compared to the size of the real product.
Architecture	The designing of buildings or structures.
Area	Height x Width, displayed as unit <sup>2</sup> . E.g. 400mm <sup>2</sup>
Repurpose	To adapt something for a different use
Orthographic Projection	2D drawing showing a Top (plan) View, Front View and Side View
Isometric Drawing	Accurate drawing technique that uses 90° and 30° lines, measurements can be taken directly off them

## Reading Drawings



## Converting Units



## Scale Conversion -

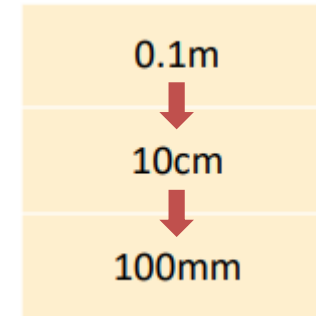
- 1:10 - 10 times smaller than the real product.
- 2:1 - Twice the size of the real product.

## Area -

**Square/rectangle** - Height x Width

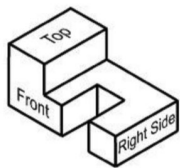
**Triangle** - (Height x Width) ÷ 2

**Circle** - ( $\pi$  x radius)<sup>2</sup>

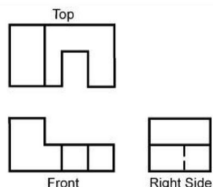


- 10mm → 1cm → 0.01m
- 100mm → 10cm → 0.1m
- 1000mm → 100cm → 1m

## Key Skills



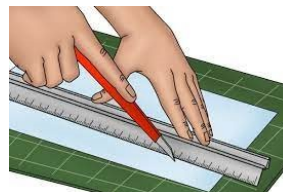
Isometric drawing



Orthographic projection



Measuring and marking out accurately



Cutting (wastage)



Modelling/ Prototyping



Gluing (addition)

## Workshop Skills

# Year 8 - Product Design - Topic: Arkitainer



## Tools and Equipment



Craft knife



Safety ruler



Straight cutter



Hot glue gun



Compass cutter



Cutting mat



Abrasive paper



Masking tape



Heat resistant gloves

## Materials

Foamboard

Thin sheet of polystyrene sandwiched between paper, used for high-quality model making.



Balsa

Lightweight but strong hardwood that can be used for model making.



Wooden Dowel

Cylindrical shaped section of wood. Can be used for reinforcing joints and model making.

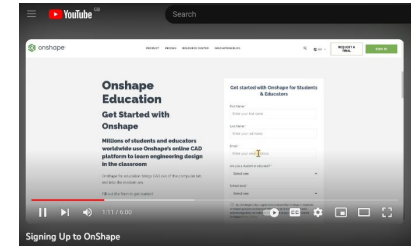


## Taking it Further

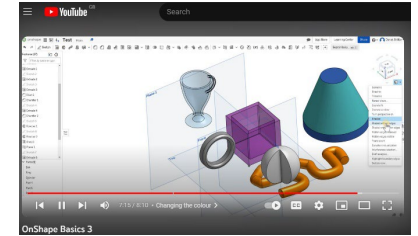
Work through the tutorial videos below to develop your CAD skills.



**Signing Up and Getting Started -**  
<https://www.youtube.com/watch?v=7BJDsbvpTEE>



**Onshape Basics 1, 2, 3**  
<https://www.youtube.com/watch?v=4dTMF2iL0es&list=PLJdglj816Ryk30CnzWAaX1kbn6LR3F3L&index=1>



**D&T Futures** - There are plenty of tutorials on the D&T Futures YouTube channel

## Learning Checklist

- I can describe a range of common materials used in Product Design.
- I can measure and mark out materials accurately.
- I can explain how scale is used when designing products.
- I can select the correct tools and equipment and use them safely in the workshop.
- I can use an isometric grid to produce presentation design ideas.
- I can explain and understand an orthographic projection.
- I can explain the advantages and disadvantages of using CAD software to design products.



# Year 8 - Product Design - Topic: Desk Tidy

## Key Vocabulary

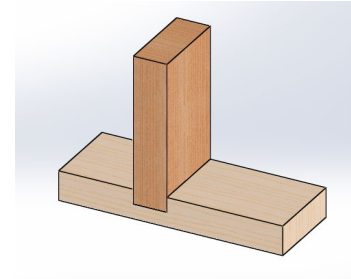
Hardwood	A timber from deciduous trees.
Softwood	A timber from coniferous trees.
Manufactured board	Made from wood layers, chips or fibres compressed with glue.
Thermopolymer	A polymer that can be reshaped using heat.
Thermosetting polymer	A polymer that cannot be reshaped using heat.
Jigs	Used to help do the same thing multiple times. Holds the work in place to complete your task without the need to spend long times setting up.
Templates	Used to help to mark out the same shapes multiple times. Means you don't need to spend as long measuring and marking every time.

## Wood Joints



### Butt Joint

Simple to make, weak and not aesthetically pleasing.



### Housing Joint

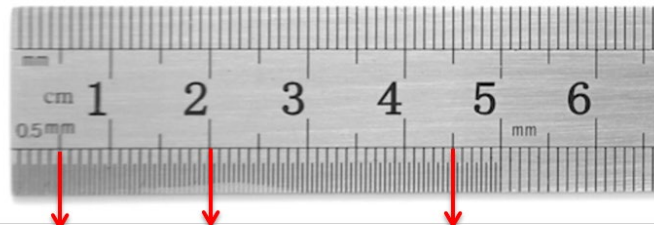
Stronger than a butt joint, not aesthetically pleasing.



### Mitre Joint

Weak, a bit harder to make but much more aesthetically pleasing

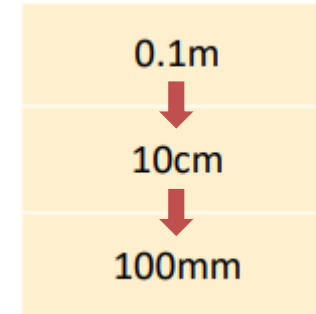
## Converting Units



5mm  
0.5cm

20mm  
2cm

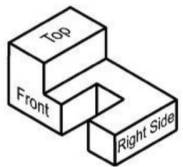
45mm  
4.5cm



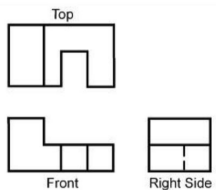
10mm → 1cm → 0.01m  
100mm → 10cm → 0.1m  
1000mm → 100cm → 1m

## Key Skills

## Workshop Skills



Isometric drawing



Orthographic projection



Measuring and marking out



Cutting (wastage)



Drilling (wastage)



Sanding (wastage)



Laser cutting (wastage)



Line bending (forming)

# Year 8 - Product Design - Topic: Desk Tidy



## Tools and Equipment



Bench vice



Bench hook



Steel ruler



Tenon saw



Try square



Bradawl



Quick clamp



Screwdriver



Hand drill



Pillar drill



Disk sander



Belt sander



Laser cutter



Strip heater



Safety glasses

## Materials

Plywood

A man-made board used for construction.



Pine

A durable and cheaper timber used for indoor furniture.



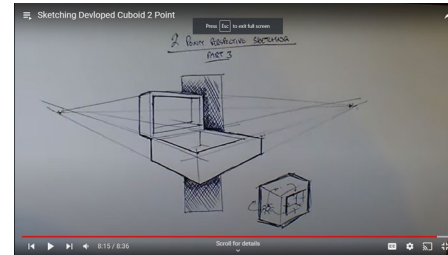
Acrylic (PMMA)

A clear, strong and stiff plastic used for signs and displays.

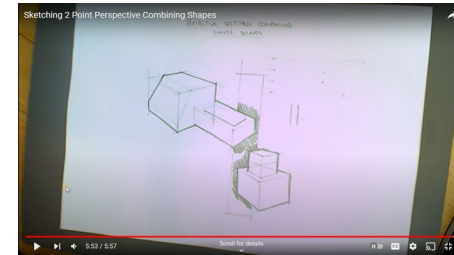


## Taking it Further

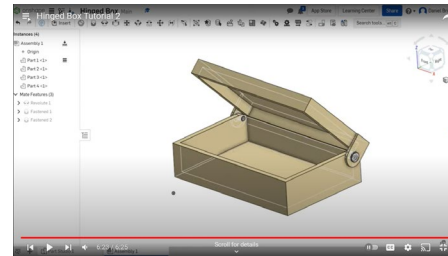
Work through the tutorial videos below to develop your sketching and CAD skills.



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## Learning Checklist

- I can describe a range of common materials used in Product Design.
- I know the purpose of a Design Brief and Design Specification.
- I can explain a variety of wood joints.
- I can measure and mark out materials accurately.
- I can select the correct tools and equipment and use them safely in the workshop.
- I can use an isometric grid to produce presentation design ideas.
- I can explain and understand an orthographic projection.
- I can explain the advantages and disadvantages of using CAM software to manufacture products.
- I can use a hot wire strip heater to bend and shape acrylic.



# Year 8 - Product Design - Topic: Fantastic Plastic

## Key Vocabulary

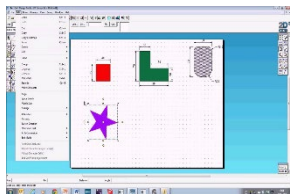
Thermopolymer	A polymer that can be reshaped using heat.
Thermosetting polymer	A polymer that cannot be reshaped using heat.
Sustainability	Meeting the needs of the present without compromising the ability of future generations to meet their own needs.
6 R's of Sustainability	These are all terms related to ways we can lead a more sustainable life and lessen our impact on the environment
Product Lifecycle	The length of time from a product first being introduced to consumers until it is removed from the market.
Carbon footprint	The total amount of greenhouse gases (including carbon dioxide and methane) that are generated by our actions.
Fossil fuels	Fuels are found in Earth's crust and contain carbon and hydrogen, which can be burned for energy such as coal, oil, and natural gas
Microplastics	Small plastic pieces less than five millimetres long which can be harmful to our ocean and aquatic life.

## 6 R's of Sustainability



## Key Skills

## Workshop Skills



CAD  
(computer aided drawing)



CAM  
(computer aided manufacturing)



Measuring and marking out



Drilling (wastage)



Laser cutting (wastage)



Line bending (forming)

# Year 8 - Product Design - Topic : Fantastic Plastic



## Tools and Equipment



Bench vice



Quick clamp



Steel ruler



Hand drill



Pillar drill



Laser cutter



Strip heater



Safety glasses

## Materials

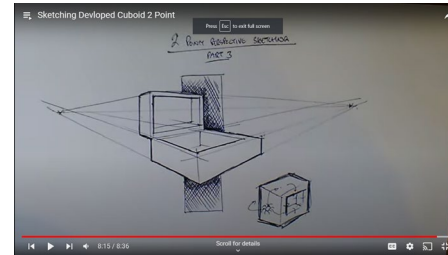
Acrylic (PMMA)

A clear, strong and stiff plastic used for signs and displays.

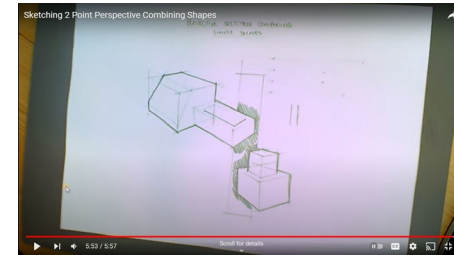


## Taking it Further

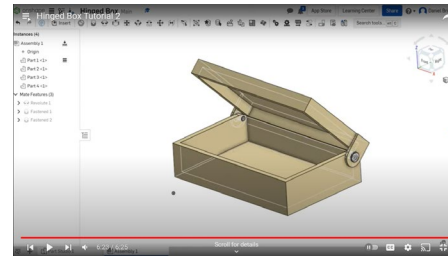
Work through the tutorial videos below to develop your sketching and CAD skills.



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## Learning Checklist

- I can describe a range of common materials used in Product Design.
- I can explain sustainability and the 6 R's.
- I can measure and mark out materials accurately.
- I can select the correct tools and equipment and use them safely in the workshop.
- I can use various strategies to produce presentation design ideas.
- I can explain the advantages and disadvantages of using CAD and CAM software to manufacture products.
- I can use a hot wire strip heater to bend and shape acrylic .