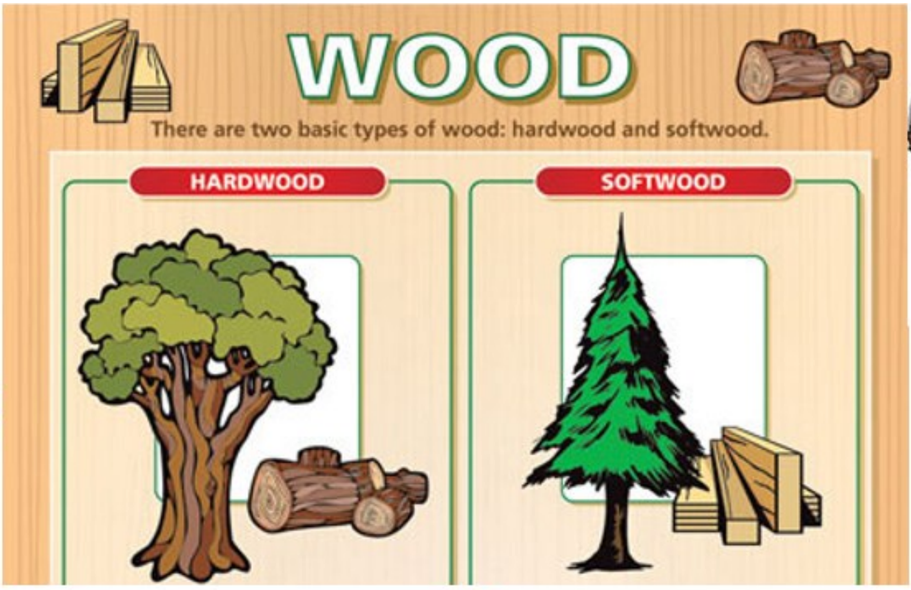
Design Technology
Revision sheet booklet

Subject contents covered in Year 7

Hardwood



Softwood

Hardwood	Softwood
. Comes from **deciduous** trees (lose their leaves in winter) . **Slow** growing . Hard, **dense** wood with tight woodgrain . Difficult to cut . Expensive	. Comes from **coniferous** trees (keep their leaves in winter) . **Quick** growing . Soft wood with wide woodgrain . Easy to cut . Cheap

FSC www.fsc.org
100% Wood from well-managed forests
FSC® C044122
Forest Stewardship Council

Tree felling machine

Sustainable Forest
A sustainable forest is a forest that is carefully managed and felled trees are replaced

Deforestation
is the removal of a forest, converting it to non-forest use. Often wildlife's habitat is destroyed.

Seasoning

Conversion

Seasoning	Conversion
is when the moisture is removed from the timber in order to be able to make things with it. You can either use the air drying or kiln drying process.	is when the tree trunk is cut into pieces. Softwoods are usually rough or through and through sawn and hardwoods are quarter sawn for a better looking grain.

Tools, Equipment and Machinery

This is what you will use for this project

Drill bit

Pilar drill

Vice

File

Belt sander

Extractor

Bobbin sander

Coping saw

Scroll saw

Know your tools and equipment

Tools	Use	Safety points
	Sawing curves in wood	Could cut your finger Blade gets hot from friction
	Making metal, plastic and wood smoother	Heavy metal would hurt if dropped onto your foot
	Drilling holes in a range of materials	Goggles to be worn Hands away from drill/ sander
 	Making plastic and wood smoother	Tie loose hair/clothing Secure the material Have the Guard on.

Research— Material Properties

The materials we will be using can be found below, using the information from the PowerPoint complete the descriptions and think of 3 examples of products made from the 3 materials. Also complete the sentences below using the key words.

Materials	3 Example products
Pine - Pine is a type of natural wood. It is soft and easy to cut and shape. It is light in colour and can be painted and varnished.	**Furniture, Doors, wooden toys**
MDF (Medium-density fibreboard) is a man made board wood made from saw dust and glue and forming sheets by applying high temperature and pressure. MDF good for the environment, easy to work with but shouldn't be used outside as it soaks up water. MDF products are usually painted to protect it and to make it look nicer.	 
Acrylic plastic is a manmade material which comes from oil. It is a thermoplastic so it can be recycled and remoulded numerous times. It comes in a range of forms and colours and often replaces glass. It is waterproof and light shines through it.	 
Neoprene is a form of thermoset plastic so it cannot be recycled. It comes in a range of forms and colours and is often used in fashion as it is soft and comfortable as well as waterproof. If neoprene burns, it lets off toxic fumes.	 

MDF is considered ___ Environmentally Friendly _ as it is made from recycled wood.

Acrylic can be heated and _____ Re-moulded _____ to make other products.

Neoprene is soft and bendy therefore is considered to be ___ Malleable _____.

KEY WORDS

Malleable Safe

Environmentally Coloured

Friendly Re-moulded

DESIGN PROCESS

DEVELOP A DESIGN BRIEF

WHO? (User)
WHAT? (Product)
WHY? (Need)

RESEARCH + ANALYSIS
e.g customer profile, existing product analysis, market research, anthropometrics + ergonomics

SPECIFICATION
List of conditions to meet when designing and making your product (ACCESS FM)

IDEAS
Initial Sketches

DEVELOPMENT
Detailed scale drawings, materials, construction methods of chosen designs, social, moral, environmental + sustainability issues

MODEL
Test + improve design

FINAL DESIGN

PLAN
Manufacturing Criteria

MAKE
Prototype

TESTING + EVALUATION
How could the design be improved/modified?

PRODUCT ANALYSIS

We use ACCESS FM to help write a specification (a list of requirements for a design) and to help us analyse and describe an already existing product.

Aesthetics

What does the product look like (e.g. shape, colour, form, size)? Do you think it looks attractive? Why? Where did the designer get their inspiration?

Cost

How much does the product cost to make? Is it value for money? Will it make a profit? Is it affordable to your consumer?

Customer

Who is the target market? Why would a consumer buy it? What impact would it have on their life

Environment

What is the product's impact on the planet? How long will it last? Can it be recycled?

Safety

Is it safe for the consumer? Does it meet safety standards? Is the product high quality?

Size

Is it an approriate size? Has the designer considered anthroprometrics? What are the measurements in mm?

Function

What does it do? Does it work? Is it easy to use? Why is it needed?

Materials

What is it made from? Would a different material make it better? What impact could the choice of material have on the environment?

Finishes are added to woods to protect them from rotting and insects, to make them last longer and to make them look nicer. These finishes can be applied with a cloth, brush or a spray.

Wood stain

varnish

Sealer

Paint

French polish

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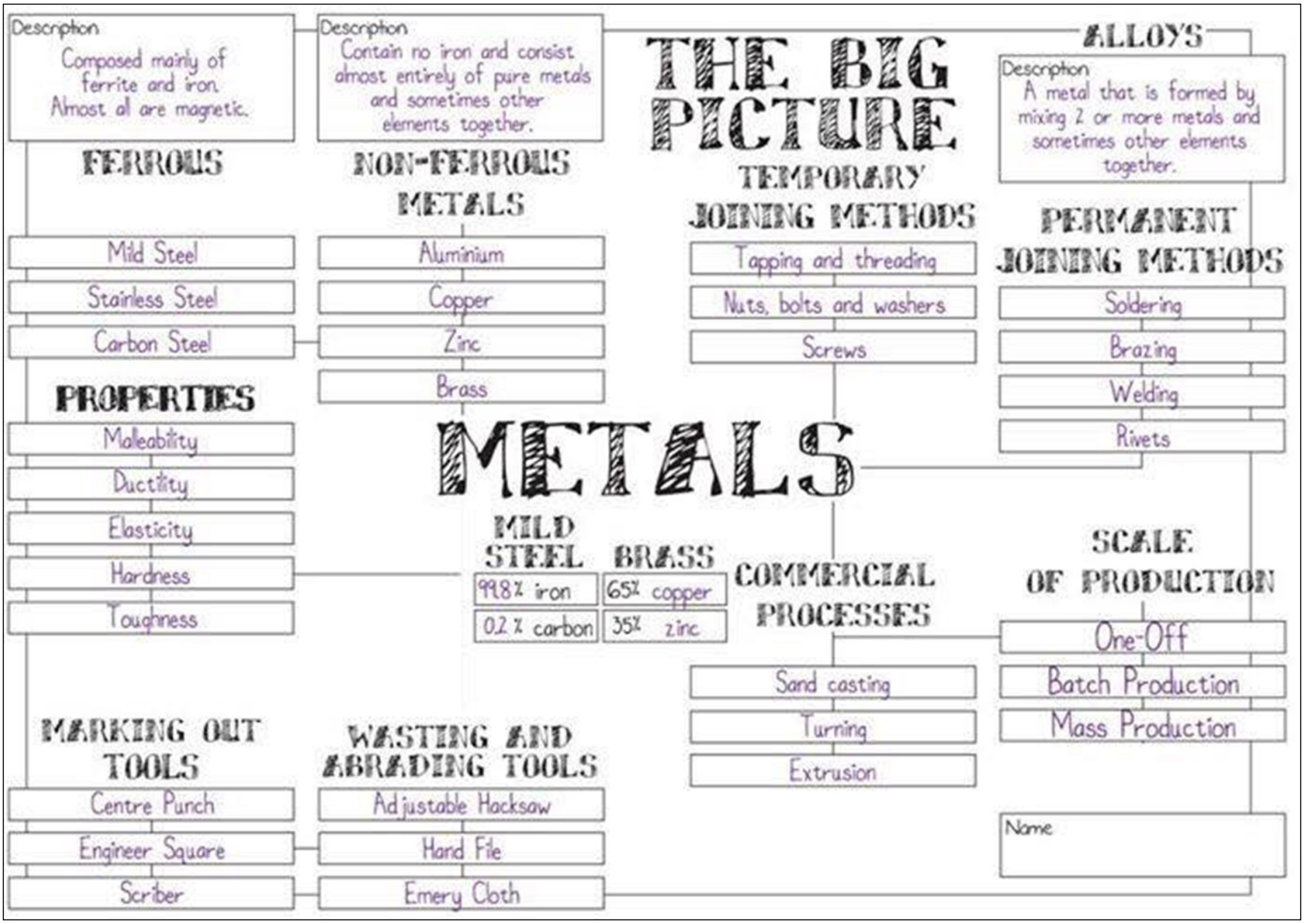
Subject contents covered in Year 8

Metals:

The majority of Ferrous metals are Steels, these Iron based alloys are created from a raw material known as Iron Ore.

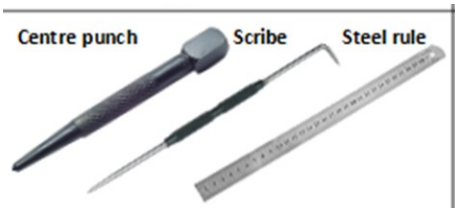
Iron Ore is burnt using Coke (Coal). The Carbon removes the oxygen from the Ore, but the carbon left in the Iron affects the properties of the Iron.
By adjusting the carbon content the properties can be changed.



Tools for Metals:

A guillotine is to cut sheet metal– A former bends the metal to a certain angle—a roller curves the metal.

Tin snips manually cut sheet metal like scissors cut paper



A centre punch dints the metal to stop the drill bit from sliding—a scribe scratches the metal to mark where to cut—a steel rule is used to measure.

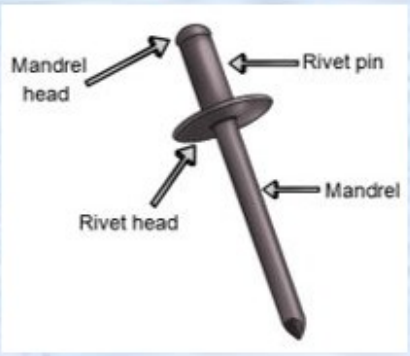
A pop rivet gun allows you to join sheet metal together using a rivet.

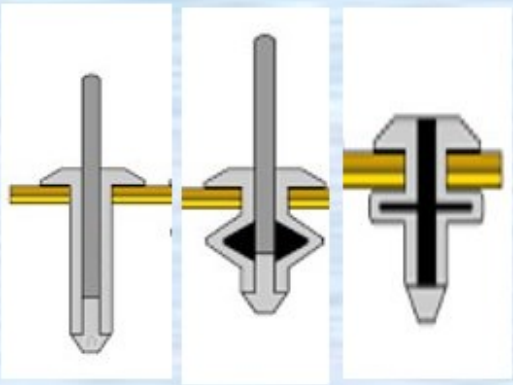
Semi Permanent Joining

Pop Riveting

Pop Rivet Gun

A Pop Rivet is a quick method of joining sheet metal together. This process is often used to join sheet material to a hollow tube.





Draw filing is a technique used for producing smooth, square edges, particularly on pieces of metal. The process works by moving any type of single cut file forwards and backwards along the length of the material's edge.

1

2

Emery Cloth

3

Wire Wool

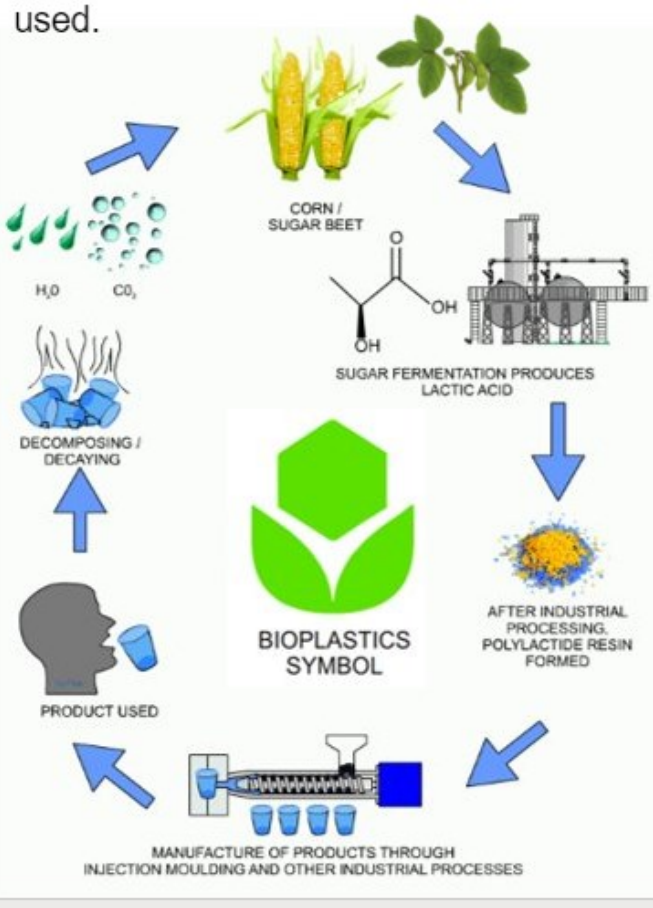
Most plastics are made form Crude Oil

But it's running out!

Fossil fuels are a **finite** resource, meaning they can't be replaced once they run out

Plastics can take 100's of years to **decompose** in **landfills** and threaten **wildlife**

Bioplastics are being developed & can decompose in just 5 years. They are made from synthetics such as **corn & soya starch**, meaning no crude oil is used.



Thermo-plastics & Thermo-setting plastics

Thermo-plastics

- Can be heated and **reshaped** many times
- Are **recyclable**
- Usually quite **flexible**
- Commonly used in **packaging, bottles, toys, plastic bags**
- **Melts** when heated
- Old products can be melted down in factories to make **new objects**

Thermo-setting plastics

'Set' like jelly

- Can **only** be heated and shaped **once**.
- Usually quite **rigid**
- Commonly used to make things that become **hot** (eg- **kettles, plugs, kitchen utensils**)

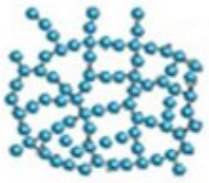
- Does **not melt** when heated, **burns** instead
- **Cannot** be recycled
- Once the product becomes unusable, they are disposed of in **landfills**

Molecular structure of plastics

What are Elastomers?

- Thermoplastics
- Thermosets
- Natural
- Synthetic
- Can be stretched to many times their original length
- Can bounce back into their original shape without permanent deformation

Thermoplastic



Thermoset

Elastomer

THE BIG PICTURE

POLYMERS

THERMOPLASTICS (Description: Can be reheated and reshaped many times.)
- Acrylic
- Polyethene
- Polyvinyl Chloride (PVC)
- High Impact Polystyrene (HIPS)
- Acrylonitrile-Butadiene-Styrene (ABS)

THERMOSETTING PLASTICS (Description: Can not be reheated and reshaped.)
- Polyester Resin
- Urea Formaldehyde

ADHESIVES
- Tensol Cement
- Epoxy Resin
- Contact Adhesive

MARKING OUT TOOLS
- Try Square
- Rule
- Scriber

WASTING TOOLS
- Coping Saw
- Hand Files
- Abrasive Paper

PROPERTIES
- Plasticity
- Durability

COMMERCIAL PROCESSES
- Line bending
- Vacuum Forming
- Injection Moulding
- Extrusion
- Blow Moulding

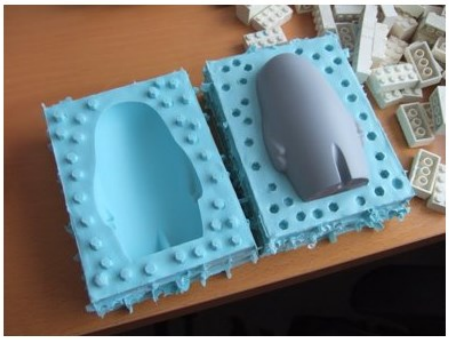
ADDITIONAL KEYWORDS
- Hard
- Tough
- Lightweight
- Rigid
- High Impact Strength
- Waterproof
- Scratch-Resistant

SCALE OF PRODUCTION
- One-Off
- Batch Production
- Mass Production

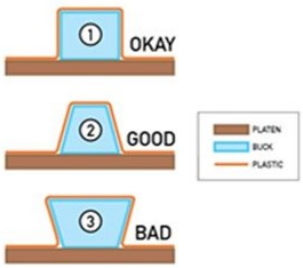
Name

Moulds:

2 Part Mould



Tapered Moulds

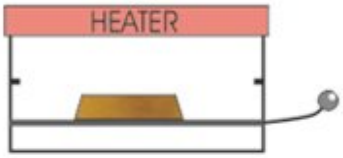


Vacuum Forming How does it work?

1.

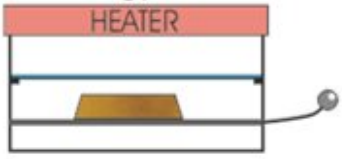
A SUITABLE MOULD / FORMER IS CAREFULLY MANUFACTURED

2.



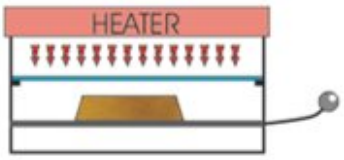
THE MOULD IS PLACED IN THE VACUUM FORMER

3.



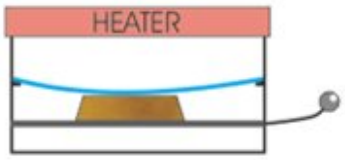
PLASTIC SHEET IS PLACED ABOVE THE MOULD AND CLAMPED SECURELY.

4.



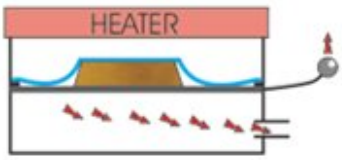
THE ELECTRIC HEATER IS TURNED ON TO WARM THE PLASTIC SHEET.

5.

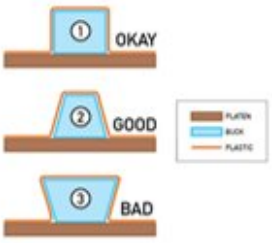


THE PLASTIC BECOMES FLEXIBLE WHEN HEATED

6.



THE AIR IS PUMPED OUT OF THE AREA BELOW THE PLASTIC AND MOULD.



Explain why number 2 is the best shaped mould.

The sides of the mould are tapered (angled) so the mould can come out and be reused again and again.

7

The plastic cools around the mould.

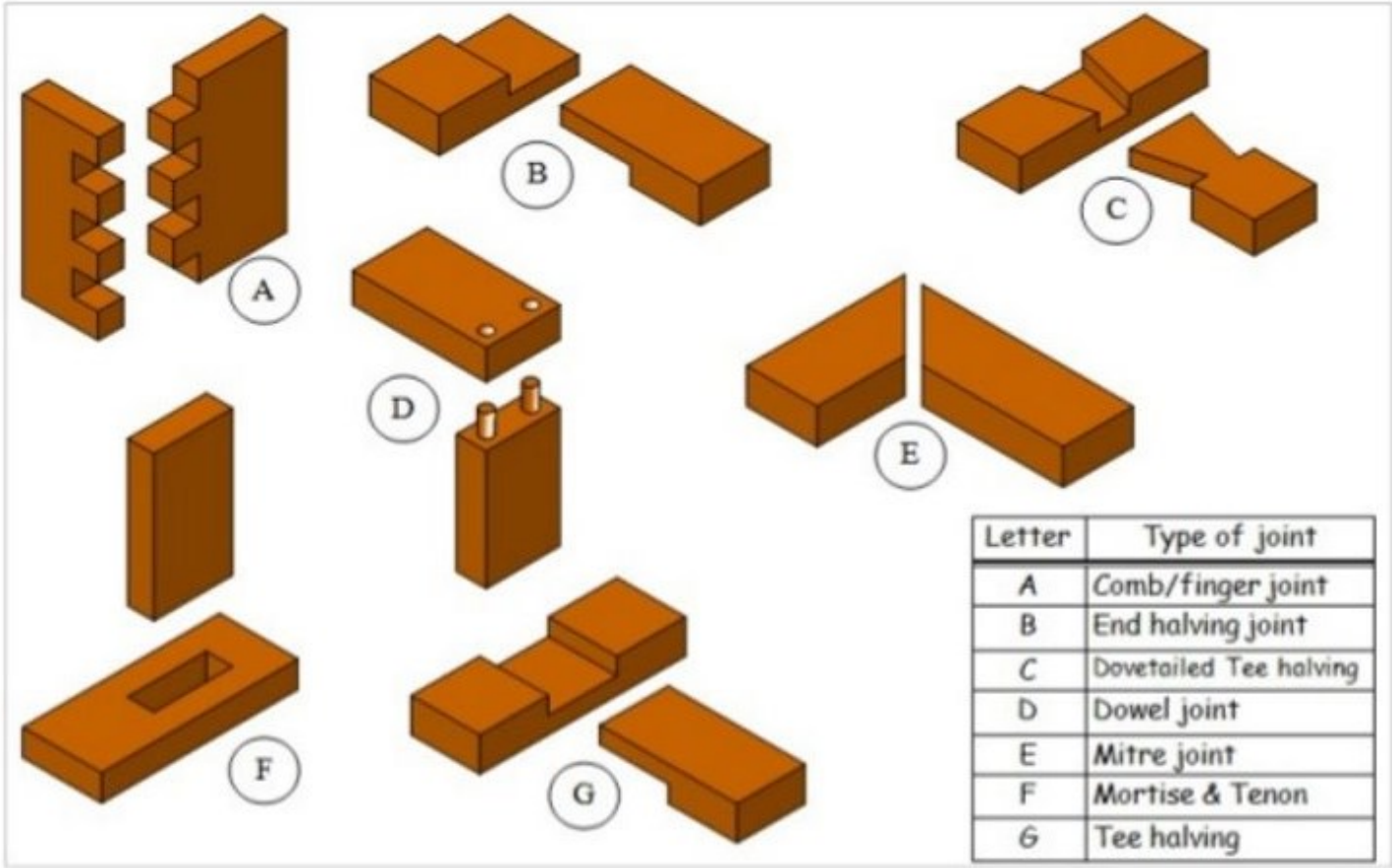
8

The platern and mould is lowered releasing the mould.

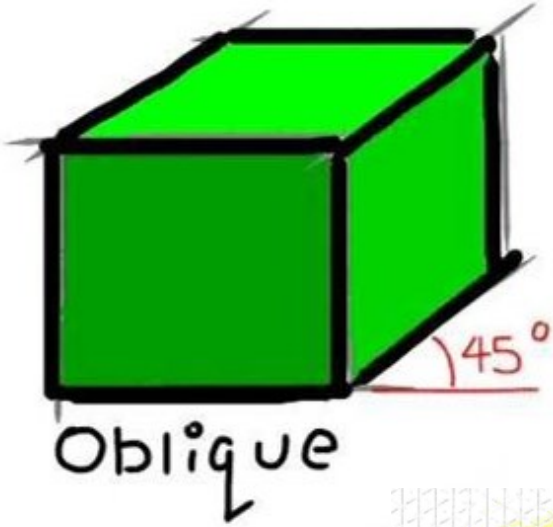
9

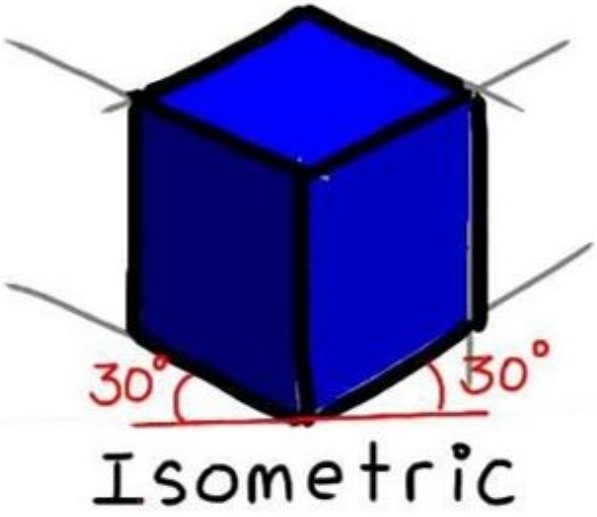
The excess plastic is cut, completing the product.

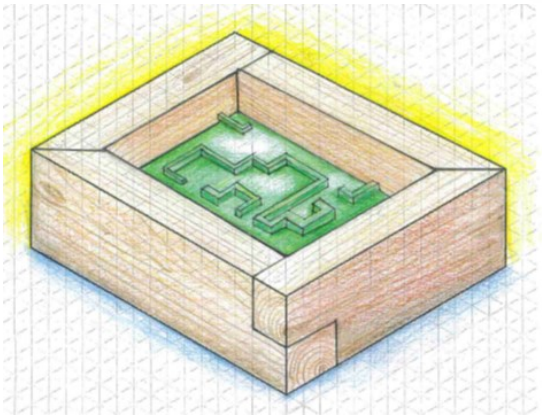
Wood joints - Focus on wood Joints



Letter	Type of joint
A	Comb/finger joint
B	End halving joint
C	Dovetailed Tee halving
D	Dowel joint
E	Mitre joint
F	Mortise & Tenon
G	Tee halving

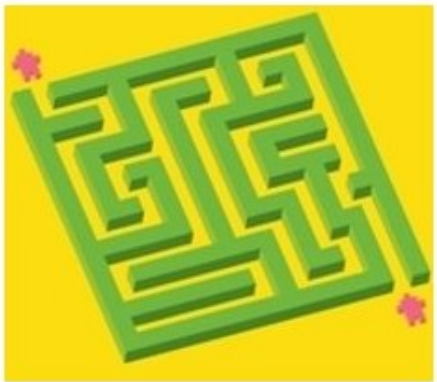






Up-levelling your Isometric design- How to get top marks

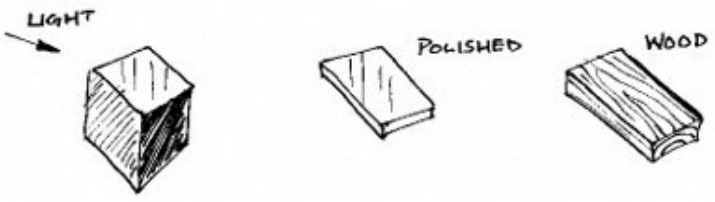
Have you made the plastic look **shiny**?



Is your track design **3D**?

Have you used **gradient** shading?

Have you included **wood grain**?



Have you included **texture**?
-Shiny/matt/smooth/coarse