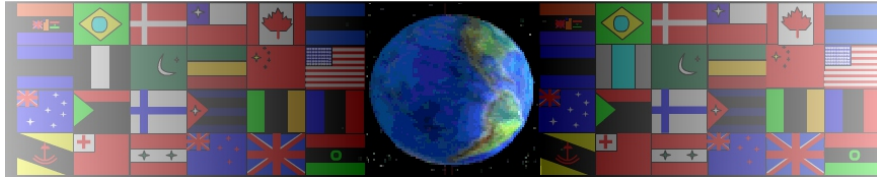


REAL WORLD MANUFACTURE OF YOUR PRODUCT SUMMARY / GUIDANCE SHEET

V.Ryan © 2000 - 2017

On behalf of The World Association of Technology Teachers

W.A.T.T.



World Association of Technology Teachers

This exercise can be printed and used by teachers and students. It is recommended that you view the website (www.technologystudent.com) before attempting the design sheet .

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EQUIPMENT

Woods and Boards

Hand Router - for cutting slots and shapes. Also used for cutting accurate dovetail and finger joints.

CNC Router - computer controlled for 'mass' manufacture - for cutting slots and shapes. Also used to manufacture sets of joints, especially if this is repeated hundreds of times.

Drilling Machine - drilling holes

Bandsaw - general cutting

Circular Saw - general cutting

Radial Saw - for cutting angles precisely.

Fretsaw - general cutting

Mortising Machine - cutting mortise joints.

Mortise and Tenon Machine - capable of cutting both joints.

Woodworking Lathe - shaping wood to a cylindrical form.

Planing Machine - for planing large surfaces, smoothing the surfaces after cutting with a saw.

Moulding Machine - For producing shapes / profiles usually along the length of a piece of timber.

EQUIPMENT - Metals

Machine Hacksaw - used for cutting 'thick' pieces of metal.

Centre Lathe - for precision shaping of metals, nylon and some other plastics. Mainly square and round sections.

Milling Machine, Shaping Machine - for precision shaping of metals, nylon and some other plastics.

Guillotine - used for cutting sheet metal.

Drilling machine - drilling holes

Plasma Cutter / Laser Cutter - for precise shaping of metals and etching.

Grinder / Surface Grinder - for precise shaping / finishing of metals.

Casting - pouring molten metal into a mould.

Compression, Drop Forging and Stamping - pressure used form shapes from flat sheet metal.

Tube / Pipe Bender - for bending tube accurately, forming accurate corners and bends.

Metal Rollers - For producing curves in metals, for example large curves.

Extrusion (Extruder) - when hot pliable metal is drawn through an extruder to form a long shape, such as an hexagonal shape or a tube.

Welding - (gas welding, arc welding, tig welding) all methods of permanently joining metals.

REAL WORLD MANUFACTURE OF YOUR PRODUCT


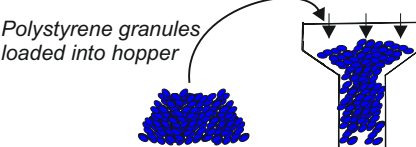
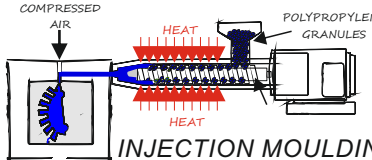
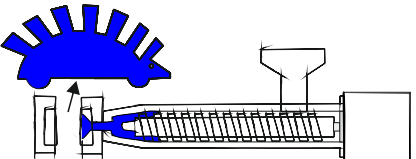
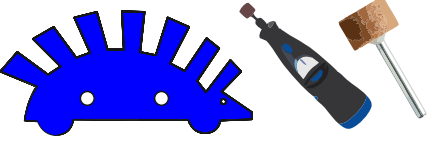
Below is a sample sheet / PowerPoint slide, representing the first 4 stages of manufacturing a product. You need to research how your product could be manufactured and then produce 7 or 8 stages, in sequence. In the left hand column, name the components/parts being manufactured. In the centre column, place an image showing the machinery / equipment used for that stage of manufacture. In the right hand column, explain the manufacturing process.

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At the top of the first slide / page write, "my product will be batched manufactured in a factory". Add, how many will be manufactured (1000, 10,000 etc....)

My product will be manufactured through batch production, on a production line. Initially, 10,000 will be manufactured.

REAL WORLD MANUFACTURING

COMPONENT	EQUIPMENT	EXPLANATION OF PROCESS
1. SIDES 	 Polystyrene granules loaded into hopper	The hopper is filled with polypropylene pellets. This can be completed by an operator or it can be automated (automatic feed), for a long run of production.
2. SIDES	 INJECTION MOULDING	Polypropylene pellets are fed into the injection moulding machine. They are heated up until they become fluid. The liquid 'plastic' is pushed into a mould and the DVD holder sides are manufactured.
3. SIDES		The mould is water cooled to speed up the process. The DVD sides are ejected from the injection moulding machine. Quick quality check carried out.
4. SIDES		Any rough edges are smoothed using a Dremel grinding tool.

QUALITY CHECKS

Stage 1. The quality of the granular polystyrene is checked through sampling. A sample is sent to the factor laboratory and is scientifically checked.

Stage 2. The injection moulding machine is checked for temperature and 'smooth' operation. This is carried out by sensors, monitored by the computer system.

Stage 3. The DVD holder sides are ejected. An initial visual check of the quality of the product is carried out by the production line supervisor.

Stage 4. Rough edges are removed and this is followed by another quality check.

At the bottom of each slide, write how the quality" of each stage of manufacture is checked. E.g. checked by an inspector, checked by computer / sensors, checked with a template etc....

Go to:

<http://www.technologystudent.com/equip1/equipex1.htm>
for information on equipment / industrial processes.

EQUIPMENT - Plastics

Band Saw - for general cutting and shaping.

Fretsaw - for general cutting and shaping.

Drilling Machine - drilling holes

Laser Cutter - for precision cutting, shaping and engraving.

Vacuum Former - for 3D forming of a range of plastics.

Strip Heater - for folding plastics at an set angle.

Injection Moulding - for moulding 'fluid' plastic into a shape inside a mould (dye). Good for making thousands of the same part / component / product.

Rotational Moulding, Blow Moulding, Extrusion, Compression Moulding - all ways of shaping large numbers of components / parts and products.

Profile Cutter - for trimming the edges of plastics after injection moulding and vacuum forming.

Extrusion (Extruder) - for producing an extruded shape / profile. E.G. a long hexagonal shape or a tube.

Subliminal Printer - used to print on to materials such as plastics.

EQUIPMENT - Finishing

Polishing / Buffing Machine - for polishing metals and plastics.

Spray Booth and Spray Gun - used for spray painting.

Sanding Machine, Linisher, Belt Sander - used for smoothing woods.

Galvanising steel - adds a zinc coating to steel - corrosion protection.

Anodising aluminium - adds a coloured finish.

Varnish - gloss / matt finish to woods. Can be used with a spray gun

Waxing - applying a protective wax coat to the surface of wood.

Lacquering - Applying a coat of clear lacquer to a metal surface to prevent corrosion.

Stains - can be applied to the surface of woods. They come in a range of colours, as well as stains mimicking other woods, including dark oak, light oak, antique pine and many more.

Oil Blacking - a technique using oil engine oil or coloured oil, to 'colour' the surface of steel. Also protects the surface from corrosion.