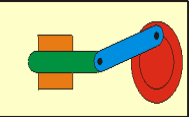
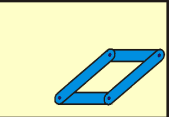
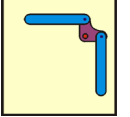
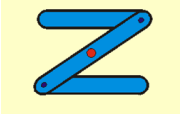





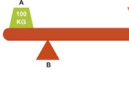


**Motions and movement:**

<p><b>Crank and slider</b></p> 	<p><b>Parallel motion</b></p> 	<p><b>Bell crank</b></p> 	<p><b>Reverse motion</b></p> 	<p><b>Ratchet and Pawl</b></p> 
<p><b>Linear motion-</b> Moves in a straight line in one direction only</p> 	<p><b>Rotary motion-</b> Rotates around a central axis</p> 	<p><b>Reciprocating motion-</b> Moves back and forth or up and down along a straight line</p> 	<p><b>Oscillating motion-</b> Moves back and forth along a curved line</p> 	<p><b>A Load</b> <b>B Fulcrum</b> <b>C Effort</b></p> 

**Sustainability when using woods-** Wood should only be used from managed forests, trees are replanted once they have been cut down- easy to repair- can be recycled into chipboard, mdf, card and paper- can be re used to manufacture other wooden products- less effect on the environment than many other resistant materials- Biodegradable- used wooden products can fuel bio mass power stations.

**Flat pack versus traditional:**  
**Advantages-** Compact for ease of transport- Low cost compared to traditional furniture- Large choice of styles and finishes- Easy to assemble with limited tools and experience- Can be disassembled for storage/moving.  
**Disadvantages-** Needs to be constructed yourself or by someone else at an additional cost- Not as robust as traditional furniture- Can be complex to construct for some- Prone to damage by moisture- Can chip and break easily.  
**Fixings:**  
 Why use pre-manufactured fixings- It is cost effective-Pre manufactured components are made by companies that specialise in this product-they make very high volumes to a low price- High quality- consistent sizes.



**Key words:**

Inset	Nuts and bolts
Coping saw	Spanner
Fret saw	Long nose pliers
Allen key	Machine vice
Waste area	Isometric
Finger joints	Parallel
Waste side	Oblique
Try square	Perspective
Ruler	Excellence
G clamp	PVA
Drill	Clamp
Dowels	Vice
Dowel pegs	Glass paper
Pilot hole	Wax
Counter sunk bit	MDF
Driver	Paint
Drill bits	Grain line
Screw driver	Grain
Halving joint	Degrease
	Key

**Industrial Revolution:**  
**Changes-** A 260 per cent growth in population- A change from agriculture to industry- A move from domestic industry to factory work- A move from water and wind power to steam engines- A revolution in transport and communications.  
**Inventors-** John Kay- It made hand loom weaving quicker. *The Flying Shuttle.*  
 James Hargreaves- Hand power. Increased the supply of thread. *The Spinning Jenny.*  
 Richard Arkwright- Increased the supply of strong thick thread. *The Water Frame*  
 Samuel Crompton- Increased the supply of strong high quality thin thread. *The Mule*  
 Edmund Cartwright- Speeded up weaving. *The Power Loom*  
 Henry Cort- Produced iron, which revolutionised materials used for machinery. *Iron*

**Year 8 RM Knowledge Organiser Frame**

**Health and Safety:**  
 HSE- Health and Safety Executive is an organization which looks after the welfare of employees and enforces the Health and safety at work act.  
 Health and safety at work act- It was introduced in 1974, it is legally binding agreement, employers are obliged to provide safe working environment for all employees.  
 BSI- BSI Group, also known as the British Standards Institution, is the national standards body of the United Kingdom.

**Flow chart symbols:**

<b>Process</b>	
<b>Start/end</b>	
<b>Decision</b>	

**Adhesives:**  
 PVA- Wood-wood-strong glue-takes a long time to dry  
 Glue gun- modelling materials-quick-not strong  
 Solvent cement-acrylic to acrylic-dries clear- can damage the finish  
 Epoxy resin- any materials to any material-strong joint-irritant to skin  
 Super glue- any materials to any material-quick- irritant

**Jig moulds and templates:**  
**Accuracy:** The level of accuracy is improved as human error is limited.  
**Consistency:** The level of consistency is improved as all the products will be identical.  
**Speed:** The time taken to produce a product is reduced as there is no requirement for marking out.  
**Cost:** The cost of producing products is reduced as the use of jigs, moulds and templates means less labour required, initial set up high

**Finishes:**  
 Types of finishes- varnish-paint-wax-stain-oil  
 It enhances the look-brings out the wood grain- shiny finish- durable- protect-water resistant- smoother finish.

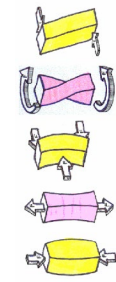
**Forces and Loads:**  
 Static load- doesn't move, easy to design  
 Dynamic loads- moves, harder to design  
 Shear-splits at 90 degrees

Torsion- twisting

Bending- compression and tension

Tension-pulling

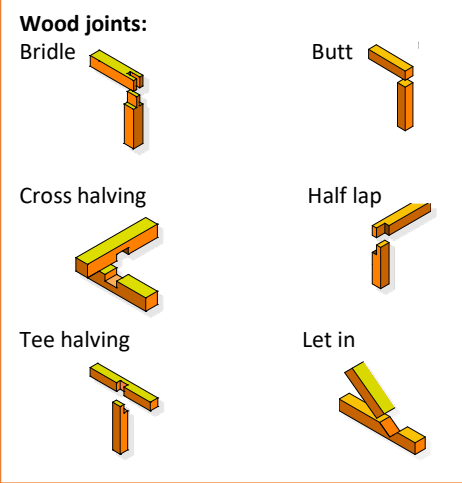
Compression- squeezing



**Brunel:**  
 The famous engineer played a key role in Britain's industrial revolution. He was the chief engineer of the great western railway- build a ship that took 15 days to sail from Liverpool to New York- created box tunnel which was when complete the longest tunnel in the world- created Thames tunnel which was the first successful tunnel to be built below a river.

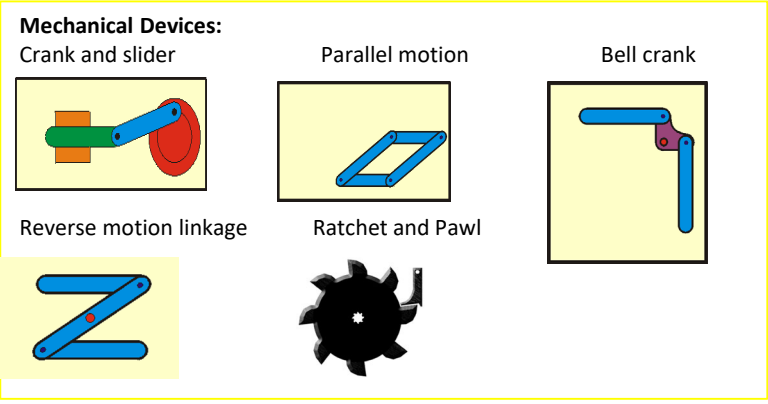
**Machine maintenance:**  
**It is important-**  
 It extends the life of the product -You don't have to buy a new product when a part is worn out or fails- You can keep the product in optimum working order- A product in optimum working order is more efficient- It is cost effective- You don't have to buy a complete new product- It increases the sustainability of the product- It is environmentally friendly- It ensures that the product will be safe to use.

**Quality assurance/ quality control:**  
**Why quality control is important-**  
 Check or test-Make sure the product meets a specific standard-To ensure manufactured products meets an agreed specification-Guarantees the accuracy of a part or component-Manufactured to an agreed tolerance-Fit for purpose-Suitable enough for selling  
**Importance of tolerance-**  
 Very difficult to make a component exactly correct- Easier to make a component within tolerances-This is the maximum and minimum sizes a component can be- Manufacturer knows that if a product is within tolerances then it will work.  
**Method of quality control check-**  
 Visual check- Using a ruler- Using a multimeter- Using a jig/fixtures or template- Testing against the specification- Testing to see if the product works.



**Structural Engineering:**  
 Triangulation: triangles are strong and rigid.  
 Iron Bridge- 1779- Abraham Darby- worlds first iron structure.  
 Industrial revolution- population increase, change from agriculture to industry, move from water and wind to steam, revolution in transport and communication.  
 Inventors- Richard Arkwright- water frame, Samuel Crompton- the mule, James Watt- steam engine, Edmund Cartwright- the power loom and Henry Cort- Iron.  
 Brunel-He built bridges- changed transportation-created railway between Bristol and London, built a ship that took 15 days from Liverpool to New York.  
 Shell- strength reloads into the outer surface.  
 Frame- combinations of beams, slabs and columns to resist the lateral and gravity loads.  
 Struts- support the beam underneath.  
 Ties-supports the beam on top.

**Materials**  
 Natural- soft wood and hard wood  
 Manmade timbers-Manufactured boards advantages: cheaper, larger board available, doesn't warp, no knots or defects.  
 Seasoning-Removes the moisture from the natural wood to prevent warping.  
 Strength in wood- wood is stronger along the grain  
 Conversion- slap sawn and quarter sawn



# Year 8 RM Knowledge Organiser Structures

**Designing:**  
 Third angle orthographic Projection- show multiple views of the same object  
 Dimensions- numbers sit on the top of the line  
 Plan- view from the top  
 Side- view from the side  
 Front- view from the front  
 Construction lines

**Tools:**  
 Claw hammer- is a tool primarily used for pounding nails into, or extracting nails from, some other object.  
 Coping saw- is a type of hand saw used to cut intricate external shapes and interior cut-outs in woodworking.  
 Tenon saw- is a type of hand saw used to cut wood straight.  
 Vice- used for holding work in place while cutting or hammering pins into the material.  
 Bench hook- its purpose is to provide a stop against which the piece of wood being worked can be firmly held.  
 File- a steel hand tool with small sharp teeth on some or all of its surfaces; used for smoothing wood or metal.  
 Try square- used for marking and measuring a piece of wood. The square refers to the tool's primary use of measuring the accuracy of a right angle (90 degrees).

**Forces and Loads:**  
 Static load- doesn't move, easy to design  
 Dynamic loads- moves, harder to design

Shear-splits at 90 degrees

Torsion- twisting

Bending- compression and tension

Tension-pulling

Compression- squeezing

**Architects:**  
**Antoni Gaudí:** love of natural design and modernism. Famous works: Sagrada Familia in Barcelona.  
**Le Corbusier:** icon of Modernism, His early works-smooth, white concrete and glass structures elevated above the ground. His later work- rough, heavy forms of stone, concrete, stucco, and glass  
 Famous works: The Villa Savoye in Poissy.  
**Walter Gropius:** Pioneer of the Bauhaus movement: less is more, merge fine arts and craftsmanship; use modern materials such as steel, cement, and glass; and the idea that form follows function.  
 Famous works: Sommerfeld House  
**Frank Lloyd Wright:** low pitched roofs, overhanging eaves, a central chimney, and open floor plan. Change to the confined, closed-in architecture of the Victorian era.  
 Famous works: Falling water  
**Zaha Hadid:** strong, unique, powerful, curvy and interesting, bold and contemporary. She explores new aspects of design through technology and materials.  
 Famous works: Evelyn Grace Academy.



- Key words:**
- Design brief
  - Engineer
  - Triangulation
  - Struts
  - Ties
  - Blast Furnace
  - Weaving
  - Water Power
  - Industrial Revolution
  - Empire
  - Architect
  - Shell structure
  - Frame structure
  - Natural
  - Manmade
  - Static
  - Dynamic
  - Compression
  - Tension
  - Torsion
  - Shear
  - Bending
  - Load
  - Linkage
  - mechanism
  - Reverse motion
  - Parallel
  - Crank and slider
  - Bell crank
  - Ratchet and Pawl
  - Orthographic
  - Isometric
  - Perspective
  - Seasoning
  - Hardwood
  - Softwood
  - Quality Control
  - Temporary fixing
  - Permanent fixing
  - Gusset Plates
  - Evaluation