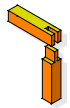
Year 8 RM Knowledge Organiser

Structures

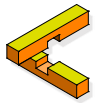
Wood joints:

Bridle

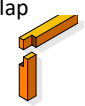


Butt

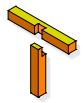
Cross halving



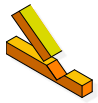
Half lap



Tee halving



Let in



Structural Engineering:

Triangulation: triangles are strong and rigid.

Iron Bridge- 1779- Abraham Darby- worlds first iron structure.

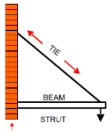
Industrial revolution- population increase, change from agriculture to industry, move from water and wind to steam, revolution in transport and communication.

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

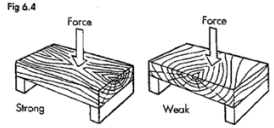
Natural- soft wood and hard wood

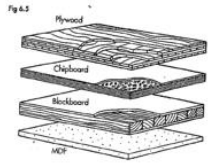
Manmade timbers-Manufactured boards advantages: cheaper, larger board available, doesn't warp, no knots or defects.

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





Designing:

Third angle orthographic Projection- show multiple views of the same object

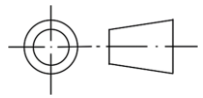
Dimensions- numbers sit on the top of the line

Plan- view from the top

Side- view from the side

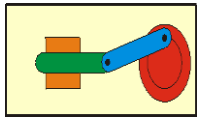
Front- view from the front

Construction lines

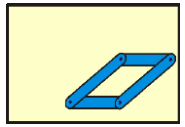


Mechanical Devices:

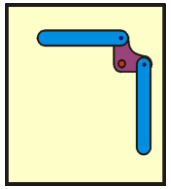
Crank and slider



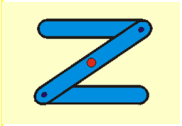
Parallel motion



Bell crank



Reverse motion linkage



Ratchet and Pawl

Forces and Loads:

Static load- doesn't move, easy to design

Dynamic loads- moves, harder to design

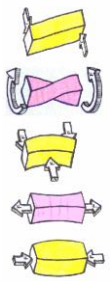
Shear-splits at 90 degrees

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.

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).

Design Heroes:

Stephanie Kwolek- - Kevlar, **Zaha Hadid-** London Olympic pool, **Milton Glaser-** New York logo, **Sir Norman Foster-** Wembley Stadium, **Sir Jonathan Ive-** Mac Mini 2005, **Phillipe Starck-** Zartan chair 2011.

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