

Resistant Materials

Year 8 Homework Booklet

Name:

Teacher:

Form:

- This book is your property, if you lose it you must buy a new one
- Bring it to each lesson

I will get my homework marked at the start of each lesson.

For my technical knowledge I need to know:

- How to spell the word correctly
- What the meaning is
- How and where it is used

Homework 1: Industrial revolution

Research:

- How Britain changed from the industrial revolution

Key information about the inventions listed below and what made it so significant

- The flying shuttle- John Kay
- The spinning jenny-James Hargreaves
- The water frame-Richard Arkwright
- The mule-Samuel Crompton
- The power loom-Edmund Cartwright
- Iron- Henry Cort

Homework 1: Industrial revolution

Question	Answer	Marks
What were the main changes in Britain due to Industrial Revolution?		4
What did John Kay invent and why was it significant?		2
What did James Hargreaves invent and why was it significant?		2
What did Richard Arkwright invent and why was it significant?		2
What did Samuel Crompton invent and why was it significant?		2
What did Edmund Cartwright invent and why was it significant?		2
What did Henry Cort invent and why was it significant?		2

Homework 2: Brunel

Research:

- The life and work of Isambard Kingdom Brunel
- Look at areas Brunel was involved via engineering

Great Western Railway

Box tunnel

SS Great Western

Thames tunnel

The Great Britain

Homework 2: Brunel

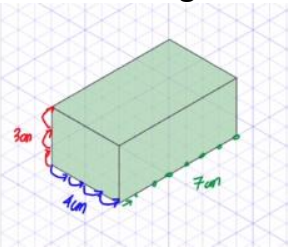
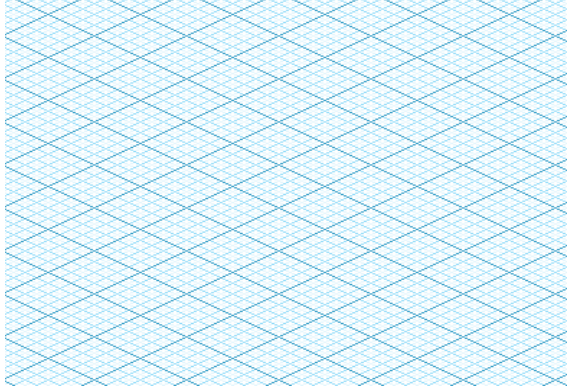
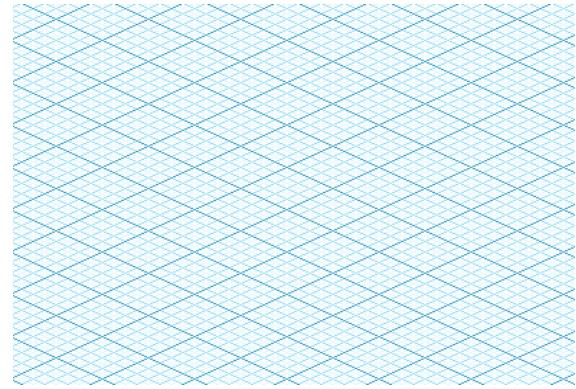
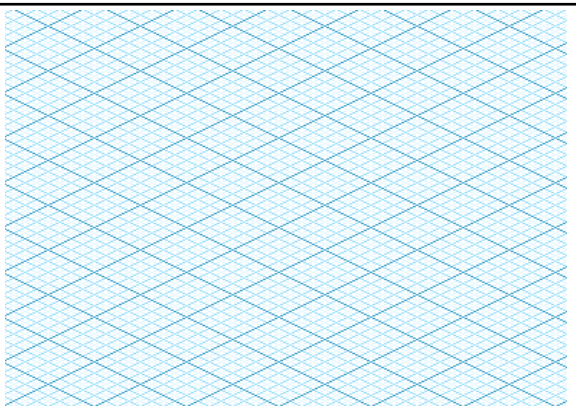
Question	Answer	Marks
Why was the Thames tunnel significant?		2
How long did it take the SS great western to travel from New York to Liverpool?		1
What was Brunel most famous for?		4
Where did the rail line travel to and from that Brunel created for the Great Western Railway?		2
What record did the box tunnel hold, when it was completed?		1

Homework 3: Drawing 3D shapes in isometric

Complete the questions on the next page

Homework 3: Hegarty Maths Drawing

3D shapes in isometric (832 – Drawing 3D shapes)





Question	Answer	Marks
<p>What are the dimensions of the cuboid given on the isometric grid below?</p> 		2
<p>Using the isometric paper draw a cube with 3cm edge.</p>		2
<p>Using the isometric paper draw a cuboid with a length of 5cm, width 3cm and height 2cm.</p>		4
<p>A prism has a cross-section which is a right-angled triangle. It has a base of 6cm, a height of 4cm and a depth of 7cm. Draw this accurately on the isometric grid.</p>		4

Homework 4 :Comparing flat pack furniture to traditional techniques

Research:

- Flat pack furniture fixings-dowel-modesty blocks, cross dowel fixing, CAM lock fitting, hinges and screws
- Advantages and disadvantages of Flat pack furniture compared to traditional furniture.

Homework 4: Comparing flat pack furniture to traditional techniques

Question	Answer	Marks
What are the advantages of using Flat pack furniture?		3
What are the disadvantages of using Flat pack furniture?		3
Write the correct name of the fixing? 		1
Write the correct name of the fixing? 		1
Write the correct name of the fixing? 		1
Write the correct name of the fixing? 		1

Homework 5 : Forces



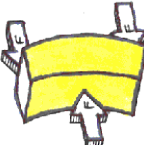
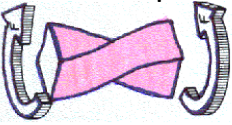
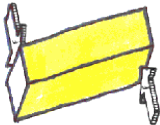
Research different forces and stresses, for each of the following, you need to understand each and give an example of use:

- Static load
- Dynamic load
- Torsion
- Compression
- Tension
- Shear
- Bending

Homework 5 :Forces

Identify the force acting upon each of the following **three** parts of the high chair when in use.



Question	Answer	Marks
Legs?		1
Seat?		1
Straps?		1
Name the force and give an example? 		2
Name the force and give an example? 		2
Name the force and give an example? 		2
Name the force and give an example? 		2
Name the force and give an example? 		2

Homework 6 : Motion and movement

Research different motions and movement:

For each of the following, you need to understand each and give an example of use:

- Linear motion
- Rotary Motion
- Reciprocating motion
- Oscillating motion

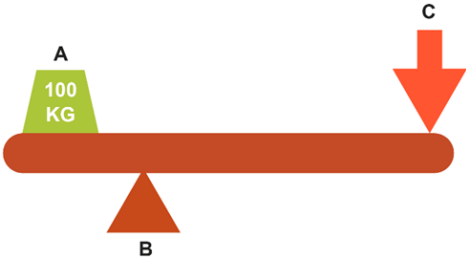



Looking at levers:

- What is a load
- What is the effort
- What is the fulcrum

Looking at linkages for where they can be used:

- Parallel motion
- Reverse motion
- Bell crank
- Crank and slider

Homework 6 : Motion and movement

Question	Answer	Marks
Which of the words describes a mechanism?	Electricity Thermoplastic Static Movement	1
On the drawing label the fulcrum, the effort and the load?	<p>A B C</p> 	3
Complete the sentence with the correct number.	There are _____ different orders of lever.	1
What is the name of the linkage shown?		1
The change in motion taking place in the car jack below is best described as?		1
On the image, label the fulcrum, effort and load?		3

Homework 7: Sustainability

Research:

- Life cycle analysis of a product processes from wood
- 6 R's
- Environmental impact of processing materials manufactured from wood.

Homework 7: Sustainability

Question	Answer	Marks
<p>Discuss the environmental impact of using wood to manufacture products.</p>		6

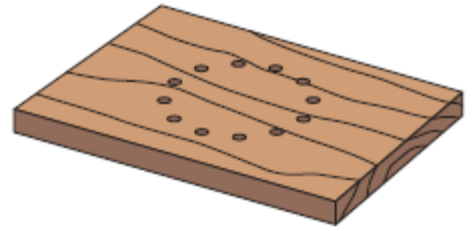
Homework 8: Manufacturing using Jigs

Research:

- What is a drilling jig
- Why and where are they used?
- What main features do drilling jigs need when manufacturing products.

Homework 8: Manufacturing using Jigs

Study the wooden block shown below. This wooden block is to be made in a school workshop.







Question	Answer	Marks
Produce a labelled drawing of a simple drilling jig that will allow 100 similar wooden blocks to be drilled?		5
Explain how the use of jigs, moulds and templates affect the manufacture of products?		6

Homework 9: Adhesives

Research the glues below, you need to find out what materials the glue is used for, how long the glue takes to dry and how strong the glue is once dry and how you apply the glue:

- PVA
- Contact Adhesive
- Epoxy Resin
- Glue gun
- Super glue
- Solvent Cement

Homework 9: Adhesives

Question	Answer				Marks	
Complete the table by: <ul style="list-style-type: none"> • suggesting a suitable use for each adhesive • giving an advantage of each adhesive • giving a disadvantage of each adhesive. 	Adhesive	Use	Advantage	Disadvantage	8	
	PVA 					
	Glue gun 					
	Solvent cement 					
	Epoxy resin 					

Homework 10: Finishes

Research:

- Why finishes are applied to materials
- What type of finishes can be applied to metal
- What type of finishes can be applied to wood
- How to apply the finishes to the surface of the materials

Homework 10: Finishes



Study the pine table shown

Question	Answer	Marks
Name a suitable finish for the pine table		1
Give two reasons for choosing the finish you have named.		2
Use notes and sketches to describe how you would apply the finish you have named.		6

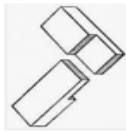
Wood joints:



Dowel



Halving



Screwed butt



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).

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.

PPE Sign	Meaning	Activity	Hazard
	Wear goggles	When using machinery that creates debris or dust	You could damage your eyes.
	Wear gloves	When handling hot or sharp objects	Your hands could be cut/ burned.
	Wear ear protectors	When using loud machinery	You could damage your hearing.
	Wear dust mask	Using machinery or chemicals that create dust or fumes	You could damage your lungs.

Year 8 RM Knowledge Organiser Test

Flow chart symbols:



Process

Start/end

Decision

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.

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

Adhesives:

PVA- Wood-wood-strong glue-takes a long time to dry
Glue gun- modelling materials-quick-not strong
Epoxy resin- any materials to any material-strong joint-irritant to skin



Screws



Hinge



Modesty block



Dowels



Washer



Bolt



Nylol nut



Nut

Designing:

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

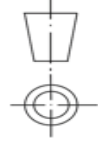
Dimensions- numbers sit on the top of the line

Plan- view from the top

Side- view from the side

Front- view from the front

Construction lines

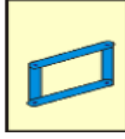


Motions and movement:

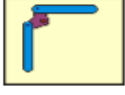
Crank and slider



Parallel motion



Bell crank



Reverse motion



Ratchet and Pawl



Linear motion-

Moves in a straight line in one direction



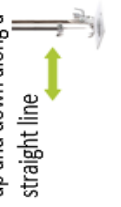
Rotary motion-

Rotates around a central axis



Reciprocating motion-

Moves back and forth or up and down along a straight line



Oscillating motion-

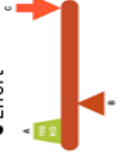
Moves back and forth along a curved line



A Load

B Fulcrum

C Effort



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

Year 8 RM

Knowledge Organiser Homework

Flat pack versus traditional:

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Fixings:

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Screws



Hinge



Modesty block



Dowels



Washer



Bolt



Nylloc nut



Nut

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.

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

Finishes:

Types of finishes- varnish-paint-wax-stain-oil
 It enhances the look-brings out the grain- shiny finish- durable- protect-resistant.

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

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.

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.