Resistant Materials
Year 9 Homework Booklet

Name:

Teacher:

Form:

My teacher is going to test me on all of my homework 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.

Marks

Date	**Test number & total mark**	**My mark**	**%**
	Test 1 - 8 marks		
	Test 2 - 11 marks		
	Test 3 - 5 marks		
	Test 4 – 5 marks		
	Test 5 – 5 marks		
	Test 6 – 7 marks		
	Test 7 – 20 marks		
	Test 8 – 6 marks		
	Test 9 – 8 marks		
	Test 10- 7 marks		
	Test 11 - 8 marks		
	Test 12 - 10 marks		
	Test 13 - 8 marks		
	Test 14 – 8 marks		
	Test 15 – 30 marks		

Date	Test number & total mark	My mark	%
	Test 16 – 16 marks		
	Test 17 –8 marks		
	Test 18 –8marks		
	Test 19- 8 marks		
	Test 20 – 12 marks		
	Test 21- 20marks		
	Test 22 -14 marks		
	Test 23- 8 marks		
	Test 24-19 marks		
	End of module test-100 marks		

Learning towards excellence UPUR
How I have performed What I need to do

Homework 1:Research the different roles within a product development company.

Understand the roles of:

- The client
- The designer
- The manufacturer
- The user
- Explore how they would interact with each other

Homework 1: Research the different roles within a product development company.

A health food restaurant named 'Healthy Foods' would like to redesign the furniture in their children's area.

Question	Answer	Marks
Describe the role of the **client**, in the product development of new tables and chairs?		2
Describe the role of the **designer**, in the pro duct development of new tables and chairs?		2
Describe the role of the **manufacturer,** in th e product developm ent of new tables and chairs?		2
Describe the role of the **user**, in the product development of new tables and chairs?		2

Homework 2: Research different types of plastics

Research a range of different types of plastics:

- Include what type of categories of plastic they are from (thermosetting thermoplastics)
- Their properties
- Where they are used

Homework 2: Plastics

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>Tick the correct categories?</td><td>
<table>
<tr><th>Material</th><th>Use</th><th>Thermoplastic</th><th>Thermosetting plastic</th></tr>
<tr><td>Acrylic (PMMA)</td><td>Car indicator lens</td><td></td><td></td></tr>
<tr><td>Polyethylene terephthalate (PET)</td><td>Fizzy drink bottle</td><td></td><td></td></tr>
<tr><td>Melamine formaldehyde (MF)</td><td>Kitchen worktop</td><td></td><td></td></tr>
<tr><td>Low-density polyethylene (LDPE)</td><td>Plastic carrier bag</td><td></td><td></td></tr>
<tr><td>Urea formaldehyde (UF)</td><td>Electric socket</td><td></td><td></td></tr>
</table>
</td><td>5</td></tr>
<tr><td>Name the category of plastic that has been used to manufacture a margarine tub?
Margarine tub
  </td><td></td><td>2</td></tr>
<tr><td>Explain why this category of plastic has been chosen?</td><td></td><td>3</td></tr>
<tr><td>Name the category of plastic that has been used to manufacture an electrical socket?
Electrical socket
  </td><td></td><td>1</td></tr>
</table>

Homework 3: To research different plastic processes

Research the different plastic processes below:

- Injection moulding
- Blow moulding
- Vacuum forming
- Compression moulding

You must look for diagrams of how the machines work, what type of products the process makes, advantages and disadvantages of each process.

Homework 3: plastic processes

A plastic process has been used to manufacture the polymer toy instrument.

Polymer toy musical instrument

Question	Answer	Marks
Name **one** industrial process used in the manufacture of the product above?		1
Draw a diagram to explain this process?		2
Write steps to describe the process?		2

Homework 4: Research different metal processes

Research the different metal processes below:
Die casting
Press forming
Spinning

You must look for diagrams of how the machines work, what type of products the process makes, advantages and disadvantages of each process.

Homework 4: Metal processes

Product	Toy car
Commercial process	Casting

Question	Answer	Marks
Name **one** industrial process used in the manufacture of the product above?		1
Draw a diagram to explain this process?		2
Write steps to describe the process?		2

Homework 5 : Research different metal processes

Research a range of different types of metal:

- Include what type of categories of metal they are from (Ferrous and Non Ferrous)
- Explore how to enhance metal with regards to alloying
- Their properties
- Where they are used

Homework 5: Metal processes

Question	Answer	Marks
Describe a ferrous metal?		1
Describe a non-ferrous metal?		1
Describe an alloy?		1
Name an alloy and where it can be used?		2

Homework 6 : Select a designer from the list below and then research the following areas.

Design movement choices:

- Marcel Breuer
- Norman Foster
- William Morris
- Charles Rennie Mackintosh
- Ettore Sottsass
- Philippe Starck

Research:

About the style of their work

The different materials they have used

Different technologies (manufacturing processes)

Homework 6 : Chosen designer

Question	Answer	Marks
Name the designer and 1 piece of their work?		1
What inspiration did they use in their work?		2
What type of technologies did they use in their work?		2
What type of traditional materials did they use in their work?		2

Homework 7 :Topic Test next lesson, revise all areas for your topic test

Revise:

- Metals categories -properties-use
- Enhancing metals via alloying
- Plastics categories-properties-use
- Woods categories -properties-use
- Metal processes- advantages-disadvantages-use
- Plastic processes- advantages-disadvantages-use

Homework 7: Topic Test

Question	Answer	Marks
What are the three main groups of woods?		3
Name two advantages of using manufactured boards?		2
What is the difference between a ferrous and non ferrous metal?		2
What is an alloy, give an example and use?		3
What is a thermosetting plastic, give an example and use?		3
What is vacuum forming?		2
Name a metal process and an advantage of the process ?		2
What can be used in the line bending process to ensure the plastic is bent at the correct angle?		1
Vacuum forming and line bending are two plastic processes, name another two?		2
Total		20

Homework 8 :Pupils are to research the Anglepoise lamp.

Research:

- Looking at who invented it
- Where the idea originates from
- What materials it is manufactured from

Homework 8 : Pupils are to research the Anglepoise lamp.

Question	Answer	Marks
What is the name of the designer that has created the lamp?		1
What is the lamp design based on?		1
How does the lamp work?		2
What type of materials are used to manufacture the lamp and why?		2

Homework 9 : What areas do designers research prior to designing and why is it relevant?

Gain an understanding of different research areas and explore why it would be relevant for designers to conduct this research

Research areas:

- Questionnaire
- Product analysis
- Mood boards
- Materials
- Construction methods

Homework 9 : What areas do designers research prior to designing

Question	Answer	Marks
Explain why designers research products from other manufacturers?		2
Explain why designers compare products from other manufacturers?		2
Explain how research and comparing products would help to design their own product?		2
Name two different research areas designers could conduct, when designing a product?		2

Homework 10 : Research Biomimicry

Research:

- What is biomimicry
- What products are inspired by biomimicry features
- Look why it has been used and what it improves.

Homework 10 : Research Biomimicry

Question	Answer	Marks
What is Biomimicry?		1
Give an example of a product where biomimicry has been used and how it has been used?		2
Compare the two images, what biomimicry links does a bird have with an airplane?		4

Homework 11 :Research advantages and disadvantages of CAD

Research:

- What different design programs can be used for CAD designs
- What are the advantages of using CAD
- What are the disadvantages of using CAD

Homework 11 : CAD

Question	Answer	Marks
Computer based tools are helpful to designers when modelling. Discuss how a designer might use the internet?		2
Computer based tools are helpful to designers when modelling. Discuss how a designer might use shape and form?		2
Computer based tools are helpful to designers w hen modelling. Discuss how a designer might use non-destructive testing?		2
Computer based tools are helpful to designer s when modelling. Dis cuss how a designer might use social media?		2

Homework 12 :Research 3D drawing techniques

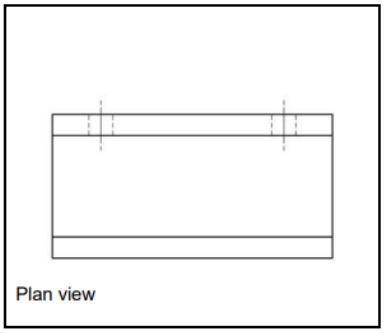
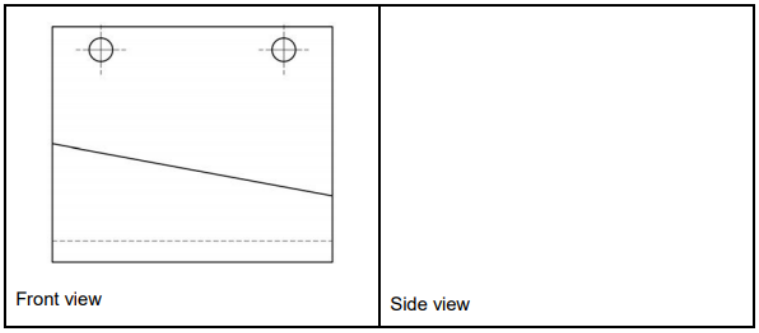
Research:

- Orthographic drawing
- Isometric drawing
- Perspective drawing

Look for where these drawing techniques would be used and why they are used.

What are the advantages and disadvantages of using these techniques over 2D drawing

Homework 12 : 3D drawing techniques

Question	Answer	Marks
Three dimensional (3D) drawings communicate information in different ways to two dimensional (2D) drawings. Describe two advantages 3D drawing has over 2D drawing.	Advantage 1 Advantage 2	4
To the side is a drawing of a storage rack for letters. Complete the third angle orthographic projection by adding a side view and isometric drawing of the shape in the boxes provided.	 	6

Homework 13 : CAM

Research:

- What different machines can be used for CAM
- Explore rapid prototype machines, laser cutter and milling machines in detail
- What are the advantages of using CAM
- What are the disadvantages of using CAM

Homework 13 : CAM

Question	Answer	Marks
Computer based tools are helpful to designers when modelling. Discuss why designers would make a mock-up of a final design?		2
Computer based tools are helpful to designers when modelling. What machine could be used to create a model?		2
What are the advantages of using CAD and CAM?		2
What are the disadvantages of using CAD and CAM?		2

Homework 14 : Electronics

Research:

- What materials conduct electricity
- What materials don’t conduct electricity
- Health and safety issues around using a soldering iron

Homework 14 : Electronics

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>Give two reasons why copper wire is used to connect electrical components.</td><td>Reason 1:

Reason 2:</td><td>2</td></tr>
<tr><td>Name the material that is used to cover the copper wire. Explain why this material has been used.</td><td>Material

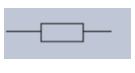
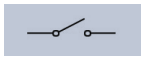
Explanation</td><td>2</td></tr>
<tr><td>The process of soldering can be a dangerous activity. Complete the table</td><td>
<table>
<tr><th>Health and safety issue</th><th>Hazard</th><th>Precaution</th></tr>
<tr><td>The tip of the soldering iron gets hot.</td><td>.....
.....
.....
(1 mark)</td><td>.....
.....
.....
(1 mark)</td></tr>
<tr><td>Soldering gives off fumes.</td><td>.....
.....
.....
(1 mark)</td><td>.....
.....
.....
(1 mark)</td></tr>
</table>
</td><td>4</td></tr>
</table>

Homework 15 :Topic test revision

Research:

- Electronic components- soldering
- Circuit diagrams
- Advantages and disadvantages of CAD/CAM
- Different drawing techniques-where used-why
- Technology push and market pull- types of products
- Biomimicry
- Product analysis
- Angle poise lamp
- Metals categories -properties-use
- Enhancing metals via alloying
- Plastics categories-properties-use
- Woods categories -properties-use
- Metal processes- advantages-disadvantages-use
- Plastic processes- advantages-disadvantages-use
- Designers

Homework 15 : Topic Test

Question	Answer	Marks
What does each letter stand for in ACCESS FM?		7
Who was the angle poise lamp designed by and what was it inspired from?		2
Name 4 different types of box joint?		4
What is the different between technology push and market pull		2
What three colours are used when laser cutting and what are they used for?		6
What component controls the flow of current through a circuit?		2
What is the difference between a polarised and non polarised component?		1
What are the circuit symbols below?	     	6
Total		30

Homework 16: Further research into energy stores

Research:

- Kinetic
- Thermal
- Chemical
- Elastic
- Sound

Look for examples of where the energy stores are used and an explanation for each

Homework 16 : Energy stores

The racing boats are put into the water using a crane.
The crane uses an electric motor. ?

Question	Answer	Marks
Using the image above, Show the different energy stores and transfers in the drawing by labelling a to i on the drawing.		7
(a) On something storing energy because it is moving	(energy)	1
(b) On something storing energy because it has been lifted up	(energy)	1
(c) On something that is using energy stored in a battery	(energy)	1
(d) On something using energy stored in petrol	(energy)	1
(e) On someone transferring energy by sound	(transfer)	1
(f) On two places where energy is stored because objects are warm	(transfer)	1
(g) On something transferring energy by electricity	(transfer)	1
(h) On something transferring energy by forces	(transfer)	1
(i) On something transferring energy by light	(transfer)	1

Homework 17: User requirements and safety

Gain an understanding what the following words mean with regards to designing:

- Specification
- User requirements
- Safety
- Stakeholder requirements

Homework 17 :User requirements and safety

Specification for playground equipment

- For use by children age 4-12.
- Designed for external use.
- Recessed/flush fitting construction fittings used.
- All fittings are tamper proof.
- Use of weatherproof materials.
- Suitable for installation on a flat surface.
- Use of non-slip surfaces.
- Tough, durable and wear resistant finish applied to all parts.
- Parts designed to be bolted together.

	Answer	Marks
Using the image above and the information. Analyse and evaluate the playground equipment in terms of suitability for the user.		4
Using the image above and the information. Analyse and evaluate the playground equipment in terms of inclusion of safety features.		4

Homework 18: Composite materials

Research what are composite materials:

- Definition of what a composite material

Explore:

- Carbon fibre
- Glass Reinforced plastic
- Kevlar
- Concrete

Homework 18: Composite materials

	Answer	Marks
Explain how Kevlar fibers are processed and arranged to give this material its unique properties.		2
GRP is an example of a composite material Explain the advantages of using composite materials	 The car shown above has bodywork made from Glass Reinforced Plastic (GRP)	2
Henry is mixing concrete. To make concrete he needs to mix cement, sand and gravel in the ratio 1:4:7 by weight. Henry needs to make 120kg of concrete. He has 11kg of cement, 40.5kg of sand and 69kg of gravel. Does Henry have enough of the raw materials to make 120kg of concrete?		4

Homework 19: Ratios Mr Hegarty Ratios (328 - Compare quantities using ratios)

https://hegartymaths.com/compare-quantities-using-ratios
Watch the video makes note and bring into your next lesson to put in your work book.
Complete the quiz, you must achieve 80%
You will be tested in class too.

Quiz - your teacher will upload your results

Homework 19: Hegarty maths

Question	Answer	Marks
In a fruit cocktail for every **7ml** of **orange juice** you need **5ml** of **apple juice** and **13ml** of **coconut juice.** What is the ratio of **apple juice** to **coconut juice** to **orange juice**?		2
Colin and Brian are marking exam papers. Each class set takes Colin 43 minutes and Brian 1hr. Express the times Colin and Brian take as a ratio.		2
For each 7mm of coloured fabric Henry uses making his curtains he uses 9cm of white fabric. Express the amount of white to coloured fabric used as a ratio.		2
For every pound a company spends of advertising it spends 43 pence on its website. Write down the ratio of website to advertising expenditure as a ratio.		2

Homework 20 : Sustainability

Research:

- Raw sourcing of materials-metals-woods-plastic
- Transportation of products
- 6 Rs in relation to their impact on the planet
- Pollution

Homework 20: Sustainability

The design and manufacture of products has an effect on our planet and environment.

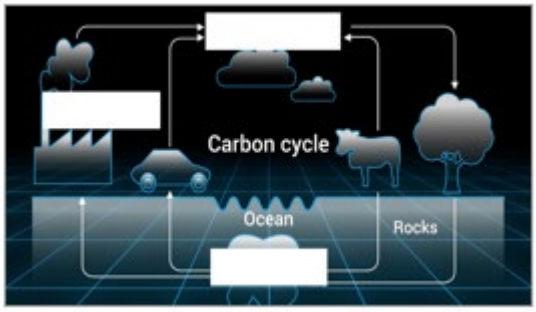
Question	Answer	Marks
How does transportation have a negative impact on the environment?		2
How does raw material sourcing have a negative impact on the environment?		2
How does pollution a negative im pact on the environment?		2
What are 6rs and their use?		6

Homework 21 :Topic Test next lesson, revise all areas for your topic test

Revise:

- Energy stores and transfers
- User requirements, specification, stakeholder and safety when looking at designing
- Composite materials-properties-use
- Testing methods
- Carbon cycle
- CAD-advantages-disadvantages-use
- sustainability

Homework 21: Topic Test

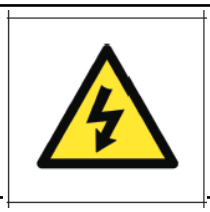
Question	Answer	Marks
What is the term used for energy stored when the boat is suspended from a crane?		3
What is the term used for energy stored when on a trampoline?		2
What does primary user mean?		2
What materials properties are lightweight and stronger than steel?		3
What two type of tests can be carried out when testing the properties of materials and what are they testing?		3
Label the areas on the carbon cycle?		2
What are the 3 main advantages of using CAD?		2
Name two CAD programs?		1
What does the end of life cycle mean?		2
Total		20

Homework 22 : Safety

Research:

- Safety signs in a workshop-meaning and precaution
- Different PPE equipment that can be used in a workshop to provide protection

Homework 22: Safety

Question	Answer	Marks
Complete the table by: • describing the safety precautions you would carry out before using the drilling machine • describing the hazard each precaution will prevent. 	<table><tr><th>Precaution</th><th>Hazard</th></tr><tr><td>[1 mark] _____ _____</td><td>Cuttings (swarf) could damage your eyes</td></tr><tr><td>Long hair should be tied back</td><td>[1 mark] _____ _____</td></tr><tr><td>[1 mark] _____ _____</td><td>The work could spin out of your hands</td></tr><tr><td>Make sure there is only one person inside the safety zone/using the drill.</td><td>[1 mark] _____ _____</td></tr><tr><td>[1 mark] _____ _____</td><td>[1 mark] _____ _____</td></tr></table>	6
	Meaning: Precaution:	2
	Meaning: Precaution:	2
	Meaning: Precaution:	2
	Meaning: Precaution:	2

Homework 23: Applying a finish

Research:

- Finishes that can be applied to woods
- Finishes that can be applied to metals
- Preparing the surface
- Applying the finish

Homework 23: Applying a finish

Question	Answer	Marks
Use notes to describe how you would prepare the surface prior to applying a finish? 		2
Use notes to describe how you would apply varnish to the surface of a material?		2
Use notes to describe how you would apply multiple layers of varnish to the surface of a material?		2
Explain why a galvanised finish has been applied to a steel watering can		2

Home work 24 : Hegarty Maths and topic test revision

Research:

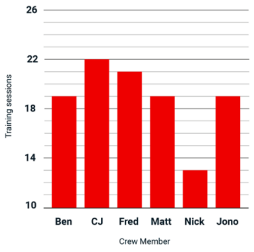
- Drawing techniques, orthographic drawings
- Tools and equipment
- Different PPE and use
- Different finishes applied to materials
- Distance, speed and time
- Averages and range

Hegarty Maths-mean, mode, median (419 - Averages & range (problem solving) (1)

Watch the video makes note and bring into your next lesson to put in your work book.
Complete the quiz, you must achieve 80%
You will be tested in class too.

Quiz - marks your teacher will upload your results
https://hegartymaths.com/averages-range-problem-solving-1

Home work 24: Topic test and Hegarty

Question	Answer	Marks
Why are orthographic drawings used?		1
What are the three views shown in an orthographic drawing?		3
What three tools/equipment can be use to smooth a wooden shape?		3
What does PPE stand for and name two items of PPE?		3
Explain why are finishes applied to the surface of materials?		1
Draw the speed, distance and time triangle?		1
Using the triangle work out the answer to the following question. The boat travels 176m over 11 seconds. What is its average speed , show your working out?		2
What are the three types of averages?		3
The chart shows the quantity of water consumed by the crew in a week. What is the mode of the data, show your working out?		2
Total		19