What do a Soda Can and a Space Craft have in common?

Key Stage 4 Programme

Pupil Name	Name
Handbook Designed by	Dr V Adamaki

Timetable and Assignment Submission

Timetable – Tutorials

1			
2			
3			
4			
5			
6 (Feedback)			

Timetable – Homework Assignments

Tutorial 1		
Tutorial 2		
Tutorial 3		
Tutorial 4		
Tutorial 5		

Assignment Submission – Lateness and Plagiarism

Lateness	
Submission after midnight on 9th August	10 marks deducted
Plagiarism	
Some plagiarism	10 marks deducted
Moderate plagiarism	20 marks deducted
Extreme plagiarism	Automatic fail

The Brilliant Club KS5 Programme – Pupil Feedback Report

Grade	Marks	What this means
1st	70+	Performing to an excellent standard at A-level
2:1	60-69	Performing to a good standard at AS-level
2:2	50-59	Performing to an excellent standard at GCSE
3rd	40-49	Performing to a good standard at GCSE
Working towards a pass	0-39	Performing below a good standard at GCSE
Did not submit	DNS	No assignment received by The Brilliant Club

Lateness	
Any lateness	10 marks deducted
Plagiarism	
Some plagiarism	10 marks deducted
Moderate plagiarism	20 marks deducted
Extreme plagiarism	Automatic fail

Name of PhD Tutor			
Title of Assignment			
Name of Pupil			
Name of School			
ORIGINAL MARK / 100		FINAL MARK / 100	
DEDUCTED MARKS		FINAL GRADE	

If marks have been deducted (e.g. late submission, plagiarism) the PhD tutor should give an explanation in this section:

Learning Feedback Comment 1 - *Enter Key Learning Priority Here*	
What you did in relation to this Key Learning Priority *Enter feedback here*	How you could improve in the future *Enter feedback here*
Learning Feedback Comment 2 – *Enter Key Learning Priority Here*	
What you did in relation to this Key Learning Priority *Enter feedback here*	How you could improve in the future *Enter feedback here*
Learning Feedback Comment 3 – *Enter Key Learning Priority Here*	
What you did in relation to this Key Learning Priority *Enter feedback here*	How you could improve in the future *Enter feedback here*
Resilience Comment	
How you showed learning resilience during the course *Enter feedback here*	How you could build learning resilience in the future *Enter feedback here*

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Course Rationale

Do a soda can and a space craft have something in common after all?
Believe it or not they are made out of the same material, aluminium! An aluminium alloy to be more accurate that is slightly different for these two cases. There are more cases were you will find the same material used in everyday and in high technological applications. For example, can you make a bicycle out of carbon nanotubes?

In this course we are going to find out why and how we choose certain materials for certain applications. You will also find out why it so important to choose the correct material!

In order to be able to do that, you will learn the basic mechanical properties we can use to characterise, compare and select materials. You will also learn what equipment you can use to measure them and how to calculate their values. As part of the course, we will analyse an application that was part of the European project called "MeshMesh" and find the suitable material for it.

For the final assignment you will select the material that you want your bicycle to be made of. By analysing how you use your bicycle and comparing the properties of the materials you will be able to make the right choice for you. You can then prepare a poster and present it at a conference!

Mark Scheme Table

	Skills	1st (70-100)	2:1 (60-69)	2:2 (50-59)
Subject knowledge	Knowledge and Understanding	○ All content included is relevant to the specific question ○ Good understanding of all the relevant topics. ○ Scientific terms are defined and used accurately throughout ○ Clear justification on how the content included is related to the specific issues that are the focus of the assignment	○ Most of the content included is relevant to the specific question ○ Good understanding of most the relevant topics ○ Scientific terms are used accurately but not always clearly defined. ○ Adequate justification on how the content included is related to the specific issues that are the focus of the assignment	○ Some of the content included is relevant the specific question ○ Good understanding on some of the relevant topics but occasional confusion on others. ○ Scientific terms are used mostly accurately with occasional confusion and often not defined. ○ Some justification on how the content included is related to the specific issues that are the focus of the assignment
Critical thinking	Research and Evidence	○ Use evidence/calculations to support claims/assertions /ideas, consistently clearly and convincingly ○ Evidence of further reading beyond materials provided which were used in an appropriate context ○ Data is effectively analysed and appropriate conclusions are reached	○ Use evidence/calculations to support claims/assertions/ideas, mostly clearly and convincingly ○ Evidence of further reading beyond materials provided ○ Data is analysed and the conclusions that are reached are mostly appropriate	○ Use evidence/calculations to support claims/assertions/ideas, at times clearly and convincingly ○ Limited evidence of further reading beyond materials provided ○ There is an attempt to analyse data is and draw conclusions
	Developing an Argument	○ A point of view or position in relation to the title or question is consistently clear ○ Argument/proof exceptionally well-developed and well-justified ○ Makes links effectively between subjects that have not previously been associated	○ A point of view or position in relation to the title or question is adequately clear ○ Argument/proof clear and well-developed and position justified ○ Some evidence of linking subjects that have not previously been associated ○ Use some concepts	○ A point of view or position in relation to the title or question is somewhat clear ○ Argument/proof clear but not well-developed ○ Limited evidence of linking subjects that have not previously been associated ○ Limited use of concepts from the tutorials in other

		○ Uses concepts from the tutorials in an unfamiliar context, and does so accurately and confidently. ○ Content is analysed effectively to support the argument	from the tutorials in an unfamiliar context, but not always accurate ○ Analysis of content to support the argument	contexts ○ Some analysis of content to support the argument
	Critical Evaluation	○ Moved beyond description to an assessment of the value or significance of what is described ○ Evaluative points are consistently explicit/systematic/reasoned/justified ○ Effective critiques on the reliability of sources provided	○ Mostly description but some assessment of the value or significance of what is described ○ Evaluative points are mostly explicit/systematic/reasoned/justified ○ Some evidence of critiques on the reliability of sources provided	○ Only description with minimal assessment of the value or significance of what is described ○ Evaluative points are at times explicit/systematic/reasoned/justified ○ Limited evidence of critiques on the reliability of sources provided
Written communication	Structure and Presentation	○ Ideas are presented in paragraphs and arranged in a logical structure that is appropriate for the assignment ○ The introduction clearly outlines the aim of the report ○ The conclusion summarises all the main points clearly and concisely ○ Tables, figures and graphs are effectively constructed including appropriate headings, units and scales. ○ All sources are referenced correctly in an agreed format	○ Ideas are presented in paragraphs and arranged in a structure that is mostly appropriate for the assignment ○ The introduction adequately describes the aim of the report ○ The conclusion summarises most of the main points clearly ○ Most tables, figures and graphs are well constructed ○ Most sources are referenced correctly in an agreed format	○ Ideas are presented in paragraphs and arranged in a structure ○ The introduction mentions the aim of the report ○ The conclusion summarises some of the main points clearly ○ Some tables, figures and graphs are well constructed but contains some errors ○ Some sources are referenced correctly in the agreed format with occasional errors

	Language and Style	○ No spelling, grammar or punctuation errors ○ Units and significant figures are presented accurately throughout ○ Writing style consistently clear, appropriate for scientific documents and easy to follow ○ Accurate and consistent use of technical language and vocabulary	○ Minimal spelling, grammar or punctuation errors ○ Units and significant figures are presented accurately throughout ○ Writing style mostly clear, appropriate for scientific documents and easy to follow ○ Some attempts of using technical language and vocab alary, but not always accurate	○ Some spelling, grammar or punctuation errors ○ Units and significant figures are presented accurately throughout with occasional errors ○ Writing style moderately clear, appropriate for scientific documents and easy to follow ○ Use of simple language and vocabulary effectively but struggles to use technical language

Glossary of Keywords

Word	Definition/notes
Material property	
Material selection	
Ultimate strength	The maximum tensile stress that a material can withstand before rapture
Young modulus	The elasticity of a material is its ability to return to its original shape, size, and condition after it has been stretched
Hardness	A measure of how resistant a material is to permanent shape change when a compressive force is applied
Density	The mass per unit volume
Brittle	
Yield point	The stress at which a material begins to deform permanently
Ductile	
Stress	
Metal alloy	
Compressive	
Ashby diagram	

Tutorial 1 – Prior knowledge and more on material properties

Example 1

vs

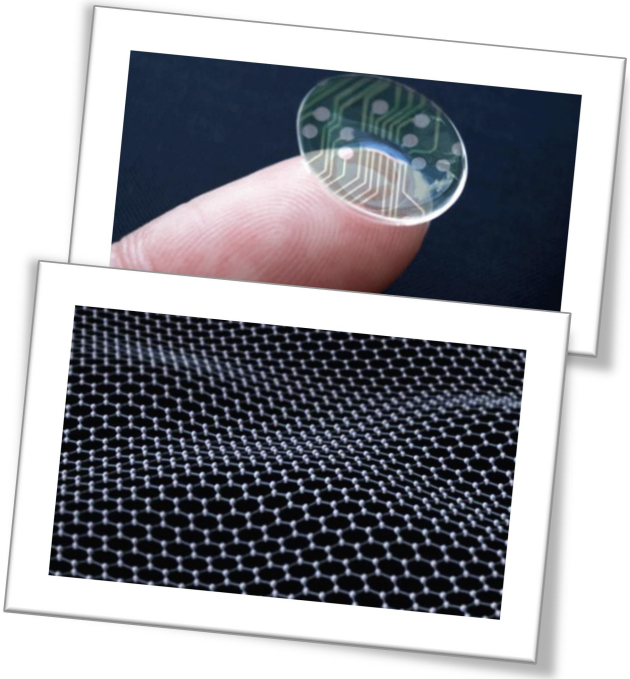
What is the Purpose of Tutorial 1?

- To explore the similarities and differences between a soda can and a space craft
- To explain why material selection is important
- To be able to state at least 5 materials properties

1.1 More unexpected similarities

Example 2

VS



Notes

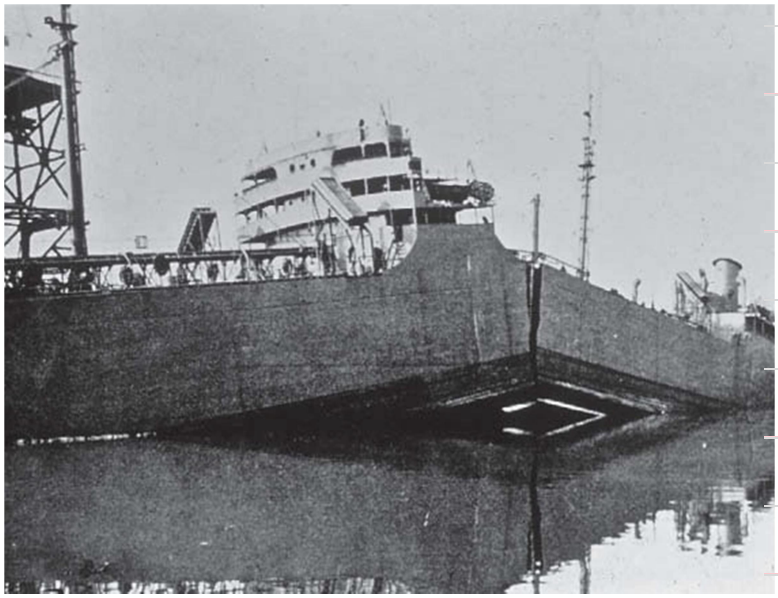
Example 3

VS

Notes

1.2 What happens if we choose the wrong material?

Example 4



Example 5

Example 6

Example 7

1.3 Baseline activity

1. Which of the following is not an example of a material?'
   a. metal
   b. plastic
   c. light
   d. ceramic

2. What is material?
   a. Substance which something is made from
   b. metals
   c. gas
   d. wood

3. What is the term given to an object that electricity can pass through?
   a. Insulator
   b. Conductor
   c. Metal
   d. insulation

4. Which of the following is not a property used to describe a material?
   a. Density
   b. Elasticity
   c. Height

5. How strong a material is, is how much Force is require to break or permanently change it
   a. True
   b. False

6. Tensile strength is a materials ability to withstand a _____
   a. Pushing force
   b. Pulling force
   c. Weight

7. Compressive strength is a materials ability to withstand a _____ force.
   a. Pulling
   b. Strong
   c. Pushing

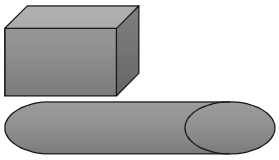
8. Stiffness is an objects ability to stay _____ under force
   a. Strong
   b. Rigid
   c. In place

9. An objects ability to stretch and return to its original shape is referred to as _____
   a. Compressive strength
   b. Tensile strength
   c. Density
   d. Elasticity

10. Which one is harder?
    a. Diamond
    b. Steel
    c. Charcoal
    d. Plastic

11. Which one of these shapes of steel samples could you bend easier? (add photos)

a.

b. 

c.

d.

12. Which material property should a ball pein hammer posse? (add photo)
    a. Brittleness
    b. Toughness
    c. Ductility

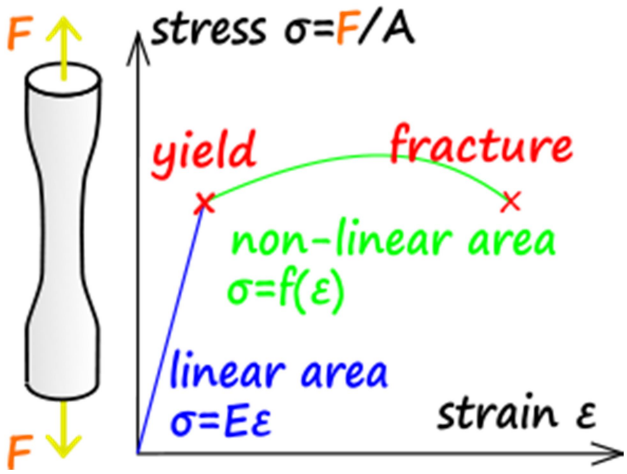
13. What is an Alloy?
    a. A metal made by combining two or more metallic elements
    b. A hollow metal
    c. A plastic
    d. A ceramic

14. Elasticity is the ability of a material to _____
    a. Deform in all directions without fracture
    b. Be drawn into a wire
    c. Stay in the new shape once the load is removed
    d. Return to its original shape once the load is removed

15. What property is the ability to resist to scratching and pressure? For example, Hardwood does not mark as easily as softwood.

    a. Hardness
    b. Elasticity
    c. Waterproof
    d. Plasticity

1.4 Introducing material properties



Density
The mass per unit volume

Elasticity (Young's modulus)
The elasticity of a material is its ability to return to its original shape, size, and condition after it has been stretched

Yield point
The stress at which a material begins to deform permanently

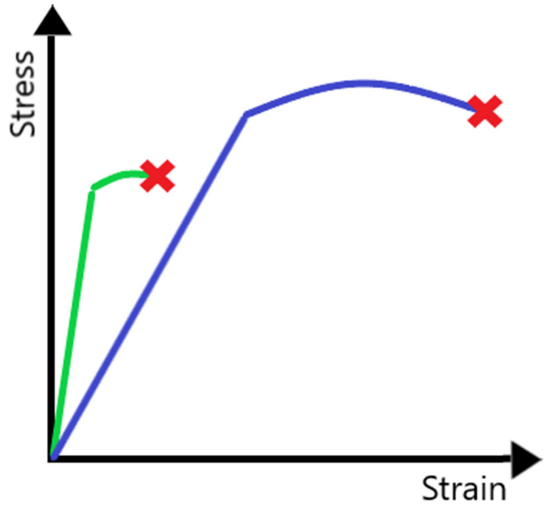
Hardness
A measure of how resistant a material is to permanent shape change when a compressive force is applied

Ultimate strength
The maximum tensile stress that a material can withstand before rapture

Notes

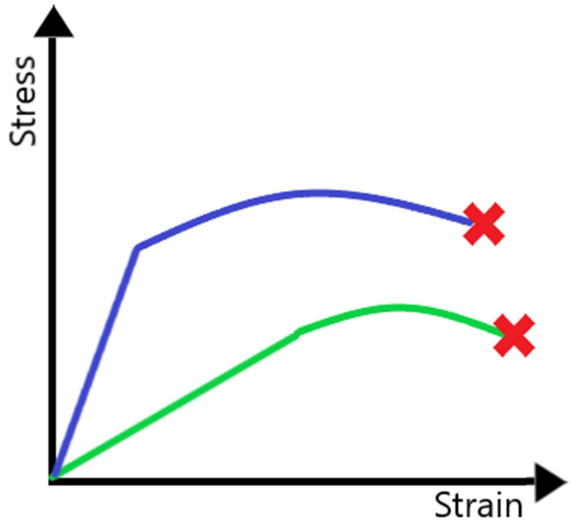
Tutorial 1 – Homework

1. Which material is stronger?



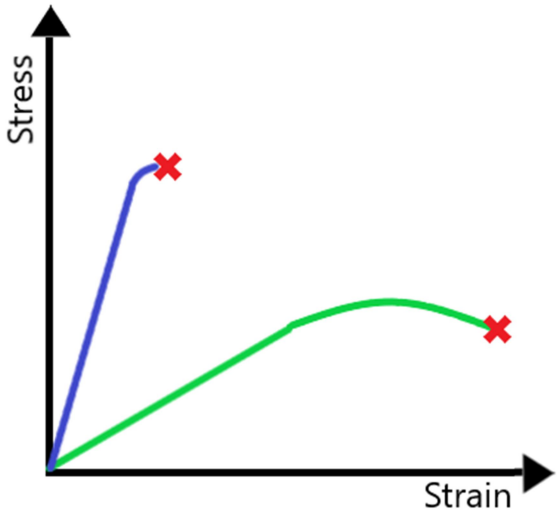
Material A ☐
Material B ☐

2. Which material is more elastic?



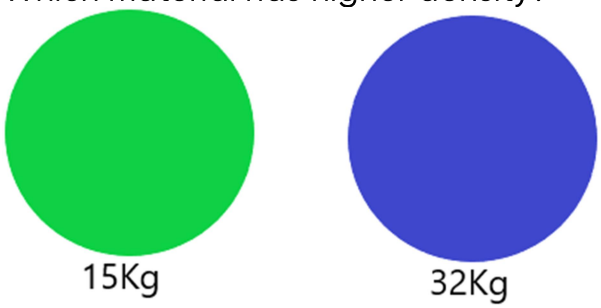
Material A ☐
Material B ☐

3. Which material is brittle?



Material A ☐
Material B ☐

4. Which material has higher density?



Material A ☐
Material B ☐

5. Match the properties with the units

Young's modulus	• Kg/m^2
Density	• GPa
Ultimate strength	• Vickers
Hardness	• GPa
Yield point	• GPa

Tutorial 2 – Case study: Making a Mould

What is the Purpose of Tutorial 2?

- To learn to apply material selection process
- To be able to use an Ashby diagram
- To be able to find material properties in literature

2.1 Making a mould

Can you create 2 moulds that make a ring and a cylinder that fit tightly together?

You can use plasticine to make your moulds, Plaster of Paris will be poured into it to make your cylinder and ring

When your models have dried, carefully take them out and check if they fit together

2.2 Evaluate your mould

- Was it easy or not? Why?
- What went wrong in the making?
- What problems might they have in industry if they are using a mould a hundred or thousand times a day?

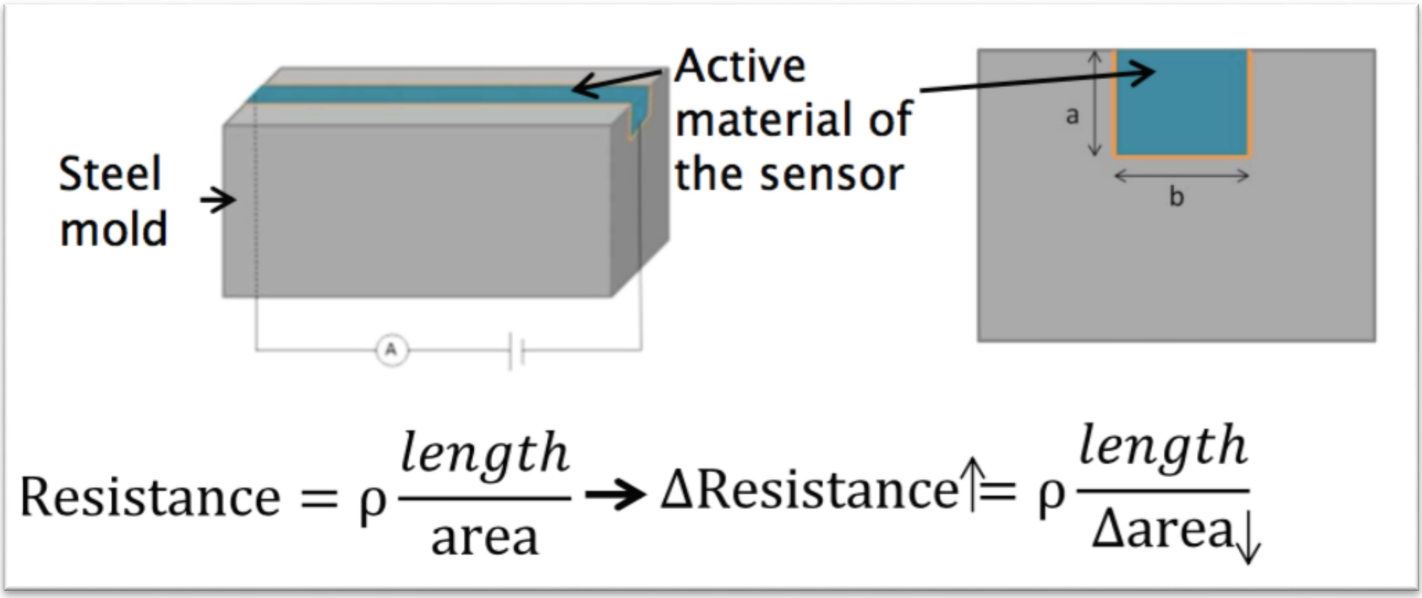
Notes

2.3 A solution

We only know if a mould does not work if we make a product and it does not fit or cannot be used properly.

➔ This is expensive.

Scientists needed to find a way to measure the damage on the moulds and that was the goal of a European project called "MeshMesh".



Properties of steel

Hardness (Vickers)	780
Stable up to 200oC	✓
Price	£
Conductivity	High

Notes

2.4 Which material should we use?

Properties of Titania

Hardness (Vickers)	744
Stable up to 200oC	✓
Price	£
Conductivity	Low

Properties of MAX phases

Hardness (Vickers)	300
Stable up to 200oC	✓
Price	£££
Conductivity	High

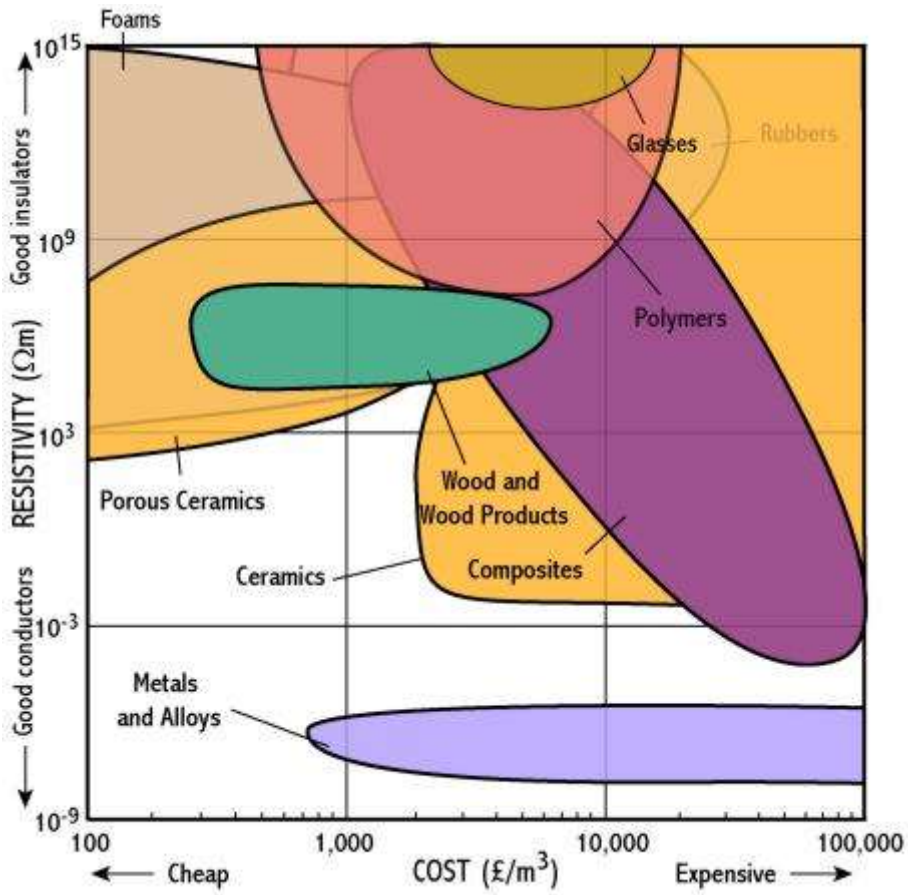
Properties of Magnéli phases

Hardness (Vickers)	850
Stable up to 200oC	✓
Price	££
Conductivity	Medium

Properties of Alumina

Hardness (Vickers)	1600
Stable up to 200oC	✓
Price	£
Conductivity	Low

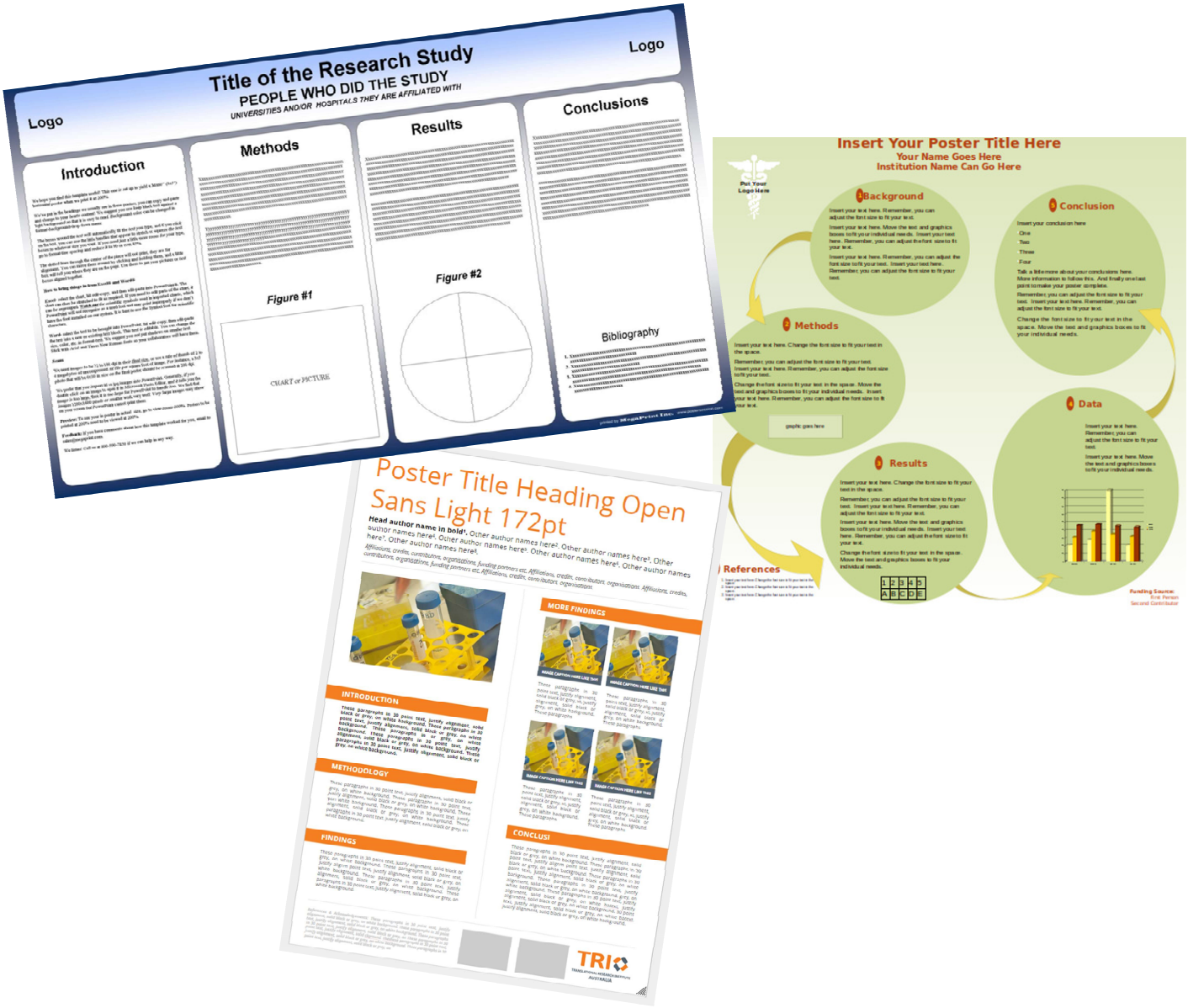
Electric resistivity – Cost Ashby diagram



Notes

Tutorial 2 – Homework

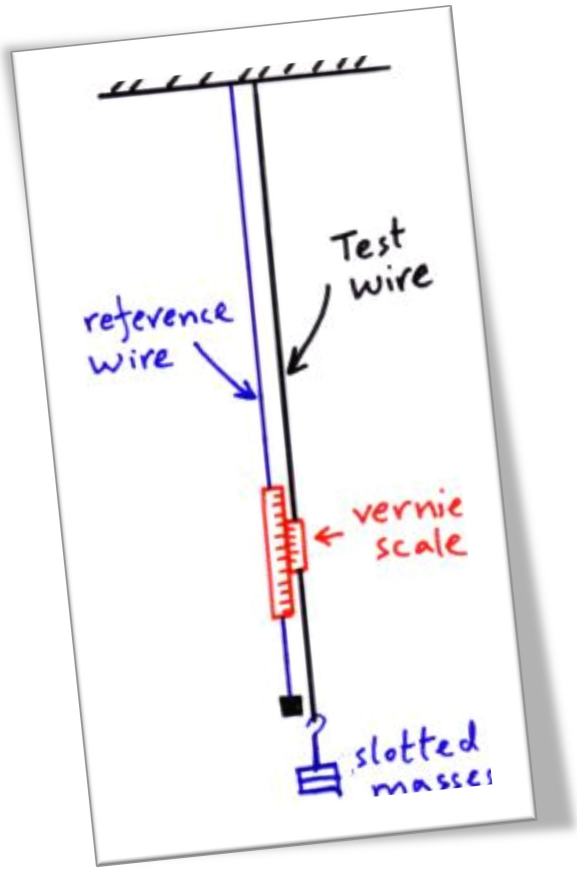
2.1 Make a poster presenting the application, the problem and the solution, the material selection process and the result. Have a look at the poster templates and get ideas.



2.2 Search the literature and fill the table with the properties values for Stainless Steel 400, Alumina and Titania.

	Density	Yield point	Ultimate strength
Stainless Steel 400			
Alumina			
Titania			

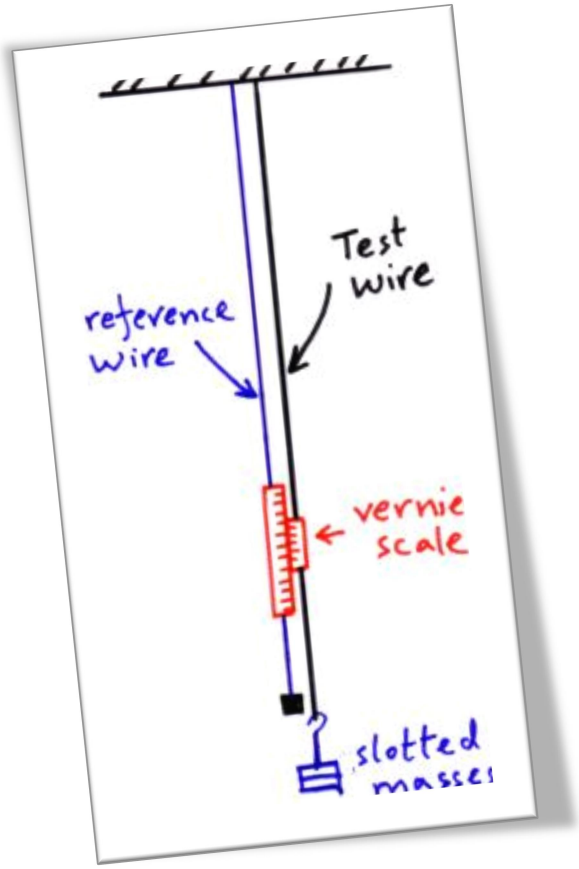
Tutorial 3 – Time to measure the properties!



What is the Purpose of Tutorial 3?

- To be able to name equipment we can use to measure strength and hardness
- To calculate strength, Young modulus and hardness
- To get familiar with reading manuals and lab sheets

3.1 Measuring the Young's modulus with a tensile test



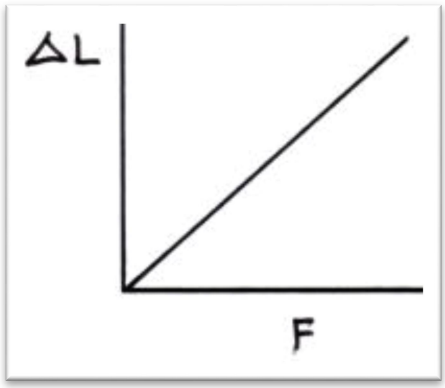
Measurements needed:

1) The original length of the test wire (L) should be measured with a tape measure.

2) The cross-sectional area (A) can be calculated from measuring the wires diameter with a micrometer. The micrometer should be used to measure the diameter at several different points along the wire.

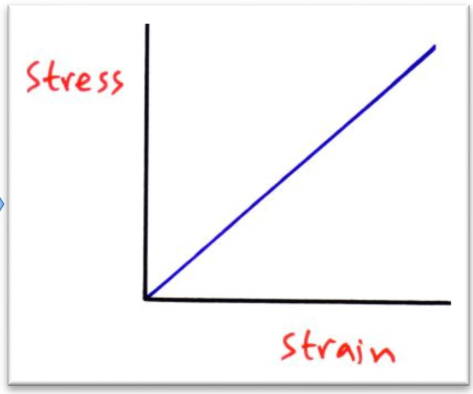
3) The test wire will have several different forces (F) applied using the slotted masses and each time the extension of the test wire (DL) will be measured using the vernier scale.

- E = the young modulus in Pascals (Pa)
- F = force in Newtons (N)
- L = original length in metres (m)
- A = area in square metres (m^2)
- DL = change in length in metres (m)



$$Stress\ (Pa) = \frac{Force\ (N)}{A\ (m^2)}$$

$$Strain = \frac{DL\ (m)}{L\ (m)}$$



$$E\ (Pa) = \frac{Stress\ (Pa)}{Strain}$$

How accurate where your measurements?

Notes

3.2 Equipment you will use in University of Bath

The equipment you will use in University of Bath to perform a tensile test is an INSTRON machine following the same principles as the practical we did in the class as shown in figure 1.

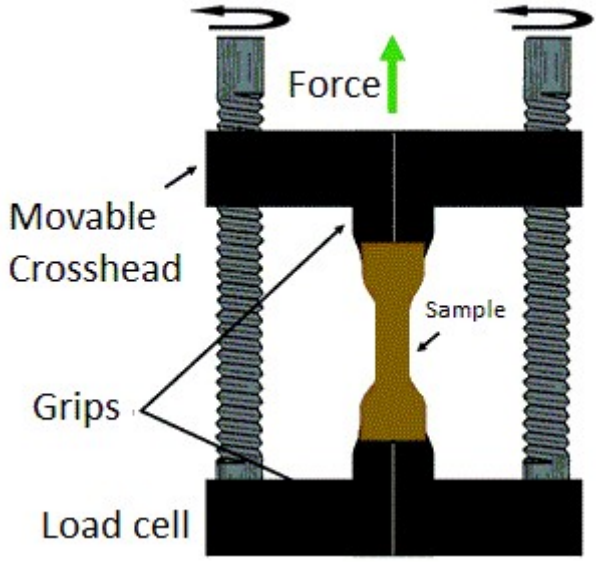


Figure 1: Schematic representation of the INTRON equipment

For more details read the manual and the lab sheet to be ready for the laboratory work!

Notes

Tutorial 3 – Homework

3.1 Read the manual of the INSTRON machine for tensile testing and the lab sheet

Find the manual and the lab sheet in the tutorial's handouts.

3.2 Do the following calculations

1. A strip of rubber originally 75 mm long is stretched until it is 100 mm long.

(a) What is the tensile strain?

(b) Why has the answer no units?

2. The greatest tensile stress which a steel wire can withstand without breaking is about 109 Nm^{-2}. The cross-sectional area of the wire 0.01 mm^2 . What is the greatest force that it can withstand?

3. Find the minimum diameter of a cable, tensile strength 75 MPa, needed to support a load of 15 kN.

4. Calculate the tensile stress in a suspension bridge supporting cable, of diameter of 50 mm, which pulls up on the roadway with a force of 4 kN.

5. Calculate the tensile stress in a nylon fishing line of diameter 0.36 mm which a fish is pulling with a force of 20 N

6. A large crane has a steel lifting cable of diameter 36 mm. The steel used has a Young modulus of 200 GPa. When the crane is used to lift 20 kN, the unstretched cable length is 25.0 m. Calculate the extension of the cable.

7. A long strip of rubber whose cross section measures 12 mm by 0.25 mm is pulled with a force of 3.0 N. What is the tensile stress in the rubber?

8. Another strip of rubber originally 90 mm long is stretched until it is 120 mm long. What is the tensile strain?

9. A 3 m long copper wire of diameter 0.4 mm is suspended from the ceiling. When a 0.5 kg mass is suspended from the bottom of the wire it extends by 0.9 mm.

(a) Calculate the strain of the wire.

(b) Calculate the stress in the wire.

(c) Calculate the value of the Young modulus for copper.

10. A force of 10 kN is acting on a circular rod with diameter 10 mm.

(a) Calculate the stress in the rod.

(b) The rod is 2 m long and is made of steel with Young's modulus of 200 GPa. Calculate the change in length.

Tutorial 4 – Going to University to perform a tensile test!

What is the Purpose of Tutorial 4?

- To visit a university laboratory and see equipment you can use to determine various materials properties
- To perform a tensile test
- To write a lab report

4.1 University of Bath

- Awarded Gold status in the Government's Teaching Excellence Framework
- Ranked 5th best university in the UK by the Guardian University Guide 2018
- 88.15% for overall student satisfaction in the National Student Survey 2017
- Ranked 7th for job prospects by the Whatuni Student Choice Awards 2017
- Ranked 7th for graduate prospects by The Times and The Sunday Times Good University Guide 2017 and 9th by the Complete University Guide 2018
- The University of Bath's Team Bath Racing was recently crowned the number one UK electric team, following a successfully outing at the Formula Student competition at Silverstone.

4.2 Tour of the Mechanical Engineering Department

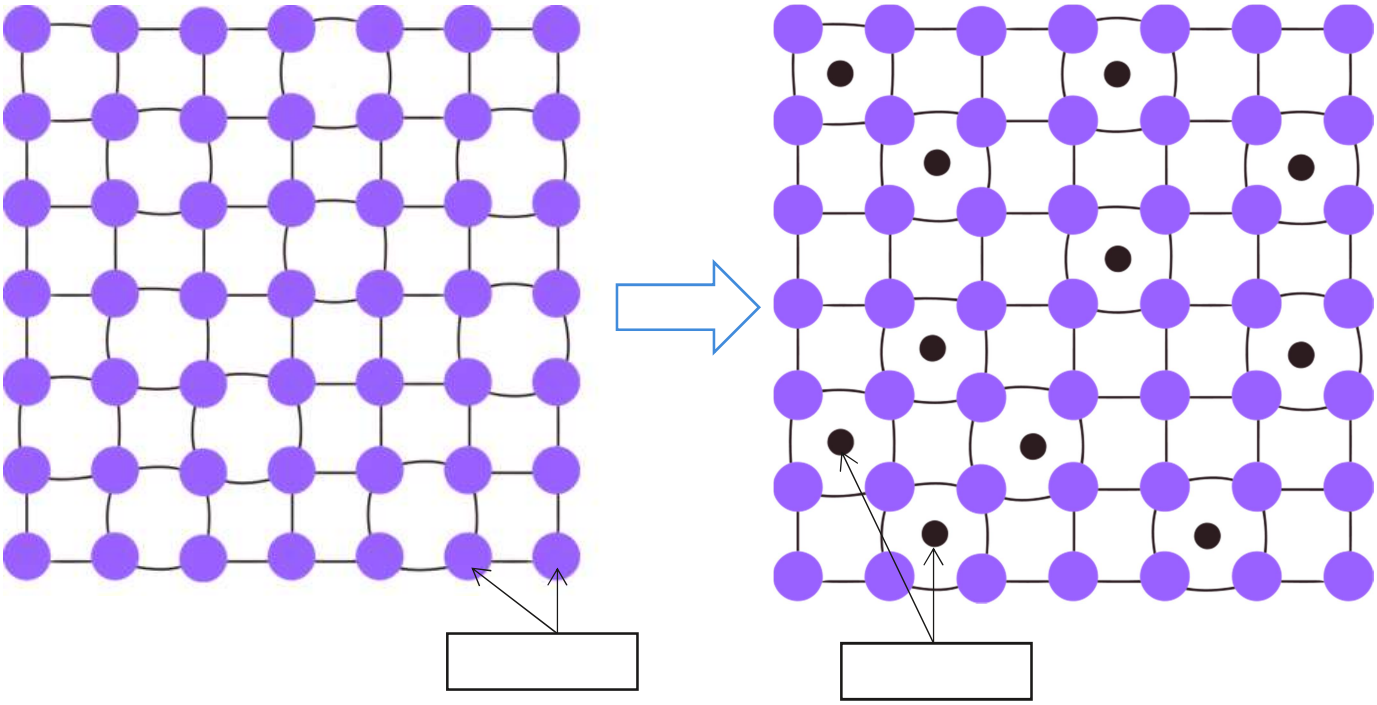
Prof. Chris Bowen is going to welcome you to the University of Bath. Following that you will visit the laboratories in the Mechanical Engineering department. You will see a lot of equipment you can use to determine various materials properties. During the tour fill in the following table so at the end of the tour you have a full list of the equipment you saw and what you can measure with them.

Equipment	What property can you measure?	How can you measure that property?
Hardness testing machine		
Dilatometer		
Impedance spectroscopy		
Profilometer		
Tensile testing		
Compression testing		

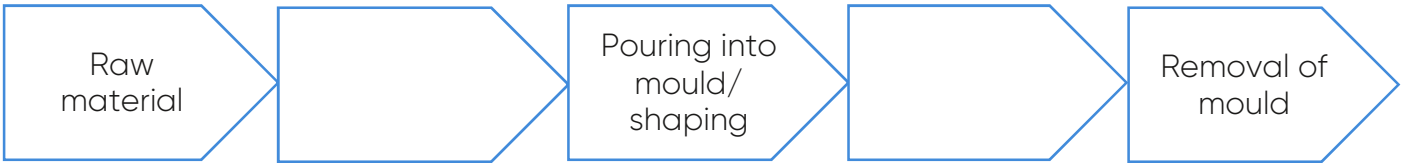
4.3 Tensile testing of steel alloys

Alloy → A mixture of two elements, one of which is a metal!

Steel is an alloy, what is it made of?

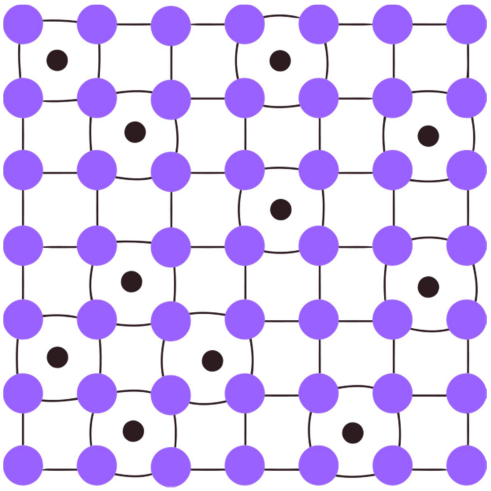


How is a steel sample manufactured? Fill in the missing stages of the manufacturing process.

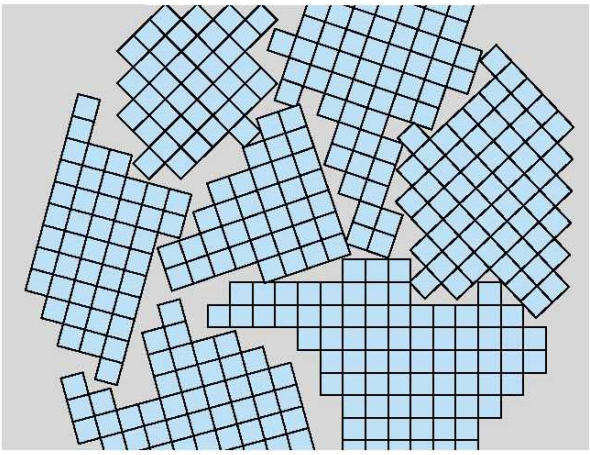


Notes

Atomic vs micro-structure → How do the atomic and micro-structure influence the properties of the material?



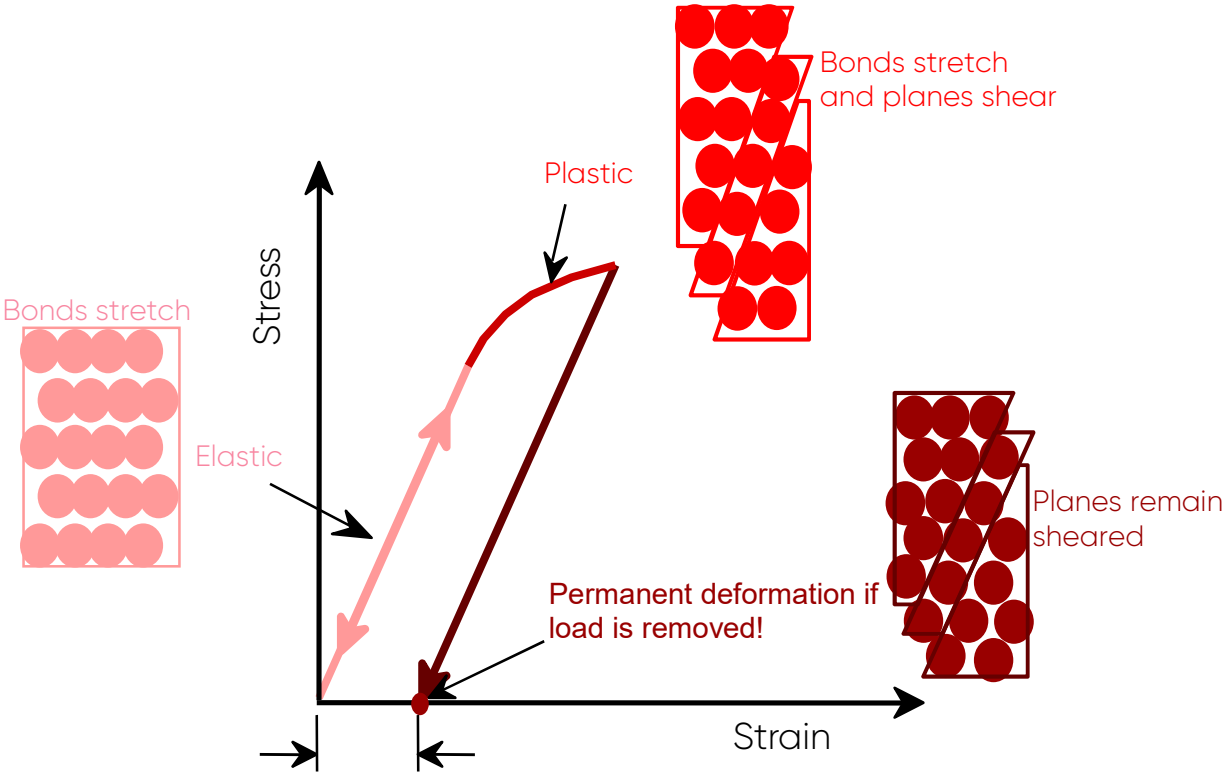
Atomic structure:



Micro-structure:

Notes

What happens when we apply a tensile force?



Notes

Perform the tensile test!

Find the lab sheet in our handouts and keep notes!

Tutorial 4 – Homework

Prepare a lab report with your results following the structure of the lab sheet. Try to use references (Appendix 1) and answer the challenge question!

Tutorial 5 – Why is steel so important?

What is the Purpose of Tutorial 5?

- To find out why steel is so important
- To summarise what we have learned so far
- To start working on final assignment

5.1 Industrial revolution

The years after 1750 were a time of great achievement:

- **Agriculture** - Charles 'Turnip' Townshend introduced the Norfolk four-course rotation of wheat-turnips-barley-clover to his farm and Robert Bakewell used selective breeding to develop the New Leicester sheep. Arthur Young promoted new methods to a wider audience.
- **Industry** - Richard Arkwright's Mill at Cromford heralded 'the Factory Age' of the textile industry, production of iron increased 30-fold and production of coal increased 20-fold. Newcomen and Watt contributed to the development of steam power to drive machinery more efficiently.
- **Transport and communications** - Thomas Telford built roads and canals in the 1700s and George Stephenson and Isambard Kingdom Brunel oversaw the 'Railway Mania' of the 1800s. There had previously been no very fast way of transporting goods and people around the country. However, canals did already exist and so most materials were transported by boat to towns and cities which had to be located on canal routes.

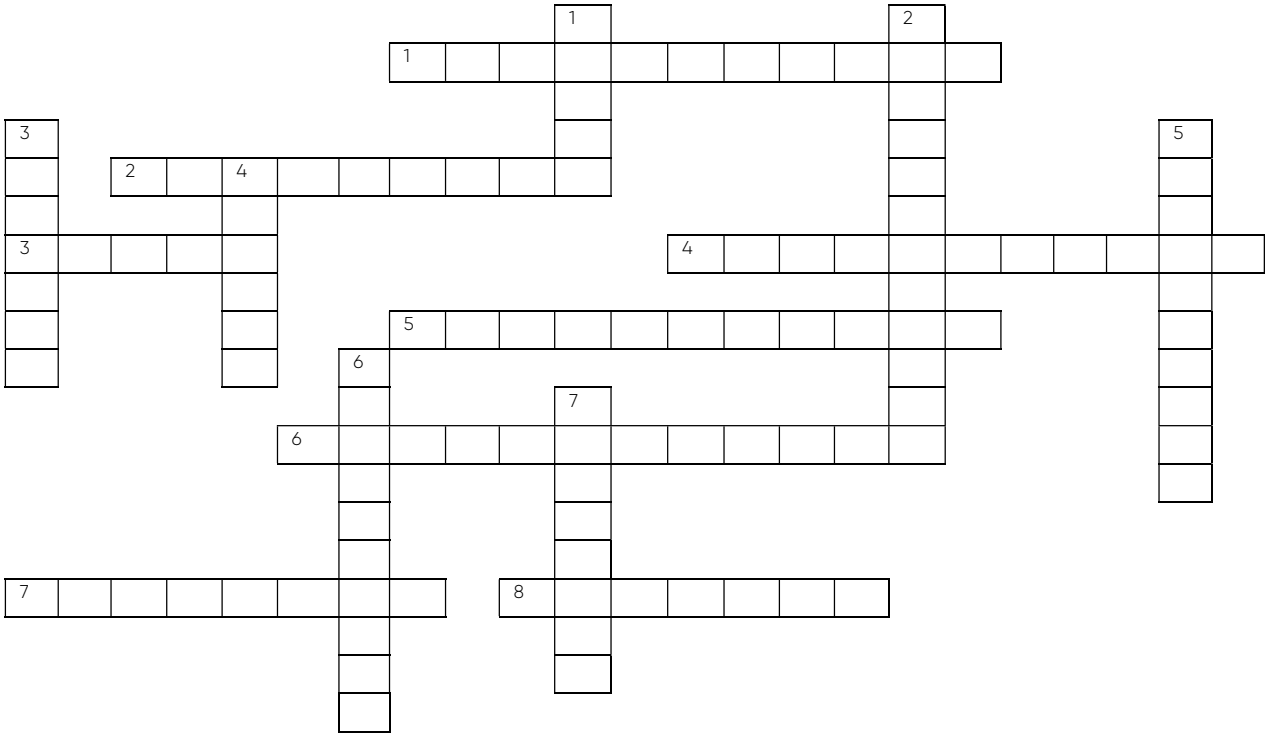
The Industrial Revolution involved innovation, capital investment and increased output:

Iron and steel

- Abraham Darby smelted iron using coke (1709), Henry Cort's puddling process made wrought iron (1784) and Henry Bessemer's Bessemer converter (1856) and the Gilchrist-Thomas process (1879) made steel.
- Huge ironworks, eg Richard Crawshay's Cyfartha works in South Wales and John Roebuck's Carron Works in Scotland.
- Production of 'pig' iron increased 30-fold in the century 1815-1914.

Notes

5.2 Review crossword



Across:
1. A line defect

2. Ability to be drawn through a die
3. Stress that is coplanar with a material's cross-section
4. Inability to flex without shattering
5. Strength to resist opposing forces
6. Ability to be shaped under force

7. Inorganic, non-metallic, solid material
8. Contains iron

Down:
1. Two or more materials combined to form a new material
2. Ability to allow the flow of heat or electricity
3. Strength to resist being pulled apart

4. Material that adds strength to steel
5. Deforming permanently under load
6. Deforming under load and returning to original shape when load is removed
7. Ability to resist surface wear

Tutorial 5 – Final assignment

Select the material to make the frame of your bicycle!
Report the material selection process, your research and results in a 500 word essay (use references). Additionally, prepare an A2 poster to present at the closing conference.

Things to consider:

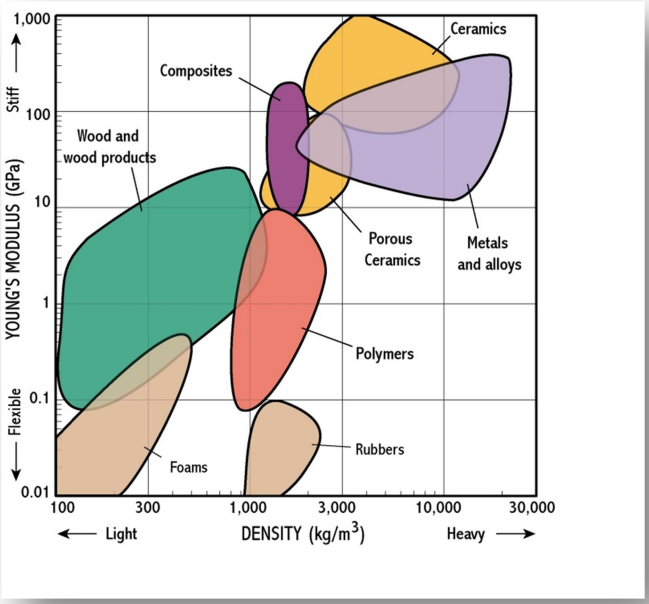
- What kind of bicycle do you want? i.e mountain bike, touring, for kids
- How much it will cost?
- What should it look like?

Candidate materials:

- Steel
- Carbon fibre
- Bamboo
- Wood

Properties that you will base your material selection on and you need to search the literature for:

- Strength
- Density
- Appearance
- Processability
- Cost



Find out more details in your handout.

Tutorial 6 – Feedback tutorial

What is the Purpose of Tutorial 6?

- To receive feedback on final assignments.
- To share examples of best practice with the other pupils in your group.
- To write targets for improvement in school lessons.
- To reflect on the programme including what was enjoyed and what was challenging.

Final assignment feedback

What I did well…	What I could have improved on…
•	•
•	•
•	•

My target for future work is…

Reflecting on Uni Pathways

What did you most enjoy about Uni Pathways?
• • •

What did you find challenging about the programme?	How did you overcome these challenges?
• • •	• • •

Appendix 1 – Referencing correctly

When you get to university, you will need to include references in the assignments that you write, so we would like you to start getting into the habit of referencing in your Brilliant Club assignment. This is really important, because it will help you to avoid plagiarism. Plagiarism is when you take someone else's work or ideas and pass them off as your own. Whether plagiarism is deliberate or accidental, the consequences can be severe. In order to avoid losing marks in your final assignment, or even failing, you must be careful to reference your sources correctly.

What is a reference?

A reference is just a note in your assignment which says if you have referred to or been influenced by another source such as book, website or article. For example, if you use the internet to research a particular subject, and you want to include a specific piece of information from this website, you will need to reference it.

Why should I reference?

Referencing is important in your work for the following reasons:

- It gives credit to the authors of any sources you have referred to or been influenced by.
- It supports the arguments you make in your assignments.
- It demonstrates the variety of sources you have used.
- It helps to prevent you losing marks, or failing, due to plagiarism.

When should I use a reference?

You should use a reference when you:

- Quote directly from another source.
- Summarise or rephrase another piece of work.
- Include a specific statistic or fact from a source.

How do I reference?

There are a number of different ways of referencing, and these often vary depending on what subject you are studying. The most important to thing is to be consistent. This means that you need to stick to the same system throughout your whole assignment. Here is a basic system of referencing that you can use, which consists of the following two parts:

1. A marker in your assignment : After you have used a reference in your assignment (you have read something and included it in your work as a quote, or re-written it your own words) you should mark this is in your text with a number, e.g. [1]. The next time you use a reference you should use the next number, e.g. [2].
2. Bibliography: This is just a list of the references you have used in your assignment. In the bibliography, you list your references by the numbers you have used, and include as much information as you have about the reference. The list below gives what should be included for different sources.

    a. Websites – Author (if possible), title of the web page, website address, [date you accessed it, in square brackets].

    E.g. Dan Snow, 'How did so many soldiers survive the trenches?', http://www.bbc.co.uk/guides/z3kgjxs#zg2dtfr [11 July 2014].

    b. Books – Author, date published, title of book (in italics), pages where the information came from.

    E.g. S. Dubner and S. Levitt, (2006) *Freakonomics*, 7-9.

    c. Articles – Author, 'title of the article' (with quotation marks), *where the article comes from* (newspaper, journal etc.), date of the article.

    E.g. Maev Kennedy, 'The lights to go out across the UK to mark First World War's centenary', Guardian, 10 July 2014.

Appendix 2 – Using the VLE

VLE username	
VLE password	

Please remember the following key details...

- You are able log into the VLE either through the link on our website (www.thebrilliantclub.org) or going directly to the VLE site at (https://portal.thebrilliantclub.org/sign-in).
- Please update your profile with your full name and email address- this will allow you to retrieve forgotten passwords or usernames
- If you forget your log-in details you can request them to be emailed to you by clicking the link on the VLE home page. (If you are still having problems you can email: schools@thebrilliantclub.org)

What is the VLE?

The VLE is a virtual learning environment for all pupils on Uni Pathways it is used for:

- messaging your tutor
- submitting homework
- submitting your final assignment
- accessing resources for your tutorials
- finding out more information about university and careers

How should I use the VLE?

The VLE is a professional academic environment in which pupils are able to message their PhD Tutor. Here are a few things to consider:

- Ensure you keep a professional tone in the messages you send to your tutors.
- Ensure you always reply to your tutors in a timely manner.
- Thank your tutor for the effort they are putting in to give you your feedback etc.
- Submit all homework to your tutor on time.

IMPORTANT: Final assignment

- When you submit your final assignment, please remember that you need to do so through the 'My Activities' tab and not as an attachment to a message.

Notes

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Notes

What do a Soda Can and a Space Craft have in common?

Key Stage 4 Programme

researchersinschools.org