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TEXTILES

EXAM BOARD: AQA **COURSE CODE: 8552**

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Tutor Group: .....

TEXTILES

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TEXTILES SP - TOPIC 1.1

New and emerging technologies: Industry

Introduction

The use of new and emerging technologies has an impact on the design and organisation of the workplace.

The industrial revolution, which began around 1760, was assisted by the discovery of harnessing water power to drive machinery. The invention of the steam engine then led to greater automation.
Before the industrial revolution, most people lived in the countryside working on the land. Automation led to larger workshops, mills and factories, so more people moved away from the countryside to find work. Towns and cities grew up around areas of manufacture.
Gradually a society based on consumerism & enterprise developed. People had money to buy goods & services and manufacturing boomed which is the structure of society that we still live in today.

Key words

Automation – the use of machines to do a task automatically without much, or any, human input.

Robotics – robots are programmed by humans and then they run automatically. Humans are only needed to monitor the robots and repair them if they break down.

JIT – Just in Time increases efficiency by only accepting goods when they are needed in production, saving money on storage and levels of stock held.

CAM – Computer aided manufacture(ing)

CNC – Computer numerical control machines such as laser cutters

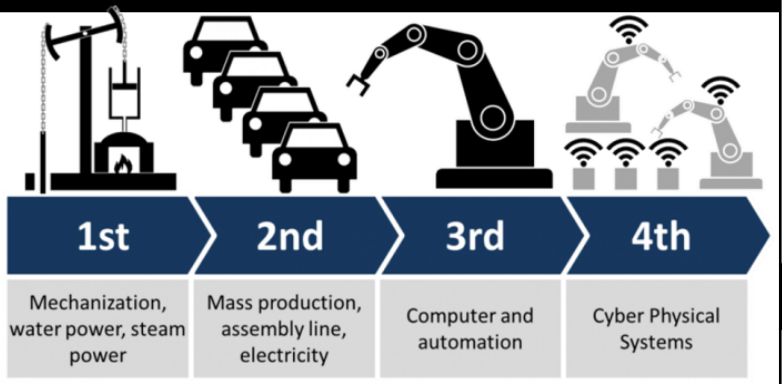
RPT – Rapid prototyping machines such as 3D printers

Exam Tips

You must be able to explain the impact of new and emerging technologies on:

- the design and organisation of the workplace including automation and the use of robotics and
- Discuss the potential effects of the use of new and emerging technologies on employment

Key Facts to Memorise



Advantages	Disadvantages
• Robots can increase the speed of production as they can work faster than humans and don't need to rest. This means they can also be cheaper to use. • Robots can work with high accuracy and consistency with no mistakes, so the quality of products is better which reduces costs. • Robots can be used in dangerous situations where it would be unsafe for humans	• Robots can replace human workers so there is less employment available • Robots can be very expensive to buy • Robots can't carry out tasks that require human judgement

Buildings and the place of work
The development of the internet, improvements in ICT and the speed of data transfer across the Globe has allowed teams of people to collaborate remotely, rather than in a single place of work. Software has been developed to enable teams of designers to work on one project simultaneously, even from different parts of the world. Project designs can then be sent to machines for prototyping.

Exam Questions

1. Describe 3 advantages of a company becoming more automated.

2. List the positive and negative effects that fully automated robotic production lines have had on employment.

Stretch

A. How might automation have affected the hierarchical structure of an organisation's staff?

Further Links

www.bbc.com/bitesize/guides/z46s4wx/revision/4

www.bbc.com/bitesize/clips/zjsjmp3

www.technologystudent.com/pdf14/poster_globalisation1.pdf

TEXTILES SP – TOPIC 1.2

New and emerging technologies:

Enterprise and effective business innovation

Introduction

New and emerging technologies are used by creative people to produce innovative ideas.
There are many opportunities for creative people to get their ideas noticed by potential investors

Key words

Enterprise – an idea is grown into a business proposal that has commercial viability in a product

Investor – a company or individual who is willing to lend money to allow a new enterprise to develop – think Dragon's Den

Start-up business – A company that has come up with an idea that has the potential to grow into a profit-making business

Patent – ensures that original ideas, discoveries and inventions remain the intellectual property of the person who invented them It is a legal process of proving that you are the first person to have registered this idea or invention

Crowd funding – Usually an internet based way to gain small contributions from many investors who believe the product or idea has a future.

Virtual marketing and retail – the use of websites, social media, email and digital marketing to reach a wider audience to promote a product, service or idea.

Search engine optimisation – companies aim to make their website appear on the first page of search results for as many relevant keyword requests as possible.

Cooperatives – an enterprise that is owned and run by its members who may be it's workforce or its customers.

Fairtrade – is about better prices, decent working conditions, and fair terms of trade for farmers and workers in less economically developed countries.

Exam Tips

Effective business innovation helps to drive enterprise.
Explain how enterprise is based on the development of :

- an effective business innovation
- crowd funding
- virtual marketing and retail
- co-operatives
- fair trade.

Key Facts to Memorise

Increased sales

Sometimes complicated / difficult to navigate

Relatively cheap to set up and run

Sometimes complicated / difficult to navigate

Donation: money is given but not returned
Debt: Investors hope to receive their money back, sometimes with interest
Equity: Investors have the opportunity for a share in the business

Can increase purchasing and marketing power

Are easy to form with limited liability

Often have limited resources or funding

Can be hard to manage efficiently, which can reduce motivation

FAIRTRADE

Exam Questions

1. Give 2 reasons why virtual marketing and retail can result in increased sales for a retailer.

2. Which low cost methods of self-promotion and advertising could young designers use to get their ideas noticed?

Stretch

Explain 3 benefits of being part of a co-operative

Further links

www.co-operative.coop/about-us/history

treadingmyownpath.com/2014/05/15/fair-trade-what-it-means-what-it-does-and-how-you-play-a-part/

jobloving.com/infographics/trading/trading-infographic-babushka-darling-midwest-fair-trade-fest-2013/

TEXTILES SP - TOPIC 1.3a

New and emerging technologies: Sustainability: Impact of resource consumption on the planet

Introduction

Our planet has to provide all of our basic human needs, such as food, shelter and warmth. Humans have learned to use and manipulate many of Earth's natural resources to help provide these essential as well as many non-essential products as well. The long term sustainability of the planet's resources is very much in the forefront of responsible design when new and emerging technologies are invented or discovered.

Key words

Finite resources – are limited in supply or cannot be reproduced. Use of these should be avoided where possible or used only in small amounts for important reasons where an alternative cannot be used.

Non-finite resources – are in abundant supply and are unlikely to ever run out; they can be grown and replaced at the rate at which they are being used.

Life cycle Assessment – is a way for companies to assess the environmental impact of a product during the different stages of a product's life.

Further links

www.technologystudent.com/pdf14/POSTER_LIFECYCLE1.pdf

www.technologystudent.com/despro_flsh/revise3.html

www.technologystudent.com/pdf14/poster_polylactide.pdf

www.technologystudent.com/pdf11/rev_cards_life2.pdf

Exam Tips

- Understand that new technologies need to be developed and produced in a sustainable way.
- Be aware of the impact that resource consumption has on the planet
- Understand how the environment can be protected by responsible design and manufacturing
- Understand how waste can be disposed of with the least impact on the planet
- Understand the positive and negative impacts new products have on the environment

Key Facts to Memorise

Impact of the use of resources

- CO_2 emissions
- Transportation methods and distance travelled
- Impact on the environment through mining or harvesting
- Impact on availability or scarcity
- Maintenance and repair costs, appropriate use of material
- Ethical and moral issues
- Welfare of workers n the supply of the material; Fairtrade etc…

Extraction and processing: the amount of energy used to extract raw material from the earth or produce it from farming and process it ready for manufacture

Manufacturing and production: Energy needed to process resources into a saleable product

Distribution: Packaging and transportation of the product to the end user

In use: the energy that the product and any related consumables used during its working life or useful lifetime.

End of life: The energy that is required to recycle or dispose of the product.

The LCA can highlight a number of ethical questions for a company to consider about reduction in energy consumption and use of raw materials. Responsible companies can then decide how to neutralise any negative effects; for example planting trees

Maths/science links

Taking into consideration the ecological and social footprint of materials.

Exam Questions

1. Give 2 examples of finite resources and 2 examples of non-finite resources.
2. What can a company learn by conducting a life cycle assessment?

Stretch

A. Why should finite resources be avoided or used in limited amounts?

TEXTILES SP - TOPIC 1.3b

New and emerging technologies:

The environment: Impact of resource consumption on the planet

Introduction

We are now living in a society where everybody should take responsibility for recycling to ensure that:

- The resources we have last as long as possible
- Landfill sites do not fill up too quickly

There has been a population explosion since the beginning of the 20th Century which has led to accelerated use of all natural resources. The consequence of this is that resources are being used up at a very fast rate. Some new technologies are being developed to try to reduce this negative impact.

Key words

Built in obsolescence – products that are deigned not to be upgradable

Continuous improvement – The workforce strives to find any possible way to make adjustments to working practices in order to save time, money and resources.

Efficient working – Just In Time, lean manufacturing methods. An 'energy walk' a trained member of staff turns off unnecessary lighting, heating and other appliances.

Pollution – By conducting an LCA a company will find out how much pollution is being created and therefore enable them to plan a reduction strategy.

Global warming - A boom in greenhouse gases caused by global manufacturing has caused a gradual rise in the average temperature of the Earth's atmosphere and oceans.

Carbon offsetting – companies are able to consider their products sustainable by offsetting their negative impact through activities that reduce carbon emissions.

Exam Tips

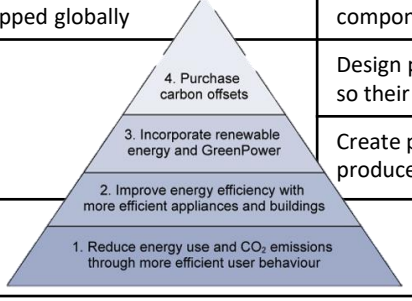
- Understand that new technologies need to be developed and produced in a sustainable way.
- Be aware of the impact that resource consumption has on the planet
- Understand how the environment can be protected by responsible design and manufacturing
- Understand how waste can be disposed of with the least impact on the planet
- Understand the positive and negative impacts new products have on the environment

Key Facts to Memorise

Benefits of careful planning for waste disposal:

- Less raw material is needed
- Waste materials are reused for alternative parts and products
- Some of the cost of materials if recouped through the sale of recyclable waste
- Energy to heat and power a business may be generated.

Technologies with a negative impact	Technologies with a positive impact
Overuse of finite & non-recycled materials	Use only renewable materials from managed sources
Use of components that are hard to repair or recycle	Use renewable energy
Fossil fuels to power manufacture	Use recycled and recyclable materials
Products with high power consumption	Design products to be repairable, reusable and fully recyclable
Built in obsolescence	Produce products with lower power consumption
Component parts travel long distances and are shipped globally	Design products with fewer components and less weight
	Design products that are upgradable so their life is extended
	Create products that are sources, produces and sold locally



Maths/science links

Taking into consideration the ecological and social footprint of materials.

Exam Questions

Wind up radios and torches have had a very positive influence in developing countries. What factors do you feel make wind-up products of this type sustainable and environmentally friendly?

Stretch

Explain how carbon offsetting helps to reduce the overall CO2 emissions of a company.

Further links

www.technologystudent.com/prddes1/waste1.html
www.technologystudent.com/prddes1/waste3.html
www.technologystudent.com/prddes1/envirmod1.html
www.technologystudent.com/prddes1/envirmod2.html
www.technologystudent.com/prddes1/upcycling1.html
www.technologystudent.com/prddes1/downcyc1.html
www.technologystudent.com/prddes1/contin1.html
www.technologystudent.com/prddes1/contin2.html
www.technologystudent.com/enerflsh/foot1.html
www.technologystudent.com/enerflsh/foot3.html
www.technologystudent.com/enerflsh/foot4.html

TEXTILES SP - TOPIC 1.4a

New and emerging technologies: People

Introduction

People across the world can have very different needs and tastes, and products successfully launched in one country can be a complete failure in another.

Key words

Consumer choice – the global market place has led to a huge increase in choice and means that prices are kept low due to higher competition

Technology push – Technology Push is when research and development in new **technology**, drives the development of new products. **Technology Push** usually does not involve market research. It tends to start with a company developing an innovative **technology** and applying it to a product

Market pull – describes consumer demand as the driving force behind new products

Changing job roles – the pace of development and the growth in digital and social media means that some of the traditional jobs of the last century cannot be relied on to last.

Further links

http://www.technologystudent.com/prddes1/revcardtec1.html

Exam Tips

- How technology push/market pull affects choice.
- Changing job roles due to the emergence of new ways of working driven by technological change

Key Facts to Memorise

Technology push

1993 APPLE NEWTON PDA

1996 PALM SERIES

2012 SAMSUNG GALAXY

Market Pull

Analysis of the consumer market, along with an understanding of human needs and desires, enables the 'gap in the market' to be filled. Market pull also puts pressure on companies to constantly improve their products so that they keep their share of the market through brand loyalty as well as attracting new customers.

Changing job roles

Some estimates predict that two-thirds of children who are about to begin their education will have jobs that do not yet exist. Job roles are already changing due to an increase in computer technology and artificial intelligence.

- Some offices are now connected through virtual connections (conferencing) and mobile communication allows for home working or working while travelling.
- Companies will need people with technological skills who can respond quickly to change.
- People will need to become skilled in new technology such as the film industry where CGI animation is increasingly used and automation is threatening the jobs of the less skilled.

Exam Questions

1. Name 3 products that would sell well in one country, but not in another. Justify your answers
2. What are the pros and cons of a satellite navigation system over a traditional map?

Stretch

A. Describe the positive and negative factors of a global market place for:
(a) The manufacturer
(b) The consumer

B. How has the development of rechargeable battery technology affected the function and form of mobile phones over the last 30 years?

C. Why does being first to market with a new product give a company a competitive advantage?

D. Digital photography has changed the way photographs are viewed and processed, taking over from traditional cellulose acetate film. How has this affected job roles in the area of photography?

TEXTILES SP - TOPIC 1.4b

New and emerging technologies: Culture

Introduction

Fashion and trends, faiths and beliefs can affect product development. Some parts of the world are still dominated by one type of culture, especially where a government or a particular religious belief has a very powerful hold over the population. Designing products for these countries may be considered easier, as there is less diversity and the majority of people have similar lifestyles. The downside of this is that they may require a limited range of products.

In the UK, and especially in large cities, there is a very diverse mix of cultures, and selling a product to this type of market can be quite challenging as so many factors need to be considered.

Key words

Fashion is defined as the dominant style in a given time period. Fashion affects areas of society including clothing, makeup or furniture.

PDM – product data management – helps manufacturers analyse what is in or out of fashion in real time

Trends reflect the general direction or development towards something new or different

Lead time is the amount of time it takes for a company to deliver a product to market from the start of the design process.

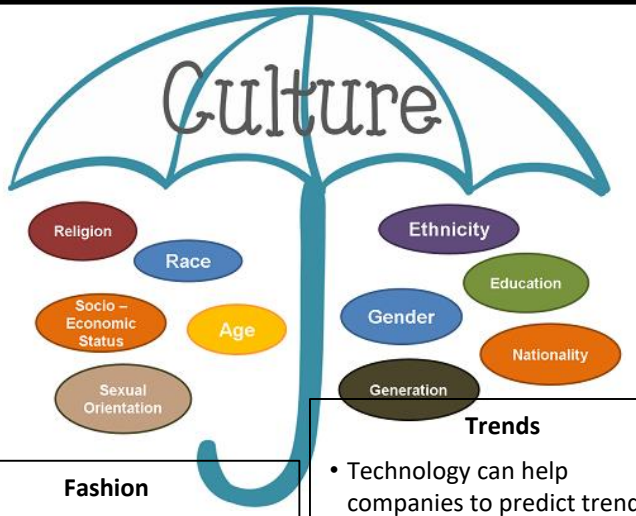
Faiths and beliefs – people from different cultures may have very different faiths and beliefs (which can be based on factors like religion, politics, vegetarianism, age or gender)

Culture is the shared general beliefs or customs of a specific group of people.

Exam Tips

Changes in fashion and trends in relation to new and emergent technologies. Respecting people of different faiths and beliefs

Key Facts to Memorise

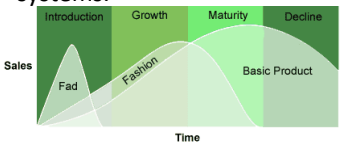


Fashion

- Fashions come and go relatively quickly, so new manufacturing technologies allow manufacturers to respond quickly to the latest fashion.
- Mobile communication and social media mean that the latest fashions can be found more easily.

Trends

- Technology can help companies to predict trends, helping them to respond quickly.
- Trends may have different lead times so companies must have flexible manufacturing systems.



Faiths and beliefs

People follow the rules of these as it is their measure of what they feel is right or wrong. Manufacturers must be careful to research their market to ensure that:

- Their products do not give offensive images or messages
- Their products do not use materials which are against the market's beliefs.
- They are aware of their workers' needs such as breaks for worship or particular clothing requirements.

Further links

www.technologystudent.com/pdf14/display7.pdf

Exam Questions

1. What should a company do to keep up-to-date with the latest trends in their sector?
2. What type of market testing should a company use to see if a product is ready for launch?

Stretch

A. Explain what is meant by the term 'culture' with regard to people.

B. Describe 3 ways the level of demand for a product will change as a trend develops

TEXTILES SP – TOPIC 1.4c

New and emerging technologies: Society

Introduction

Responsible design companies consider the environment before profit. The areas of design that are considered to be responsible include one or more of the following products that:

- Are made from renewable materials
- Reduce carbon emissions and/or other greenhouse gasses in use
- Reuse existing materials or use recycled materials
- Are designed to be 100% recyclable
- Are designed to help or ease suffering or that promote fair trade
- Are made and sold locally to avoid transportation costs and associated pollution
- Are organisations that are not-for-profit and where all money is reinvested to support good causes.

Key words

Prosthetic – any artificial body part, such as a limb, a heart or retinal implant

Further links

https://www.designcouncil.org.uk/sites/default/files/asset/document/the-principles-of-inclusive-design.pdf

Exam Tips

You need to be able to identify and explain how products are designed and made to avoid having a negative impact on others

Key Facts to Memorise

Design for the disabled

The 1 billion people around the world living with disabilities can benefit from technology to help them live a long, healthy, independent and engaging life. This includes designs for:

- Assistive technology, which covers small devices such as pencil grips and text-to-speech readers to larger lifting devices and all terrain wheelchairs that can scale uneven surfaces.
- Prosthetic limb technology where the electrical activity in the body can be harnessed, providing the user with a new degree of control.

Design for the elderly

The average age of the population is increasing. It is important that we address the needs of this part of the population so that elderly people have a purpose and sense of wellbeing, including designs for:

- Communication and accessible social media or monitoring devices
- Mobility, including transportation for short distances
- Independence with mechanical / electronic aids for normal activities at home or away from home

Design for different religious groups

Designers must consult with members of religious groups to consider their beliefs and to ensure that the design is suitable as otherwise they could lose potential customers.

- Some manufacturers have a range of designs for a product that meets the needs for each group and will not standardise the needs of religious groups.
- Technology can aid religious groups through improved communication

Exam Questions

Describe 2 ways in which the TV remote controller could be used for visually impaired users.

Stretch

A. Explain 2 ways in which new and emerging technologies are improving independence of the elderly.

B. Explain 2 ways in which new and emerging technologies are allowing individuals who are blind to enter the workplace.

TEXTILES SP – TOPIC 1.5a

New and emerging technologies:
Production techniques and systems

Introduction

The use of computers in industry has grown enormously over the last 30 years. As a result the way products are designed and manufactured ahs become increasingly automated. Computers are now used in all areas of design and manufacture.

Key words

PDM – Product data management: All information about a production system is stored centrally, updated live and accessible. It reduces mistakes, ensures team work and allows for accurate costing and forecasting of production progress.

CAD – Computer aided design: The most common file types to output CAD are: .DFX, .STL and .OBJ

CAM – Computer aided manufacture: Most CAM machines have software that converts CAD software into a language that the machine understands. This is called **post processing**.

CNC – Computer numerical control: CAD software generates machine codes which are then interpreted by the CNC machine into movements to control tools such as needles or cutters.

FMS – Flexible Manufacturing System:

Further links

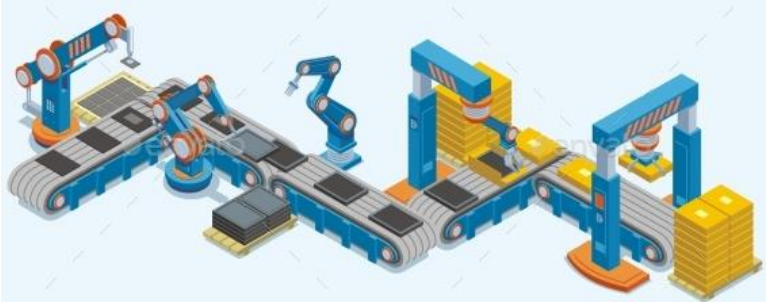
www.technologystudent.com/despro_flsh/revise12
www.technologystudent.com/cam/cnccut1
www.technologystudent.com/prddes1/justintime1
www.technologystudent.com/despro_3/lean1

Exam Tips

- Understand • automation • CAD• CAM – advantages and disadvantages
- Be able to recognise and explain the use of Flexible Manufacturing Systems (FMS)

Key Facts to Memorise

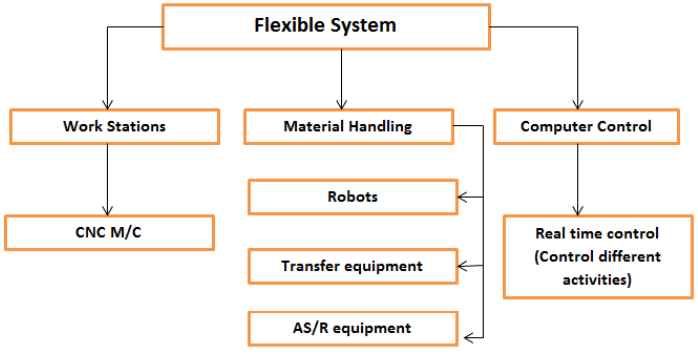
Automation



- Automated production lines flow more easily and have less need for human interaction.
- Manual production lines of the past were slower and more expensive to operate.
- Some traditional manufacturers still rely on skilled manual labour. These products tend to be bespoke, low volume and high cost items.

Computer aided design and manufacturing

CAD software has a number of benefits, although many designers prefer to start sketching an original idea by hand as ideas can sometimes be expressed more freely.



FMS

A collection of automated machines that are adaptable and used in production lines where products may change regularly.

Exam Questions

1. Which movements do the x, y and z coordinates represent on a CNC machine?
2. What are the steps that need to be taken to send a completed CAD design to a CNC machine?

Stretch

A. Why is it a good idea for companies to invest in product data management software?
B. Why do some people prefer to purchase hand-built items instead of mass-produced goods
C. How does an FMS allow a company to respond to trends and market fluctuations?

TEXTILES SP – TOPIC 1.5b

New and emerging technologies:
Production techniques and systems

Introduction

The use of computers in industry has grown enormously over the last 30 years. As a result the way products are designed and manufactured ahs become increasingly automated. Computers are now used in all areas of design and manufacture.

Key words

JIT – Just In Time: Manufacturers are able to respond to customer demands more effectively. A customer's order triggers the production process and the manufacturer makes the product specifically to meet the order.

Lean Manufacturing – Based on an ethos of eliminating waste in manufacture

Further links

www.technologystudent.com/despro_flsh/revise12
www.technologystudent.com/cam/cnccut1
www.technologystudent.com/prddes1/justintime1
www.technologystudent.com/despro_3/lean1

Exam Tips

- Understand how just in time (JIT) and lean manufacturing contribute to manufacturing efficiencies.

Key Facts to Memorise

Benefits and drawbacks of JIT

Advantages	Disadvantages
Lower stock holding means a reduction in storage space which saves rent and insurance costs	There is little room for mistakes as minimal stock is kept for re-working faulty product
As stock is only obtained when it is needed, less working capital is tied up in stock	Production is highly reliant on suppliers and if stock is not delivered on time, the whole production schedule can be delayed
Less likelihood of stock perishing, becoming obsolete or out of date	There is no spare finished product available to meet unexpected orders, because all product is made to meet actual orders
Less time spent on checking and re-working production as the emphasis is on getting the work right first time	A need for complex, specialist stock systems

Exam Questions

1. Which types of products do you think would be best produced using the JIT methods and why?

Stretch

A.. Describe 3 characteristics of JIT that could lead to increased productivity.

TEXTILES SP – TOPIC 2.1

Energy generation and storage:

Fossil fuels

Introduction

There are many ways to convert energy but there are 2 main categories; fossil fuels and renewables. Countries across the World are attempting to find as many renewable sources of energy production as possible, in order to help reduce the build-up of greenhouse gases.

Key words

Global warming

Turbines – are linked to a generator to provide a supply of electricity.

Fossil fuels – coal, gas and oil are **finite** resources. When they are burned they produce CO2

Biofuels – renewable energy sources

Shale gas – A natural gas that is trapped in areas of shale in the Earth's crust. Shale is a sedimentary rock that can be rich source of petroleum and natural gas.

Fracking – A controversial process of extracting gas from the shale. It involves drilling a well down into the Earth's crust and sending high-pressure water, sand and chemical mixture into the rock to release the trapped gas. The gas travels up the drilled shaft and is collected at the well head.

Further links

www.youtube.com/watch?v=20Vb6hlLQSg

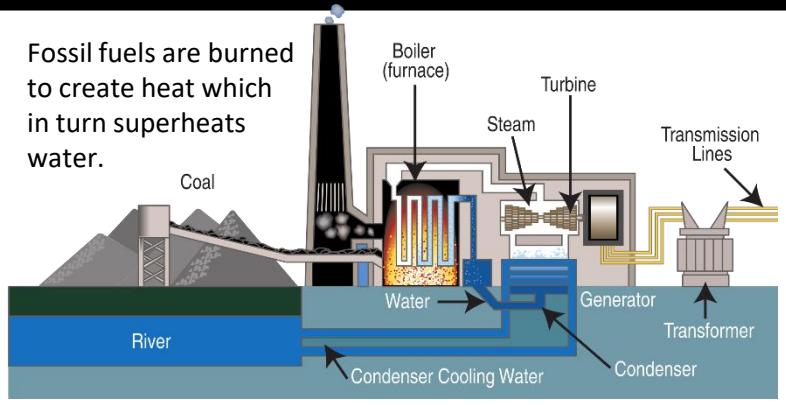
www.bbc.co.uk/news/uk-14432401

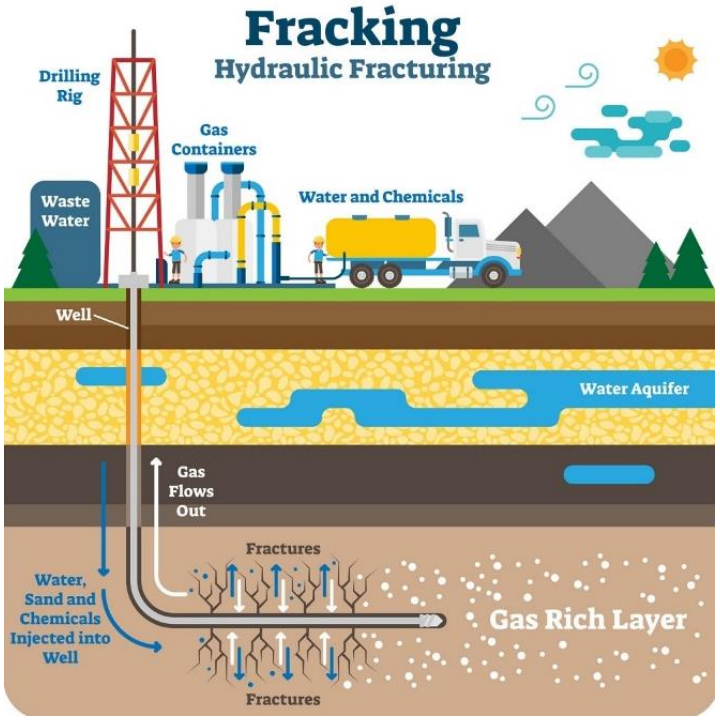
Exam Tips

- How power is generated from: • coal • gas • oil.
- Arguments for and against each of the energy sources..

Key Facts to Memorise

Fossil fuels are burned to create heat which in turn superheats water.





Exam Questions

1. Fossil fuels will run out in the future. Describe two ways in which the use of fossil fuels could be reduced.
2. Explain two environmental impacts of using coal as a power source.

Stretch

A. Explain the steps of the fracking process used to release natural gas from shale.

TEXTILES SP – TOPIC 2.2

Energy generation and storage:

Renewable energy

Introduction

Energy that comes from no-finite resources is considered to be **renewable**. Nuclear energy is also sometimes included in this category as the amount of uranium it uses is unlikely to run out in under 1000 years. It also produces very low levels of CO2.

Key words

Global warming

Turbines – are linked to a generator to provide a supply of electricity.

Fossil fuels – coal, gas and oil are **finite** resources. When they are burned they produce CO2

Biofuels – renewable energy sources

Wind

Solar

Tidal

Hydroelectrical

Biomass

Further links

www.goodenergy.co.uk/how-do-wind-turbines-work/

www.evoenergy.co.uk/technology/how-solar-panels-work/

www.youtube.com/watch?v=VkTRcTyDSyk

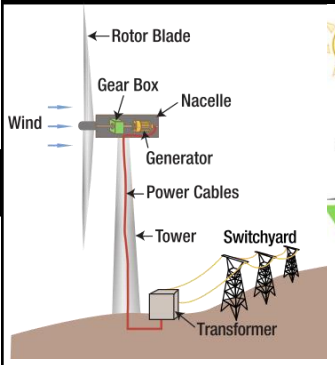
www.youtube.com/watch?v=OC8Lbyeyh-E

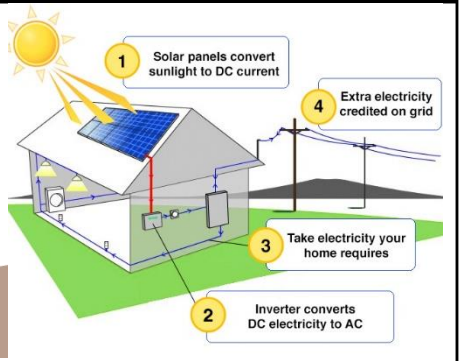
www.bbc.co.uk/schools/gcsebitesize/science/triple_ocr_gateway/beyond_the_microscope/biofuels/revision/1/

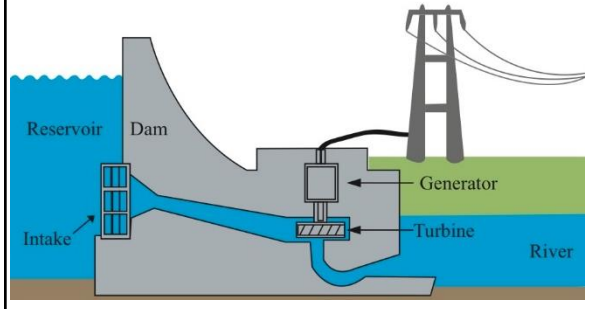
Exam Tips

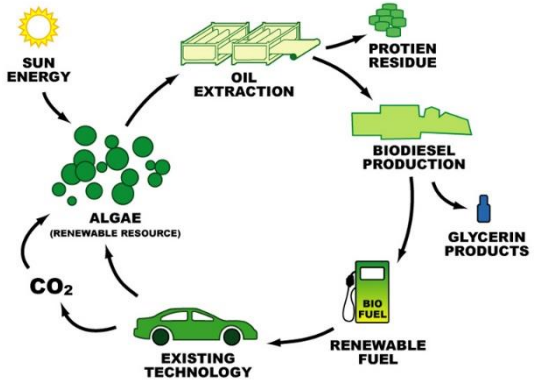
- How power is generated from: • wind • solar • tidal • hydro-electrical • biomass.
- Arguments for and against each of the energy sources..

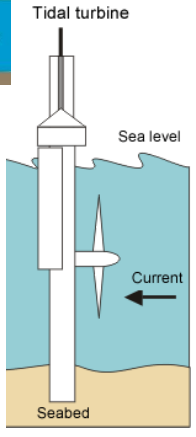
Key Facts to Memorise











Exam Questions

1. What might be the impact on the natural environment and wildlife of constructing a dam at the end of a valley and flooding the valley to create a reservoir for a hydroelectric power station?
2. list the positive factors for hydroelectric power.

Stretch

A. For each of the energy sources, explain the source of energy that justifies them being considered renewable.

B. Explain what happened to the CO2 during the life cycle of biofuel production and use.

C. If biofuel is so environmentally friendly, why do you think it is not more commonly used at present?

TEXTILES SP – TOPIC 2.3

Energy generation and storage:
Nuclear Energy

Introduction

The most controversial method of energy production is nuclear power. Considered a clean and efficient energy source, it provides over 11% of the world's electricity. It harnesses a nuclear reaction that takes place inside the reactor vessel. Control rods are moved in or out of the reactor's core to regulate the amount of power that is generated. The reaction generates vast amounts of heat which superheats water and generates power by driving turbines and generators.

Key words

Global warming

Turbines – are linked to a generator to provide a supply of electricity.

Fossil fuels – coal, gas and oil are **finite** resources. When they are burned they produce CO2

Radioactive

Further links

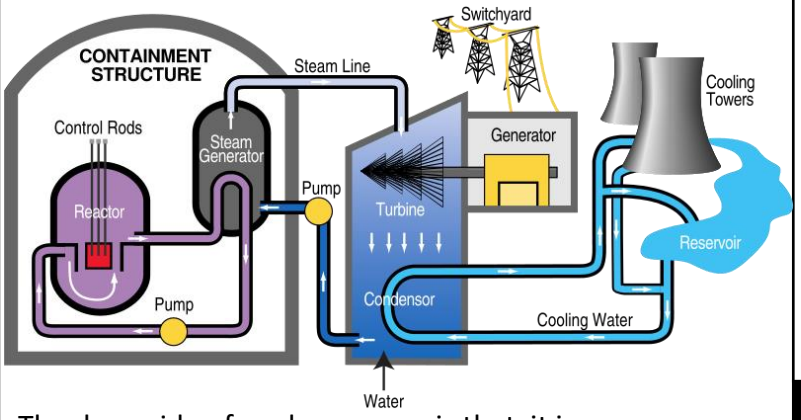
www.youtube.com/watch?v=_UwexvaCMWA

www.bbc.co.uk/schools/gcsebitesize/science/add_gateway_pre_2011/radiation/fissionrev2.shtml

Exam Tips

- How nuclear power is generated.
- Arguments for and against each of the energy sources.

Key Facts to Memorise



The downside of nuclear power is that it is very expensive to build a reactor and the waste product from the reaction is **radioactive** and very dangerous to all forms of life. It must be contained correctly and carefully stored so that the radiation does not leak. Nuclear waste is usually stored underground as it stays radioactive for a very long time.

Exam Questions

What are the social and environmental issues relating to the disposal of the waste from nuclear energy production?

Stretch

A. Explain one reason why coastal areas are good locations for building a nuclear power plant.

B. Explain 3 risks of using nuclear energy as a power source.

TEXTILES SP – TOPIC 2.4

Energy generation and storage:
Mechanical power

Introduction

There are a number of ways to produce and store mechanical power. Most mechanical power used in technological products is stored by tension or compression.

Key words

Compression energy

Tension energy

Pneumatics – A form of compression where gas or air is stored under pressure

Hydraulics – The gas or air in a pneumatic system can be swapped for a liquid, most commonly oil. This type of movement control is commonly used in car braking systems and lifting gear like forklift trucks and tractors.

Compressor – Hydraulic and pneumatic systems need compression for the systems to work. This is usually achieved through a type of pump called a compressor. Air or liquid is held under pressure in s storage tank. When the pressure falls below its minimum the compressor will automatically turn on and build the pressure back up.

Kinetic energy – energy involved in **motion**. Any object in motion has kinetic energy. Objects not in motion have **potential** energy.

Rotating flywheel – a traditional way to store kinetic energy.

Exam Tips

- Be able to identify mechanical power and understand how it is stored
- Understand pneumatics and hydraulics as examples of kinetic pumped storage systems

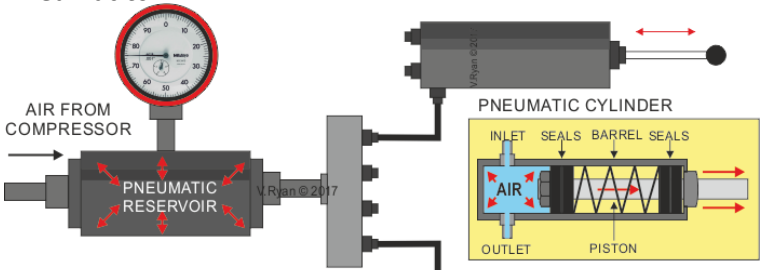
Key Facts to Memorise

Coiled springs store physical energy from the winding process.

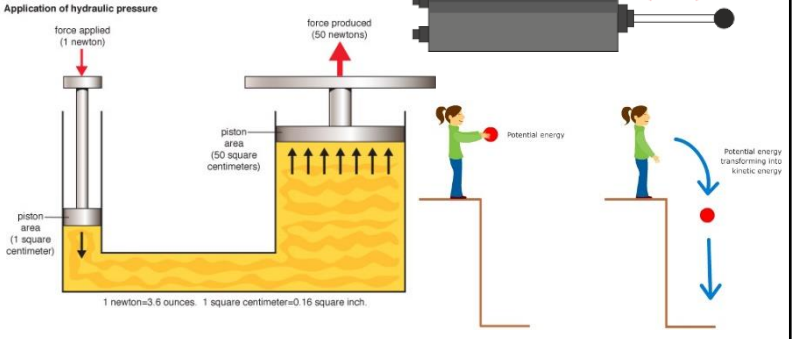



Compressing a spring is another way to store energy.

Pneumatics



Hydraulics



Exam Questions

1. What methods, other than using a spring, could be used to store tension or compression energy?
2. Define the difference between a pneumatic and hydraulic system.

Stretch

A. Why does the spring on a wind-up product need other components such as gears and cogs in order to operate efficiently?

B. How does a pump build up pressure in pneumatic and hydraulic systems?

Further links

www.bbc.co.uk/schools/gcsebitesize/design/systemscontrol/pneumaticsrev1.shtml

www.explainthatstuff.com/how-clockwork-works.html

www.explainthatstuff.com/hydraulics.html

www.youtube.com/watch?v=IqV5L66EP2E

TEXTILES SP – TOPIC 2.5

Energy generation and storage:
Electro chemicals

Introduction

Electrical power can be stored in batteries. They contain electro chemicals that react with each other to produce electricity.
A battery contains one or more **cells** with each cell providing 1.5 volts. Each cell has a positive side and a negative side.

Key words

Battery

Cell

Volts

Alkaline Cells – A higher capacity for their size than traditional acid-based cells. They are more efficient and hold their charge well.

Rechargeable batteries – Can be charged and discharged many hundreds of times.

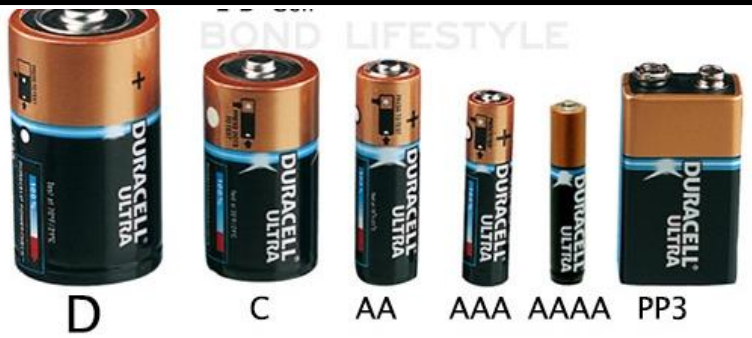
Further links

www.bbc.co.uk/schools/gcsebitesize/design/electronics/componentsrev8.shtml

Exam Tips

- Understand the functional properties of alkaline and rechargeable batteries

Key Facts to Memorise



Disposal of batteries
Batteries need to be disposed of correctly, as they contain toxic electro chemicals and some metals that can be harmful to the environment.

Exam Questions

1. A PP3 battery produces 9 volts. How many cells does it contain?

Stretch

Explain why rechargeable batteries are better for the environment.

TEXTILES SP – TOPIC 3.1

Developments in new materials:
Modern materials

Introduction

A good designer will use and exploit new materials and keep up-to-date with the latest developments.

Key words

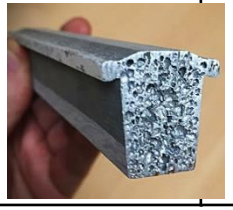
Corn starch polymers – Plastics that are made from vegetable starches and fully biodegradable if composted. They cannot be recycled because they so readily decompose. **Polylactic acid / PLA, polyhydroxy-butyrate / PHB/Biopol**

Flexible MDF

Titanium – A versatile metal that is usually alloyed with other metals to enhance its properties. It does not react with the human body and is therefore used by the medical profession for artificial joints and other orthopaedic uses.

Fibre optics – Allow digital information to travel as pulses of light along thin glass stands at high speeds. They can carry much more information than traditional copper wires and do not suffer from electromagnetic interference that can distort a signal.

Graphene – A million times thinner than a human hair and 200 times stronger than steel.



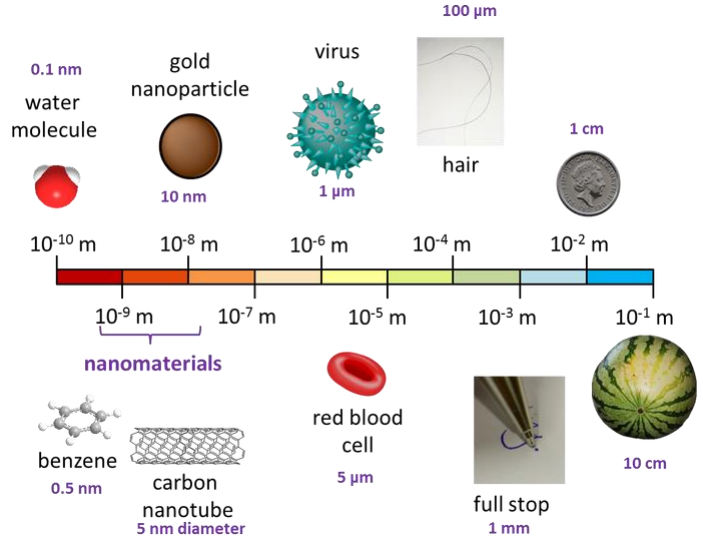
LCD – liquid crystal displays

Metal foams – Created by injecting gas into the liquid metals

Exam Tips

- Developments made through the invention of new or improved processes e.g. Graphene, Metal foams and Titanium. Alterations to perform a particular function e.g. Coated metals, Liquid Crystal Displays (LCDs) and Nanomaterials.

Key Facts to Memorise



Exam Questions

1. A cylindrical footstool measures 400m in height and has a finished external diameter of 300mm. Calculate the length of flexible MDF needed to cover the side.
2. What factors make titanium such a good material to be used by the medical profession?

Stretch

A. Why aren't biodegradable polymers biodegradable?
B. Why are corn starch polymers not ideal for use outside?
C. How can corn starch polymers help reduce the demand on finite resources?
D. Why are so many layers needed around the inner core of fibre optic cable?
E. Why are LCD displays ideal for use in a wristwatch?

Further links

www.bbc.co.uk/schools/gcsebitesize/design/graphics/materialsandcomponentsrev4.shtml

TEXTILES SP – TOPIC 3.2

Developments in new materials:
Smart materials

Introduction

A smart material is one that reacts to an external stimulus or input. This group of materials can react to heat, pressure, moisture, stress, PH level, lights and electricity.

Key words

Thermochromic

Photochromic – it is the **ultra violet** rays that effects the change in pigment

Shape Memory alloy – can remember a preset shape and return to it even after being dramatically reshaped. The stimulus for returning to the preset shape is heat or electricity.

Nitinol - An alloy of titanium and nickel. To program its shape memory, the nitinol must be held in the desired position and heated to 540 degrees. When cooled it can be deformed into a different shape. It will spring back to its original shape at around 70 degrees.

Polymorph – a non-toxic and fully biodegradable polymer in small granules. When heated to 62 degrees the granules fuse to become a mouldable substance and cool to be a solid. Can be reheated and remoulded.

Quantum tunnelling composite – can be a conductor or insulator. QTC varies its electrical resistance depending on the amount of pressure or stress applied to it.

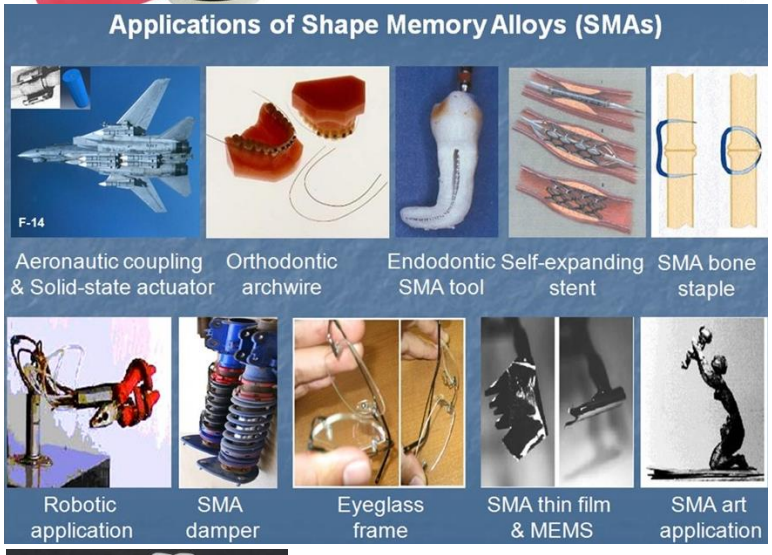
Piezoelectric material - It is not a conductor, but produces an electrical voltage when squeezed or put under pressure. Can create a spark to ignite gas. Can be used to create sound.

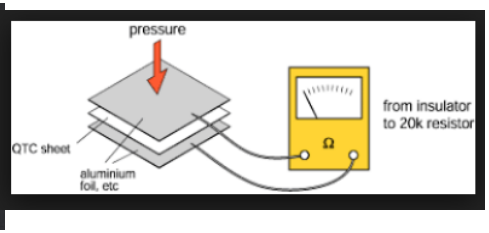
Litmus paper

Exam Tips

- That materials can have one or more properties that can be significantly changed in a controlled fashion by external stimuli, such as stress, temperature, moisture, or PH e.g. shape memory alloys, thermochromic pigments and photochromic pigments

Key Facts to Memorise





Exam Questions

- How could thermochromic pigments be used for packaging in the food industry?
- How could the two minutes delay in a pair of sunglasses darkening or lightening be an issue to the user?
- How could a glass office building benefit from having its windows covered in photochromic film?
- How could QTC be used in a child's toy?

Stretch

A. Explain how thermochromic pigments can be used to indicate a fever in a young child.

B. Explain how a piece of shape memory alloy could be used in a fire detector controlling a sprinkler system.

C. How could polymorph be used to help a person with arthritis?

Further links

www.bbc.co.uk/schools/gcsebitesize/design/graphics/materialsandcomponentsrev4.shtml

TEXTILES SP – TOPIC 3.3

Developments in new materials:

Composite materials

Introduction

Composite materials are formed when 2 or more different materials are combined to create a new material with improved properties and functionality.

Key words

GRP – glass reinforced plastic. Glass fibre matting is covered with smooth plastic resin which sets hard with a high gloss finish. It is easily coloured and complex shapes can be formed.

CRP – carbon fibre reinforced plastic. Carbon fibre is a cloth woven from individual strands, the interlacing provides different patterns. It can be coloured but is often left natural.

Further links

www.bbc.co.uk/schools/gcsebitesize/design/graphics/materialsandcomponentsrev4.shtml

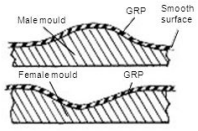
Exam Tips

- That composite materials are produced by combining two or more different materials to create an enhanced material e.g. glass reinforced plastic (GRP) and carbon fibre reinforced plastic (CRP).

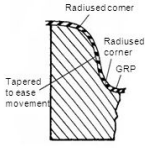
Key Facts to Memorise

Glass-reinforced plastic

This is a forming process. Glass fibre is combined with polyester resin (thermosetting plastic) to produce a very strong structure. The glass-fibre material is layered in a mould and coated with the polyester resin; the resin sets without heat or pressure needing to be applied, and when it is set it is very strong.



The mould is very important when forming GRP. The better the quality of the mould, the better the finish on the GRP. The moulds should be tapered to allow the product to be be removed easily.

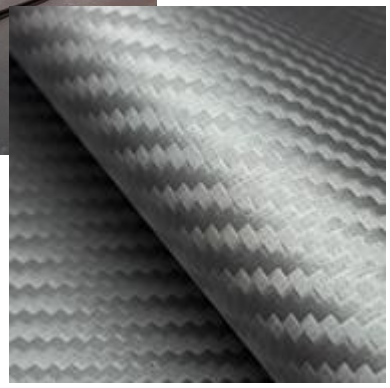


Advantages of GRP

- Excellent strength-to-weight ratio
- Excellent tensile strength
- Impact resistance
- High corrosion resistance

Uses

- Sports car bodies
- Boat and canoe hulls
- Caravan shells



Exam Questions

1. Draw a labelled diagram to show the construction of 3ply plwood.

Stretch

A. Why is it difficult to recycle many composite materials?

B. Describe 2 reasons why GRP would be used in preference to CRP for the manufacture of a kayak.

TEXTILES SP – TOPIC 3.4

Developments in new materials:
Technical textiles

Introduction

A textile that has been developed with enhanced properties to withstand specific uses. The function is more important than the aesthetics.

Key words

Gore-tex – A membrane sewn between layers of other fabrics. A waterproof but breathable garment which is used in a variety of outdoor clothing.

Kevlar – A fibre that has high tensile strength, great heat resistance and is extremely hard wearing. It is an **aramid** which are modified nylon fibres.

Conductive fibres – known as e-textiles. Highly conductive threads and fabrics allow an electrical signal to pass through them

Fire resistant fabrics – Nomex and Kevlar have been developed to withstand high temperatures and reduce combustion when exposed to a naked flame.

Fire retardants - can be applied to a range of regular fabrics. They are designed to produce a chemical reaction that slows down and even stops ignition taking place.

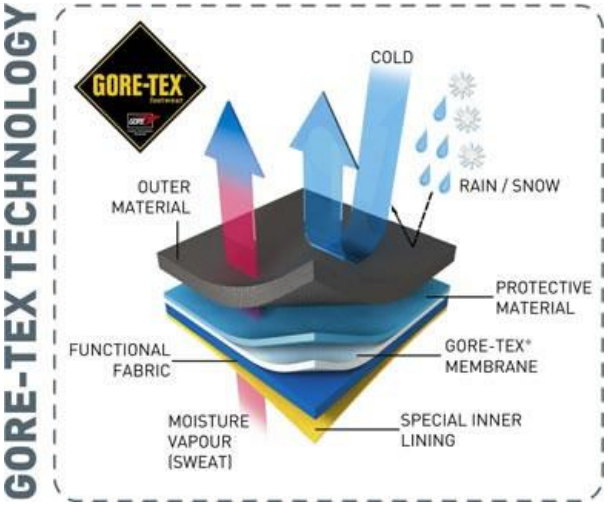
Microfibres – are synthetic fibres that are about 5 times finer than the human hair.

Microencapsulation - traps liquid or solid substances within the fibres of a material. When microencapsulated textiles are rubbed the walls of the fibre open up allowing the substance to be released.

Exam Tips

- How fibres can be spun to make enhanced fabrics e.g. conductive fabrics, fire resistant fabrics, kevlar and microfibres incorporating micro encapsulation

Key Facts to Memorise



Exam Questions

1. How could Kevlar be used to protect students in a school workshop?
2. How could conductive thread and fabric be used to improve safety features for cyclists?
3. For which activities in a school workshop would wearing fire resistant PPE be of benefit?

Stretch

A. Explain how a Goretex membrane stops water from getting in, yet lets water vapour out in both hot and cold environments.

B. Some microencapsulated clothing products lose their effectiveness after a number of washes. Why do you think this is the case?

Further links

www.bbc.co.uk/schools/gcsebitesize/design/graphics/materialsandcomponentsrev4.shtml

TEXTILES SP – TOPIC 4

Approach to designing

Introduction

All design and manufacturing tasks are made up of systems. Within each task there can be many **subtasks** or **subsystems**.

Key words

System - parts or components tat work together to control a task or activity. A system consists of inputs, processes and outputs.

Systems diagram - simple version of a flowchart that layout the input, process and output of a system. Separate operations involved in the process are not broken down at this stage.

Open loop system – has no feedback and is unable to make a decision.

Closed loop system – is able to make a decision using **feedback**.

Inputs – the most common input is a switch.

Outputs - output components are used to give off a stimulus such as light, heat , movement or sound

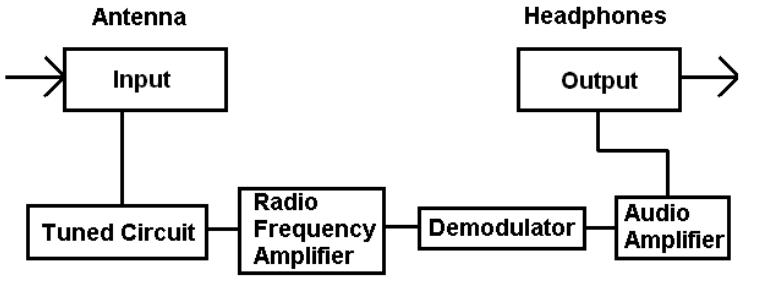
Further links

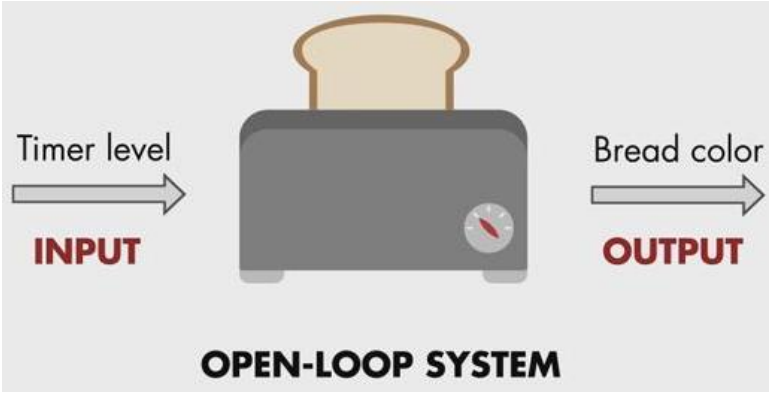
http://www.bbc.co.uk/schools/gcsebitesize/design/electronics/industrial_designrev3.shtml

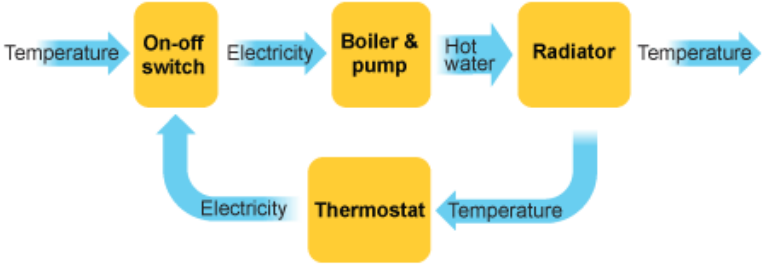
Exam Tips

Inputs: The use of light sensors, temperature sensors, pressure sensors and switches.
Processes: The use of programming microcontrollers as counters, timers and for decision making, to provide functionality to products and processes.
Outputs: The use of buzzers, speakers and lamps, to provide functionality to products and processes.

Key Facts to Memorise







Exam Questions

1. Identify the input, process, and output stages of sending a texts message.

Stretch

A. How could a feedback loop be used to switch off an electric kettle when the water has reached 100 degrees?

TEXTILES SP - TOPIC 5

Mechanical devices

Introduction

Mechanical devices are machines or tools that have one or more parts. They use and manipulate energy to perform tasks and specific actions.

Key words

Movement: Linear motion
Reciprocating motion
Oscillating motion
Rotary motion

Levers – a lever is a simple way to gain mechanical advantage (MA) making lifting or moving something much easier.

Equilibrium – Is caused when the effort and load are equal.

First order lever (class1)

Second order lever (class 2)

Third order lever (class3)

Linkages – a mechanism made by connecting rigid parts.

Further links

www.bbc.co.uk/schools/gcsebitesize/design/systemscontrol/mechanismsrev8.shtml

www.technologystudent.com/forcmom/motion1.html

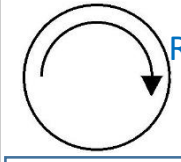
Exam Tips

Different types of movement: The functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements.
Changing magnitude and direction of force: Levers: • first order • second order • third order Linkages: • bell cranks • push/pull.
Rotary systems: • CAMs and followers • simple gear trains • pulleys and belts.

Key Facts to Memorise

Linear

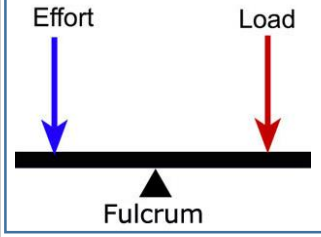
Oscillating



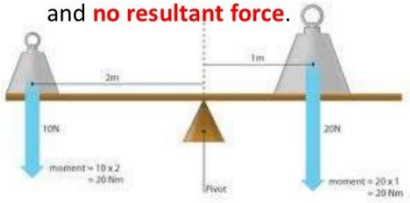
Rotary

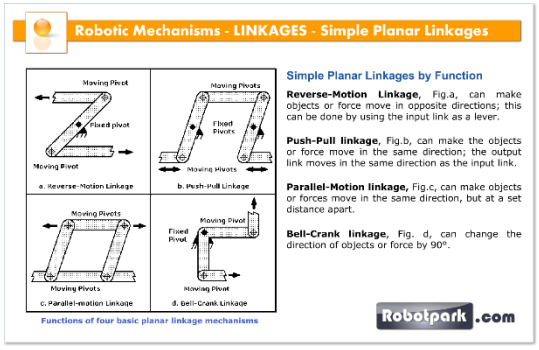
Reciprocating

MA = Load / Effort



If an object is in equilibrium there is **no resultant turning effect** and **no resultant force.**





Exam Questions

1.Which types of motion are associated with:
a paper trimmer?
the hands of a clock?
a child's swing?
2.Which class of lever best describe:
a pair of scissors?
a stapler?
a nut cracker?
5. Which linkage changes the direction of motion through 90 degrees?
6. Which linkage converts rotary motion to reciprocating motion?

Stretch

A.Calculate the mechanical advantage if the load was 875N and the effort was 125N. Express the answer as a ratio.
B.If A weighs 40kg and B weighs 60kg, how far from the fulcrum would A need to be for the seesaw to balance?

TEXTILES SP – TOPIC 6

Mechanical devices:

Rotary systems

Introduction

Rotary systems are used to drive mechanisms in equipment and machinery. They transfer the direction of force along different paths and through changes of angle and direction. They can also change one type of motion into another

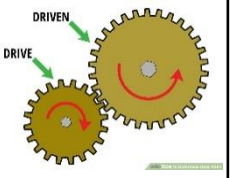
Key words

Cams and followers

Cam – a shaped piece of material attached to a rotating shaft.

Follower – A cam is mainly used to change rotary motion into reciprocating through the use of a follower.

Gear trains – A gear train consists of a cogwheel or drive 'gear' which in turn rotates the driven gear. The gear ratio is calculated by working out how many times the drive gear turns the driven gear per rotation.



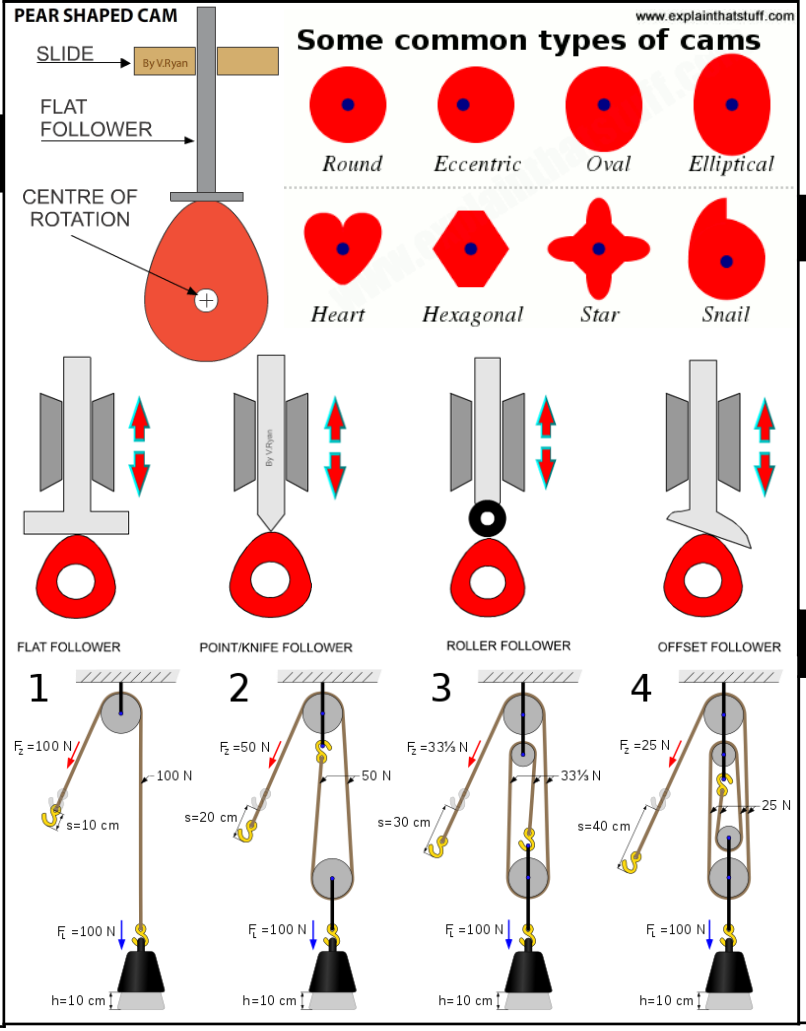
Pulley – a grooved rimmed wheel that is used in conjunction with a drive belt to transfer movement.

Block and tackle – a system of two or more pulleys that can be used in combination to reduce the effort required to lift or move a heavy load.

Exam Tips

Different types of movement: The functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements.
Changing magnitude and direction of force: Levers: • first order • second order • third order Linkages: • bell cranks • push/pull.
Rotary systems: • CAMs and followers • simple gear trains • pulleys and belts.

Key Facts to Memorise



Exam Questions

1. Which cam could be used on an automaton to create the motion of the jaw of an animal slowly opening then snapping shut.
2. Which cam could be used on an automaton to make a mouse slowly peek out of a hole and slowly retreat back in again?

Stretch

A. Why is a pulley wheel grooved?

Further links

www.bbc.co.uk/schools/gcsebitesize/design/systemscontrol/mechanismsrev8.shtml

www.technologystudent.com/forcmom/motion1.html

www.bbc.co.uk/schools/gcsebitesize/design/systemscontrol/mechanismsrev4.shtml

TEXTILES SP – TOPIC 7.1

Core principles:

Paper & board

Introduction

Papers and boards are usually made from wood pulp and converted to their finished forms at a paper mill. Other cellulose sources can include textiles such as cotton.

Key words

Physical Properties

Absorbency – how well a material may attract an element, usually a liquid such as water or moisture, but could include light or heat.

Density – the mass of material per unit of volume; how compact a material is.

Electrical conductivity – the ability to conduct electricity.

Thermal conductivity – the ability of a material to conduct heat.

Working Properties

Strength – the ability of a material to withstand a force such as pressure, tension or shear.

Hardness – the ability to resist abrasive wear and indentation through impact. Very hard materials can become brittle and can crack, snap or shatter.

Toughness – the ability to absorb energy through shock without fracturing.

Malleability – the ability to deform under compression without cracking, splitting or tearing.

Ductility – the ability to be stretched out or drawn into a thin strand without snapping.

Elasticity – the ability to return to its original shape after being compressed or stretched.

Exam Tips

- Know the primary sources of materials for producing papers and boards
- Be able to recognise and characterise different types of papers and boards
- Understand how the physical and working properties of a range of paper and board products affect their performance

Common Papers: Paper is measured by weight in grams per square metre (**GSM**)

Common boards: Board thickness is usually quoted in **microns** or grams per square metre (**GSM**). 100 microns is equal to 1mm of thickness. The lower the number, the thinner the paper or card.

Key Facts to Memorise

Bleed proof paper	Used with marker pens for design ideas and final designs
Cartridge paper	Pencil and ink drawings, sketching and watercolour
Grid paper	Graphical, mathematical and scientific diagrams
Layout paper	Creating sketches and working ideas; copying and tracing images with a variety of media
Tracing paper	Copying and tracing images. Used with a light box, overlays for adaptations and working drawings

Corrugated cardboard (fibreboard)		Packaging, boxes and impact protection.
Duplex board	2 layers of bonded card	Cheaper version of white card used for packaging boxes. Often with a waxy coating & used for food & drinks containers
Foil lined board		Takeaway containers and lids, used to retain heat for longer
Foam core board		Architectural models, model making, prototyping, mounting and framing of photos and artworks
Ink jet card		High quality photographic images
Solid white board		Greeting cards, packaging, advertising, hot foil stamping & embossing

Exam Questions

1. Justify which papers or boards you would use for the following tasks:
   (a) rendering a final design using coloured marker pens
   (b) creating the net for a box to transport a cake
   (c) producing a high quality point-of-sale advertising stand to hold leaflets.

Stretch

A. Why is it better for the environment to use softwood rather than hardwood for paper pulp?

B. A disposable coffee cup is made of duplex board with a corrugated cardboard sleeve.
   (a) Suggest two properties of corrugated cardboard that make it suitable for use as a sleeve.
   (b) Explain how the properties of duplex board can be modified to make it suitable to hold a liquid.

Further Links

www.technologystudent.com/despro_flsh/graphics_paper1.html

www.technologystudent.com/pdf15/POSTER_PAPERANDBOARDS1.pdf

TEXTILES SP - TOPIC 7.2

Core principles:

Natural timbers

Introduction

Natural wood is categorised as **hardwood** or **softwood**. This is about cell structure and not about the strength of the wood.

Hardwood comes from deciduous trees

Softwood comes from coniferous trees that are also known as evergreens

Key words

Physical Properties

Absorbency – how well a material may attract an element, usually a liquid such as water or moisture, but could include light or heat.

Density – the mass of material per unit of volume; how compact a material is.

Electrical conductivity – the ability to conduct electricity.

Thermal conductivity – the ability of a material to conduct heat.

Working Properties

Strength – the ability of a material to withstand a force such as pressure, tension or shear.

Hardness – the ability to resist abrasive wear and indentation through impact. Very hard materials can become brittle and can crack, snap or shatter.

Toughness – the ability to absorb energy through shock without fracturing.

Malleability – the ability to deform under compression without cracking, splitting or tearing.

Ductility – the ability to be stretched out or drawn into a thin strand without snapping.

Elasticity – the ability to return to its original shape after being compressed or stretched.

Exam Tips

- Students should have an overview of the main categories and types of natural and manufactured timbers: hardwoods including: • ash • beech • mahogany • oak • balsa softwoods including: • larch • pine • spruce

Key Facts to Memorise

Hardwood: Less porous and denser cell structure; harder wearing, less likely to rot

- Balsa is an exception to the rule
- Slower growing than softwoods

Name		Characteristics	Example Uses
Ash		Flexible, tough and shock resistant, laminates well	Sports equipment and tool handles
Beech		Fine finish, tough and durable	Children's toys and models, furniture and veneers
Mahogany		Easily worked, durable and finishes well	High end furniture and joinery, veneers
Oak		Tough, hard and durable, high quality finish possible	Flooring, furniture, railway sleepers and veneers
Balsa		Very soft and spongy, very lightweight but can snap in small sections	Prototyping and modelling –

Softwood: Porous cell structure

- If left unprotected it can absorb moisture and rot – cedar is an exception
- Relatively cheap and readily available
- Sustainable because it grows faster

Name	Characteristics	Example Uses
Larch	Durable, tough, good water resistance, and surface finish, machines well. Loose knots	Exterior cladding, flooring, machined mouldings, furniture & joinery
Pine	Lightweight, easy to work, can split and be resinous near knots	Interior building (and exterior if treated), cheaper furniture, decking
Spruce	Easy to work, high stiffness to weight ratio. Variable results when staining	High end furniture and joinery, veneers

Exam Questions

1. Justify which softwood you would select to construct a garden shed.

Stretch

A. A sustainably managed forest contains 1000 trees.
(a) If these were soft wood trees felled at 25 years of age and 1/25 of the trees are harvested each year to ensure consistent supply, how many trees are felled?
(b) If the same forest was planted with hardwood trees that mature at 40 years of age and 1/40 were felled annually, how many trees would be felled each year?

Further links

www.technologystudent.com/designpro/natwd1.htm

www.technologystudent.com/pdf14/poster_woods2.pdf

TEXTILES SP - TOPIC 7.3

Core principles:
Manufactured boards

Introduction

Manufactured boards are usually sheets of processed natural timber waste products or veneers combined with adhesives.

Key words

Physical Properties

Absorbency – how well a material may attract an element, usually a liquid such as water or moisture, but could include light or heat.

Density – the mass of material per unit of volume; how compact a material is.

Electrical conductivity – the ability to conduct electricity.

Thermal conductivity – the ability of a material to conduct heat.

Working Properties

Strength – the ability of a material to withstand a force such as pressure, tension or shear.

Hardness – the ability to resist abrasive wear and indentation through impact. Very hard materials can become brittle and can crack, snap or shatter.

Toughness – the ability to absorb energy through shock without fracturing.

Malleability – the ability to deform under compression without cracking, splitting or tearing.

Ductility – the ability to be stretched out or drawn into a thin strand without snapping.

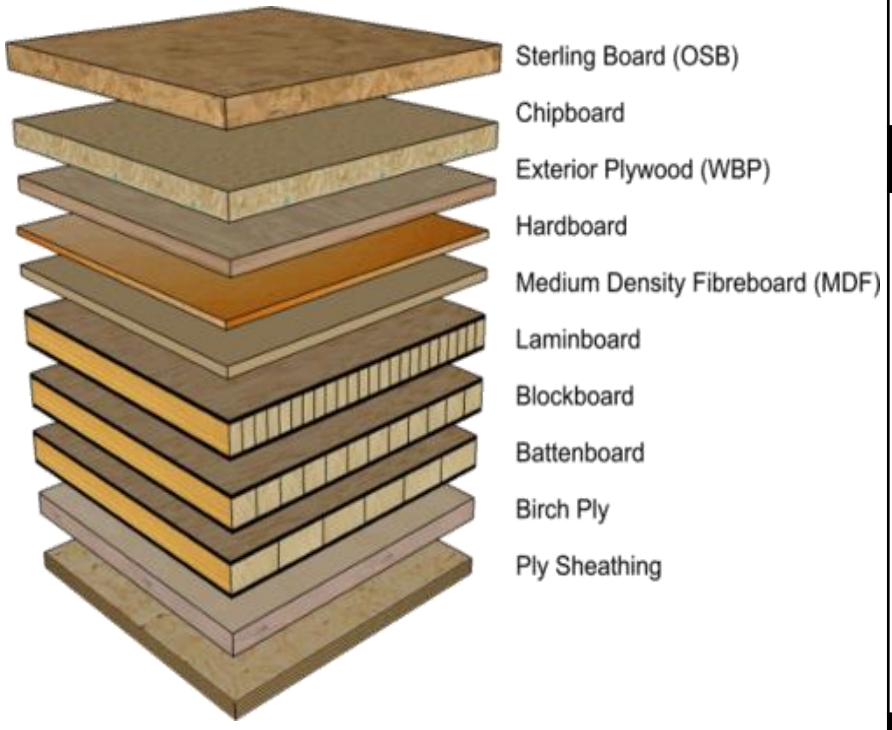
Elasticity – the ability to return to its original shape after being compressed or stretched.

Exam Tips

- Students should have an overview of the main categories and types of manufactured boards

Key Facts to Memorise

- They are made from waste wood, low grade and recycled timber.
- They can be covered with thin slices of high quality wood to give the appearance of solid wood. This is called a **veneer**.



MDF

Plywood

Chipboard

Exam Questions

1. Justify which manufactured board you would select to construct a shelf unit in a shower room.
2. Sate two ways in which softwoods or manufactured boards can be made to appear as more expensive hardwoods.

Stretch

A. Explain 3 reasons why MDF is a suitable material for making the top of a school table.

Further links

www.technologystudent.com/joints/manmade1.html

TEXTILES SP – TOPIC 7.4

Core principles:
Metals and alloys

Introduction

Metals generally have a high strength to weight ratio and are an essential construction material. Metals are categorised as either **ferrous** or **non-ferrous**. A third group, known as **alloys**, is created when 2 or more elements are blended together, where at least one is a pure metal.

Key words

Physical Properties

Absorbency – how well a material may attract an element, usually a liquid such as water or moisture, but could include light or heat.

Density – the mass of material per unit of volume; how compact a material is.

Electrical conductivity – the ability to conduct electricity.

Thermal conductivity – the ability of a material to conduct heat.

Working Properties

Strength – the ability of a material to withstand a force such as pressure, tension or shear.

Hardness – the ability to resist abrasive wear and indentation through impact. Very hard materials can become brittle and can crack, snap or shatter.

Toughness – the ability to absorb energy through shock without fracturing.

Malleability – the ability to deform under compression without cracking, splitting or tearing.

Ductility – the ability to be stretched out or drawn into a thin strand without snapping.

Elasticity – the ability to return to its original shape after being compressed or stretched.

Exam Tips

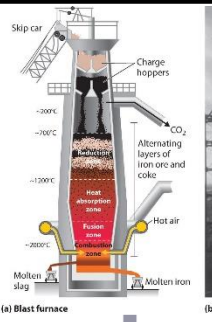
- Students should have an overview of the main categories and types of metals and alloys: ferrous metals including: • low carbon steel • cast Iron • high carbon/tool steel non ferrous metals including: • aluminum • copper • tin • zinc alloys including: • brass • stainless steel • high speed steel.

Key Facts to Memorise

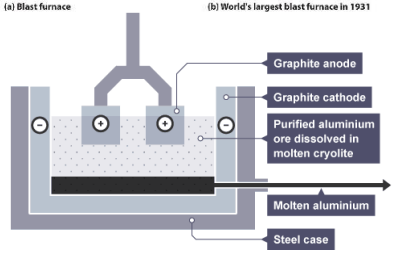
Some pure metals are mined as a whole metal but many are extracted from an **ore**. Ore is a type of rock that contains a pure metal in small quantities. The ore is obtained through mining.

Furnace: The extreme heat of the furnace separates the metal from the ore and it is drawn off as a molten liquid.

Electrolysis: Aluminium ore in the form of bauxite is crushed and the aluminium extracted by electrolysis.




(b) World's largest blast furnace in 1931



Ferrous metals

- All contain iron
- Most are magntic and will rust if exposed to moisture without a protective finish.
- **Carbon** is a common additive used to increase the hardness of iron.

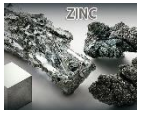


Alloys
A mixture of at least 1 pure metal and another element.

Non-ferrous metals

- Are generally non-magnetic and do not contain iron.
- Do not rust but can **oxidise**.



Exam Questions

1. Explain the major difference between an alloy and a pure metal.
2. What factors make metal an expensive material to obtain?
3. What is the chemical symbol for iron?

Stretch

A. Why is mild steel such a popular material for the construction of buildings and materials?

B. Explain why rust can be ab issue for structural products made from low carbon steel.

Further links

www.bbc.co.uk/schools/gcsebitesize/design/resistantmaterials/materialsmaterialsrev2.shtml

TRS SP TOPIC NUMBER: 7.5

Core principles: Polymers

Introduction

Plastics are mainly synthetic materials made from **polymers** which are traditionally developed from finite petrochemicals such as oil, gas and coal. They are increasingly produced from sustainable sources such as vegetable starches. There are also some naturally occurring plastics such as amber and rubber.

Key words

Physical Properties

Absorbency – how well a material may attract an element, usually a liquid such as water or moisture, but could include light or heat.
Density – the mass of material per unit of volume; how compact a material is.
Electrical conductivity – the ability to conduct electricity.
Thermal conductivity – the ability of a material to conduct heat.

Working Properties

Strength – the ability of a material to withstand a force such as pressure, tension or shear.
Hardness – the ability to resist abrasive wear and indentation through impact. Very hard materials can become brittle and can crack, snap or shatter.
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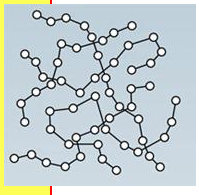
Ductility – the ability to be stretched out or drawn into a thin strand without snapping.
Elasticity – the ability to return to its original shape after being compressed or stretched.

Exam Tips

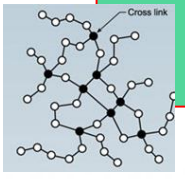
- Know the primary sources of materials for producing polymers
- Be able to recognise and characterise different types of polymers
- Understand the physical and working properties for a range of thermoforming and thermosetting polymers

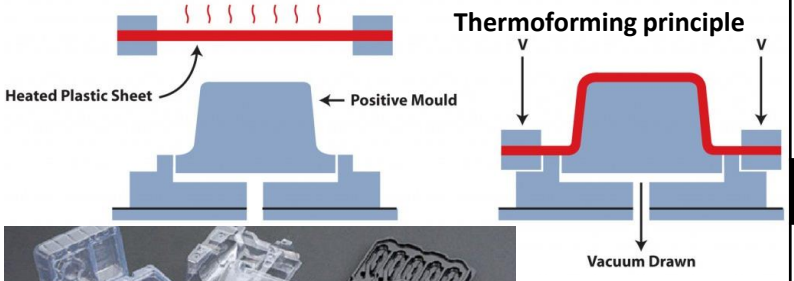
Key Facts to Memorise

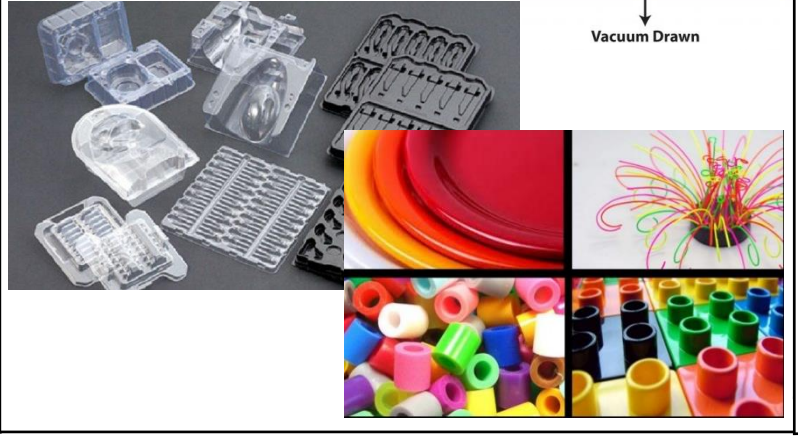
Thermoforming Plastics
More flexible, especially when heated.
Polymer chains are loosely entangled with very few cross links.
This allows the chains to slide past each other when heated.



Thermosetting Plastics
More rigid.
Once formed they cannot be reformed.
Long polymer chains have more cross links which stops the molecular chains moving







Exam Questions

1. What molecular property allows thermoplastics to have more flexibility when heated?
2. What are the basic common properties that nearly all plastics possess?

Stretch

A. Justify which category of plastic would be best suited to making drinking straws.

Further links

www.bbc.co.uk/schools/gcsebitesize/science/edexcel/fuels/hydrocarbonsrev4.shtml

www.technologystudent.com/pdf14/poster_plastics1.pdf

www.technologystudent.com/joints/oiltoplas1.html

www.differencebtw.com/difference-between-thermoplastics-and-thermosetting-plastics/

TEXTILES SP - TOPIC 7.6

Core principles:
Textiles

Introduction

Textiles are highly adaptable and can be constructed to maximise different properties including a very high strength to weight ratio, which means less material can be used to make strong and robust products. Textiles are available in any different forms including rolls, yarns and fibres. They can be made into a multitude of shapes and products using different processing methods.

Key words

Physical Properties

Absorbency – how well a material may attract an element, usually a liquid such as water or moisture, but could include light or heat.

Density – the mass of material per unit of volume; how compact a material is.

Electrical conductivity – the ability to conduct electricity.

Thermal conductivity – the ability of a material to conduct heat.

Working Properties

Strength – the ability of a material to withstand a force such as pressure, tension or shear.

Hardness – the ability to resist abrasive wear and indentation through impact. Very hard materials can become brittle and can crack, snap or shatter.

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Malleability – the ability to deform under compression without cracking, splitting or tearing.

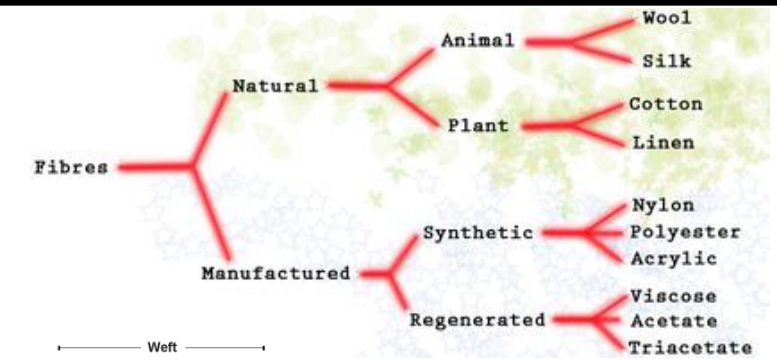
Ductility – the ability to be stretched out or drawn into a thin strand without snapping.

Elasticity – the ability to return to its original shape after being compressed or stretched.

Exam Tips

- Know the primary sources of materials for producing textiles
- Be able to recognise and characterise different types of textile
- Understand how the physical and working properties of a range of textiles affect their performance.

Key Facts to Memorise



WEAVING

Woven fabrics are made from weaving two yarns together, using a loom. The yarn that is used from the top to the bottom of the loom is the warp thread. The yarn that goes under and over the warp yarn is known as the weft thread. Where the weft thread turns around at the edge of a fabric it is known as the selvedge.

KNITTING

Knitting is forming loops on a set of needles and pulling a thread though the loops.

BONDING

Fibres are bonded together by heating, gluing or stitching the fibres together. A bonded fabric has no weft or warp threads and no right or wrong side. They are usually inexpensive fabrics that do not fray, such as felt.

Exam Questions

1. Name as many specific types of wool as possible and link them to the animal that produces the fibres that the wool is made from.
2. What properties of silk make it suitable for luxury items of clothing?
3. What might happen to woollen felted products if they are washed in hot water?

Stretch

A. Why are most synthetic fibres so water resistant and quick drying?

B. Explain how a ladder is formed in a knitted garment.

Further links

www.bbc.co.uk/schools/gcsebitesize/design/textiles/

TEXTILES SP – TOPIC 8

Specialist technical principles:
Sources and origins

Introduction

Textiles can be made from natural or synthetic fibres and can also be combined to make modern textiles that perform more usefully.

Key words

Animal skins – leather suede and fur. The skins and hides are tanned and then be dyed before use.

Chemical sources - nylon, polyester, acrylic, lycra, Kevlar, Nomex

Vegetable sources – cotton, flax (linen), jute, hemp, bamboo, coir

Fibre – Filament and staple

Yarn

Spinning

Further links

www.bbc.co.uk/schools/gcsebitesize/design/textiles/

Exam Tips

- Understand the processes in obtaining raw material from animal, chemical and vegetable sources.
- Be aware of sustainability issues in textile production, in use and end of life.

Key Facts to Memorise

Raw materials
The raw materials needed to produce textiles come from a variety of sources including, animal, chemical and plant sources. Plant and animal fibres need to be spun into a yarn, animal skins are made into leather goods and some synthetic fibres are produced as flat non-woven sheets.

Fibres and yarns
Animal fur and fleece as well as synthetic threads and plant fibres can all be transformed into yarn through spinning and twisting. Spinning also adds strength to a yarn.
There are 2 types of fibre; long ones called **filament** fibres and short ones called **staple** fibres. Filament fibres tend to make smoother yarn than staple fibres which can feel fluffy or hairy.

Sustainability
Almost all textiles are recyclable or biodegradable. Some are reused in crafting activities such as applique and patchwork or simply altered, reshaped or repaired.
Many people give unwanted items to charity shops or they can be sold in vintage shops or online.
When items are no longer fit for purpose they can be physically recycled. They can be turned into cleaning cloths and rags used in industry or they are processed into fibres and turned in to various products such as insulation, yarn and paper.

Exam Questions

1. Explain the process of obtaining cotton fibres from the cotton plant prior to the spinning process.
2. Explain the process of obtaining silk fibres from the silkworm cocoon prior to the spinning process.

Stretch

A. Why is twisting used as the main method to create yarn?
B. Why do filament fibres create a smoother yarn?
C. Why is donating usable clothes to charity shops more environmentally friendly than sending them for recycling into recycled yarn?

TEXTILES SP - TOPIC 9

Specialist technical principles:

Using and working with materials

Introduction

Both technology push in the form of new materials and 'market pull' with demand for greater performance of fabrics, have contributed to a huge and expanding industry.

Key words

Wicking fabrics – benefit athletes and outdoor adventurers by allowing perspiration to evaporate quickly.

Microencapsualtion

Industrial looms

Further links

www.youtube.com/watch?v=TyhDkd8Iabs

Exam Tips

- Know and understand how textiles based materials are selected and processed for commercial products.
- Understand why aids are used to judge quality and accuracy before and during processing

Key Facts to Memorise

Industrial looms

Exam Questions

1. Which methods of production are industrial looms best for? Justify your answer.

Stretch

A. How have developments in commercial textiles helped to improve comfort and safety in motorsport apparel?

B. Why is it so important for an interior designer to be aware of both the aesthetic and functional properties of fabrics and furnishings?

C. Why do you think pressure and heat are used in some dyeing processes?

TEXTILES SP – TOPIC 10

Specialist technical principles:

Stock forms, types and sizes

Introduction

Most textiles come in a range of standard sizes. Standard practice is to use length x width for fabrics. Some fabrics are available in range of weights from light through to heavy.

Key words

Drape - the way a fabric hangs

Fabric

Yarn

Hank

Ball

Reel

Buttons

Velcro

Hook and eye

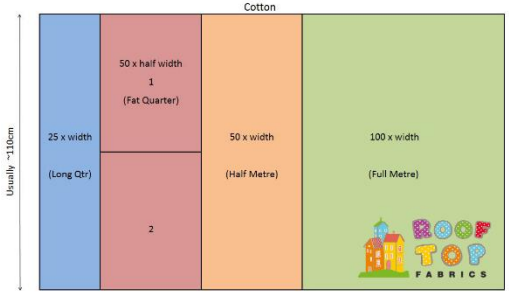
Buckle

Eyelet

Press stud

Zip

Toggle



Exam Tips

- Understand how textiles and components are available in standard forms and sizes.

Key Facts to Memorise

Fabrics are mostly available by the roll and are cut to length as needed. They come in different widths and are usually bought by the linear metre.

Yarn is available in hanks, balls and reels and is generally sold by weight. Reels tend to be used for machine production and hanks and balls are better for handmade constructions. A standard ball of yarn weighs around 100g.

Exam Questions

1. What factors make reels of yarn the most appropriate for manufacturing by machine?
2. Give 2 advantages of using a zip for a trouser fastening compared to buttons.

Stretch

A. Velcro is a popular types of fastener on children's clothing. Give three reasons why Velcro is a suitable fastening on a school coat for a child.

Further links

www.pearsonschoolsandfecolleges.co.uk/secondary/DesignAndTechnology/14-16/EdexcelGCSEDesignandTechnology91/Samples/SampleStudentBookMaterial/DT_Component1_6_fibres_marketing.pdf

TEXTILES SP – TOPIC 11a

Specialist technical principles:

Specialist techniques and processes

Introduction

The colour, texture, shape, drape and feel of a product will depend on what processing technique has taken place.

Key words

Laminated fabrics – goretex, PVC, faux leather

Shears

Rotary cutter – Cuts accurate lines and curves on multiple layers of fabric

Band saw – Can cut multiple layers of cloth in one pass. Used in commercial settings.

Embroidery scissors

Thread snips – Multi-purpose mini shears for trimming threads or ripping seams

Seam ripper

Pinking shears

Electric rotary cutter

Batik - Method of resist dyeing

Tjanting tool – Used to apply molten wax to fabric

Further links

www.textileschool.com/464/fabric-cutting-techniques/

Exam Tips

Be aware of school and commercial based cutting, forming and processing techniques.

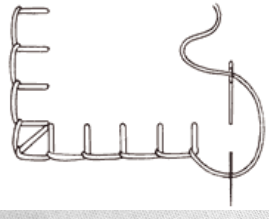
Key Facts to Memorise

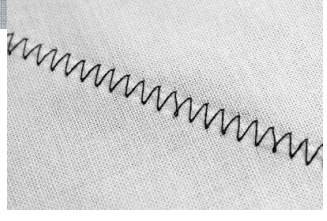
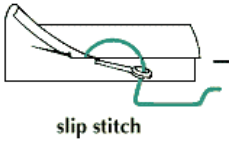


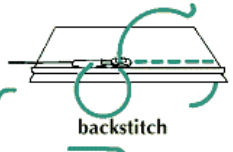


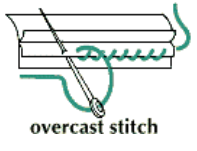


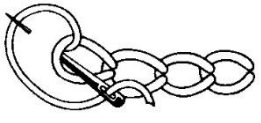










Maths/science link

Scaling of drawings, working to datums.
Material quantities required
Extracting information on tolerances and using it to control quality and make a prototype.

Exam Questions

- How do pinking shears reduce the chance of a material from fraying?
- State two additional health and safety concerns when using electric cutting tools over manual ones.
- What factors make batik dyeing techniques a labour intensive process?

Stretch

A. Explain which stitch would be best to use on Lycra.
B. Give one reason for using a blanket stitch

TEXTILES SP - TOPIC 11b

Specialist technical principles:

Specialist techniques and processes

Introduction

The colour, texture, shape, drape and feel of a product will depend on what processing technique has taken place.

Key words

Pleating – A method of folding fabric. They can be ironed or heat pressed to create a permanent crease.

Gathering – a technique used to shorten a piece of fabric which gives the impression of fullness through ruffling or bunching.

Quilting – a traditional technique that has differing methods of construction around the world.

Piping – A decorative trim mainly used as an embellishment, but it can also protect a product making the edge tougher and less prone to wear.

Further links

www.textileschool.com/464/fabric-cutting-techniques/

www.instructables.com/id/how-to-gather-fabric/

Exam Tips

Be aware of school and commercial based cutting, forming and processing techniques.

Key Facts to Memorise

= KNIFE PLEATS

= BOX PLEATS

= INVERTED PLEAT

Maths/science link

Scaling of drawings, working to datums.
Material quantities required
Extracting information on tolerances and using it to control quality and make a prototype.

Exam Questions

- Why is gathering such a popular technique to make curtains?

Stretch

A. A traditional Scottish kilt for the average man uses about 8m of material. What factors do you think justify this amount of fabric being used?

B. Why is quilting an ideal technique to use scrap and recycled materials?

TEXTILES SP - TOPIC 12

Specialist technical principles:
Surface treatments and finishes

Introduction

Many modern textiles are given a surface finish so that they perform more efficiently. The reasons for applying a finish fall into two main areas; aesthetics and functionality. Textiles finishes are either applied mechanically or chemically.

Key words

Aesthetics:

- Make the surface very smooth to improve sheen and lustre
- Receive embossed patterns
- Make the surface fluffy

Functionality:

- Resistance to water
- Resistance to staining
- Flame retardancy
- Ability to retain heat more efficiently
- Adding smart finishes such as insect repellent and anti-bacterial properties

Volatile organic compounds

Further links

www.bbc.co.uk/schools/gcsebitesize/design/textiles/productiontechniquesrev5.shtml

Exam Tips

- Understand how surface treatments and finishes affect the functional and aesthetic qualities of textile products

Key Facts to Memorise

Name	Image	Characteristics	Name	Image	Characteristics
Flame retardancy		Flame retardant chemicals are applied to the fabric to reduce its ability to burn	Heat transfer printing		Inkjet printed design on special transfer paper is heat pressed onto fabric surface
Stain protection		Fabric is coated with an invisible stain resisting substance that prevents absorption into the fibres	Distressing Various physical and chemical techniques available		Including: bleaching, stonewashing, spray painting, cutting, slashing, scraping, filing and patching
Water proofing		Fabric is coated with a waterproofing substance that forms a seal	Calendering		Fabric is fed through rollers to smooth the cloth and/or permanently emboss designs
Crease resistance		A resinous liquid is applied to the fabric which makes it quick drying and easy to iron	Brushing		Fabric is passed through rough rollers that lift fibres to form a **nap** making it soft and more insulative

Maths/science links

Surface treatments to inhibit corrosion and oxidation.

Exam Questions

Stretch

A. Explain **two** suitable forms of fabric protection that could be used on the fabric used to make a soft toy for a baby.

TEXTILES SP - TOPIC 13

Specialist technical principles:

Sources and origins

Introduction

Textiles can be made from natural or synthetic fibres and can also be combined to make modern textiles that perform more usefully.

Key words

Animal skins – leather suede and fur. The skins and hides are tanned and then be dyed before use.

Chemical sources - nylon, polyester, acrylic, lycra, Kevlar, Nomex

Vegetable sources – cotton, flax (linen), jute, hemp, bamboo, coir

Fibre – Filament and staple

Yarn

Spinnir

Key Facts to Memorise

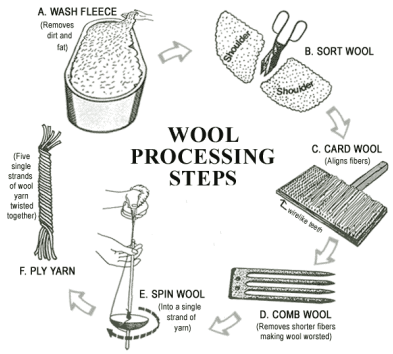
Animal fibres: Wools and silk

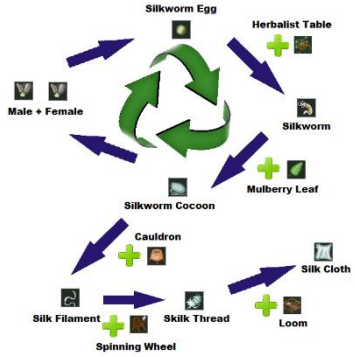


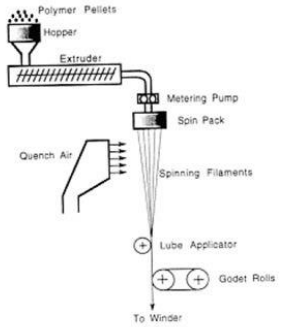


Plant fibres: Cotton and linen


Chemical sources:
Polyester, polyamide, elastane, polypropelyne, acrylic, PVC, kevlar







Sustainability
Almost all textiles are recyclable or biodegradable. Some are reused in crafting activities such as applique and patchwork or simply altered, reshaped or repaired.
Many people give unwanted items to charity shops or they can be sold in vintage shops or online. When items are no longer fit for purpose they can be physically recycled. They can be turned into cleaning cloths and rags used in industry or they are processed into fibres and turned in to various products such as insulation, yarn and paper.

TEXTILES SP - TOPIC 14

Specialist technical principles:

Deforming and reforming

Introduction

The colour, texture, shape, drape and feel of a product will depend on what processing technique has taken place.

Key words

Draping over a tailor's dummy

Draping to shape felt

Seams

Pleating – A method of folding fabric. They can be ironed or heat pressed to create a permanent crease.

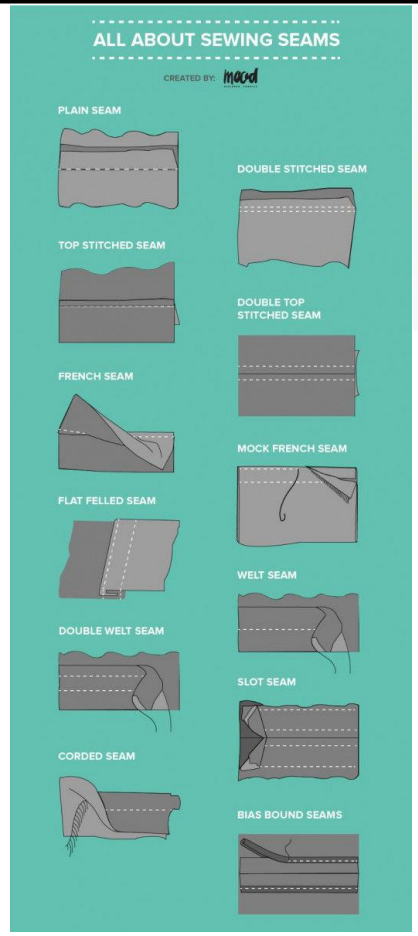
Gathering – a technique used to shorten a piece of fabric which gives the impression of fullness through ruffling or bunching.

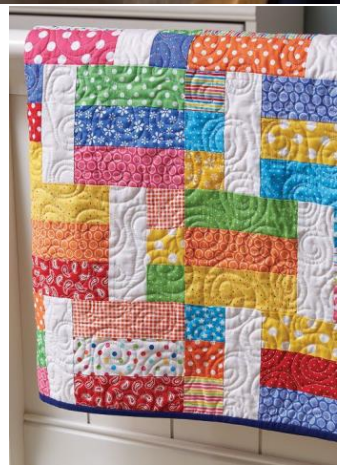
Quilting – a traditional technique that has differing methods of construction around the world.

Hems –used to give a neat edge to a fabric and prevent fraying

Darts – used to fit fabric closer to the body in triangular folds

Key Facts to Memorise





TEXTILES SP – TOPIC 15

Specialist technical principles:

Sustainability

Sustainable design is the intention to reduce or completely eliminate negative **environmental** impacts through thoughtful designs.

But also social (people) and cultural issues.

Designers need to take responsibility for their designs and be more than just aware of the need to protect our environment and raw materials from being used up.
The Six Rs of sustainability help designers think about designs and designing in the following way:
RETHINK - our current lifestyles and the way we design and make.
REFUSE - to buy materials and products that are unsustainable.
REDUCE - the amount of energy and materials used to manufacture a product.
REUSE - the product for something else so you don't need to throw it away.
REPAIR - the product so you don't need to throw it away.
RECYCLE - finally take the product apart and categorise the parts ready for being converted into another product. This uses a lot of energy.

TEXTILES SP - TOPIC 16a

Designing and making principles:

The work of others

Introduction

Before and during the creative process of producing designs for a product, it is a good idea to see what has already been produced by others. This can inspire new ideas and offer new starting points and also give you a better understanding of the materials and processes used in any given specialist area.

Further links

https://designmuseum.org/designers

Exam Tips

- Know how to investigate, analyse and evaluate the work of others

Key words

Graphic design:
Harry Beck 1902-1974

Textile Design:
Coco Chanel 1883-1971
Alexander McQueen – 1969-2010
William Morris – 1834-1896
Mary Quant – 1934-
Vivienne Westwood - 1941

Product Design:
Gerrit Rietveld – 1888-1964
Raymond Templier – 1891-1968

Architecture:
Marcel Breuer – 1902-1981
Norman Foster – 1935-
Charles Rennie Mackintosh – 1868-1928
Aldo Rossi – 1931-1997

Industrial design:
Sir Alec Issigonis – 1906-1988
Ettore Sottsass – 1917-2007
Louis C Tiffany – 1848-1933

Exam Questions

1. Alexander McQueen thought that fashion should be a form of escapism and not a form of imprisonment. What do you think he meant by this?

Stretch

A. William Morris believed products should have an emphasis on simple, yet skilled, craftsmanship. Explain how this view went against the flow of modern manufacturing at the time.
B. The mini-skirt is a garment worn and loved by many but also known to offend certain members of society. Although normalised in modern western society, discuss how it must have been shocking and revolutionary during the 1960s.

Designer	Known for	Key information	Example
William Morris (1834–1896)	Hand-crafted products, textile furnishings and wallpapers	Prominent role in the Arts and Craft movement. His designs had simple forms, were hand crafted and well made. His designs often reflected forms from nature and have been used in a range of domestic furnishings, furniture and wallpapers.	
Louis Comfort Tiffany (1848–1933)	Decorative arts designer	Known for artistic work in many materials, such as metals, pottery and stained glass. He produced innovative jewellery and interior decoration in the Art Nouveau style. Inspired by nature and colour. His designs are still popular today.	
Charles Rennie Mackintosh (1868–1928)	Architect, furniture, textile and interior designer	Produced innovative, simple, stylish and functional designs. Influenced by Arts and Crafts, Art Nouveau and Japanese styles as he moved to Modernism. Used geometric and natural materials. He did not design for mass production.	
Coco Chanel (1883–1971)	Fashion designer	Challenged post-war traditional corseted wear and introduced practical designs with clean lines. This included cropped skirts that were more feminine, comfortable, natural, sporty and chic. The brand is still popular and includes fragrances and jewellery.	
Gerrit Rietveld (1888–1964)	Architect and furniture designer	Member of the De Stijl (Dutch) modernist group. Advocated the use of simple shapes, primary colours, geometric shapes and horizontal and vertical lines in both product design and in the design of buildings.	
Raymond Templier (1891–1968)	Jewellery designer	Innovative jewellery designer. Important figure in Art Deco movement. Interested in Cubism and how it translated into jewellery designs, which included semi-circles, triangles, geometric lines, a variety of precious stones and rare metals.	
Marcel Breuer (1902–1981)	Architect and furniture designer	A student and head of carpentry at the Bauhaus (Germany). Experimented with new materials, such as tubular steel in furniture designs (Wassily Chair) and concrete in buildings. Developed the idea of modular construction.	
Harry Beck (1902–1974)	Technical draughtsman	Changed the rules on drawing maps by producing a simplified colour-coded map of the London Underground in the 1930s. He linked the relative locations of stations rather than exact geographical locations to make a schematic diagram that reduced the detail to what was essential to the user.	

Sir Alec Issigonis (1906–1988)	Car designer	Designed the iconic Mini in the 1950s, which had the largest possible interior from such a small footprint as well as a transverse engine, making it very economical. Also designed the Morris Minor, which was the first million-selling British car.	
Ettore Sottsass (1917–2007)	Product designer and architect	Influential designer and part of the Memphis design movement, which he called the 'New International Style'. Challenged the black humourless design of products and introduced colours, textures and patterns to reinvigorate everyday designs, such as the Carlton room divider.	
Aldo Rossi (1931–1997)	Architect and product designer	Influential in the Post-Modern movement. He wanted to design buildings or products that would stand the test of time and he had a desire to produce buildings that tied their form into the way of life for the people using them.	
Mary Quant (1934–present)	Fashion designer	Made famous for her youth-oriented fashions, such as her mini-skirt and hot-pants designs in the 1960s. She wanted to make clothes that were 'fun to wear' and that she would wear herself. Her Chelsea look or 'Mod style' became very popular.	
Norman Foster (1935–present)	Architect	Designed many high profile projects, including Wembley and the Gherkin in London. His designs include a lot of glass and steel with clear structure and coherent forms. His designs are also constructed to be sustainable and environmentally friendly.	
Vivienne Westwood (1941–present)	Fashion designer	Combined traditional elements of British design, such as tartan and Harris Tweed, with historical influences, such as corsets and crinoline, to produce very modern designs. Heavily involved in the 'Punk' style of the 1970s.	
Philippe Starck (1949–present)	Product designer and architect	Wanted to create products that had durability and longevity and were uniquely 'in fashion'. He wanted designers to be honest and objective and his products were influenced by fashion and novelty, were often stylized, streamlined and organic but often over-designed.	
Alexander McQueen (1969–2010)	Fashion designer	Experimental and innovative designer who pushed fashion limits to the extreme. Known for dramatic designs that were often shocking and unconventional. He displayed his theatrical designs with powerful runway shows.	

TEXTILES SP - TOPIC 16b

Designing And Making Principles:
The work of others

Introduction

Before and during the creative process of producing designs for a product, it is a good idea to see what has already been produced by others. This can inspire new ideas and offer new starting points and also give you a better understanding of the materials and processes used in any given specialist area.

Key words

Alessi

Apple

Braun

Dyson

Gap

Primark

Under Armour

Zara

Further links

www.bbc.co.uk/schools/gcsebitesize/design/graphics/designandmarketrev1.shtml

Exam Tips

- Understand how investigating the work of other designers and design companies can inform designing.

Key Facts to Memorise

Designer	Known for	Key information	Example
Alessi (Founded 1921)	Italian design company producing household items	Mass-produced products constructed from stainless steel and bright colours that are fun, functional and visually appealing. Alessi has employed a range of famous designers, including Philippe Stark, Ettore Sottsass and Aldo Rossi.	
Apple (Founded 1976)	American consumer electronics company	Known for cutting-edge technology and software, in sleek and simple products, such as the iPhone and iPad. Key concept was to make computers more intuitive, accessible and user-friendly. Founded by **Steve Jobs**, **Steve Wozniak** and **Ronald Wayne**.	
Braun (Founded 1921)	German electrical consumer appliance company	Works to the principle that 'less is better' to produce functional electrical appliances that are simple, innovative, aesthetic, easy to use, long lasting and environmentally friendly with no unnecessary detail.	
Dyson (Founded 1991)	British electrical consumer appliance company	Founded by James Dyson who was the designer of the first bagless vacuum cleaner. Other Dyson products, such as fans, hair / hand dryers, have subsequently been designed following the same principle of innovation and efficiency.	
Gap (Founded 1969)	American clothing company	Focus on casual, everyday clothing. It was founded on the **principle** of doing **business** responsibly, honestly, ethically and with integrity. Founded by Doris and Don Fisher to make it easier to find a pair of jeans.	
Primark (Founded 1969)	Irish clothing company	Brings current trends in fashion to a wide market with reasonable quality. Popular for customers that want the latest look on a budget. The original store, opened by Arthur Ryan in Dublin, is called Penneys.	
Under Armour (Founded 1996)	American sportswear company	Known for innovative designs such as synthetic fabric with moisture wicking to remove sweat. Launched by former American football captain, Kevin Plank. It now sells a wide range of sport-enhancing clothing and equipment.	
Zara (Founded 1974)	Spanish clothing company	One of the world's most successful retail brands, which has the customer at the heart of their business model. Introduced the idea of 'fast fashion' by reducing lead times and reacting to new trends quickly through new technologies in manufacturing and distribution.	

Exam Questions

1. What does the offer of a long guarantee say to a customer about a product and the company?
2. Why do you think Apple have changed their logo so many times over the years?
3. What factors make it difficult for large multi-national clothing retailers to ensure their supply chain is not using forced or child labour to produce their garments?

Stretch

A. Why do Alessi forge relationships with many famous designers rather than solely using their own in-house design team?

B. Why is the reduction in lead time to market so important in the fashion industry?

Notes page

Notes page

Notes page

Y11 GCSE Exam Dates

Y11 Mock(s): _____

Y11 PPE(s): _____

Final GCSE(s): _____

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Success Programme Sessions:

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Revision Guide (if applicable):

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