



Core Theory

**New & Emerging
Technologies**

Name:



Every 2 weeks you will be set a new theory section to read, write revision cards for, respond to questions and mark / give feedback on a previous section.

This work booklet will be a brilliant revision tool for you and should be kept up to date and in good condition.

Topic	Due Date	Completed	Marked	Score
Industry and Enterprise	Tue 19th Nov			
Sustainability and The Environment	Tue 3rd Dec			
People Culture and Society	Tue 17th Dec			

If the section tasks are not completed for the due date you will stay after school on the due date to complete some of the task and then be asked to complete the full task for the following day or you will be given another after school detention with the Head of Design & Technology, Mrs Douglass.



Task 1: Read the information provided for each topic. Highlight key information. Use the information for each topic to create a set of your own revision cards. You will have covered how to create revision cards which suit your learning style in your PHSE lessons. You can use the space provided in the booklet which can later be cut out or create you own set of cards.

Remember:

- Add all vital information, cut out only unnecessary words e.g. full paragraphs into concise sentences.
- Use key and technical vocabulary
- Highlight or underline key words
- Add sketches and diagrams where necessary
- Use lists, bullet points, tables to make the notes easy to read



Task 2: Use the information, your own additional research and your completed revision cards to answer the exam style questions for each section.

Remember:

- Write in full sentences in order to practise your exam technique.
- Use your revision cards or information as a second option, try to answer the question from memory at first and then add once you have checked your notes.



Task 3: Collect the mark scheme from Mrs McVay on the due date for each section. As part of your next set of homework you need to mark your responses or ask someone at home to mark if for you and give feedback.

Remember:

- Look for the key words from the marks scheme and tick where you see these.
- In the feedback box add any missing information, additional responses or corrections.



Industry and Enterprise

Chapter 1 - Industry and enterprise

Objectives

- Understand how new and emerging technologies have changed the way we live and how they continue to shape the modern world
- Be aware of how computers and automation have impacted upon the design and organisation of the workplace through the use of robotics
- Understand how innovation can drive product development

New and emerging technologies

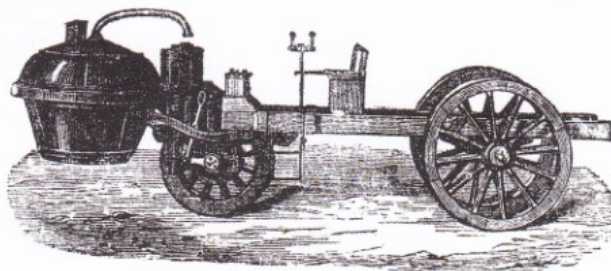
Design technologists have always looked very closely at the world of science in order to utilise new discoveries. They turn these discoveries into new ideas, materials and products that fulfil a human need.

Design and technology is often thought of as the practical application of science; some would say it is the point at which science meets art. The role of a technologist is to embrace change and to turn inspired ideas into reality. This is done by exploring, creating and refining – making lots of mistakes along the way. The ability to take risks and experiment, and then learn from the issues that arise, is an essential quality of a good design technologist.

It is human instinct to strive for a better and easier life. This is the driving force behind new inventions. From early man using simple tools to help hunt and farm, to astronauts exploring space; it is the risk takers, inventors and creators who have helped shape the modern world.

To stay at the cutting edge, designers and manufacturers have to keep up-to-date with the latest inventions and ideas in areas such as materials development, electronics and design.

The industrial revolution, which began around 1760, was assisted by the discovery of how to harness water power to drive machinery. The invention of the steam engine then led to greater automation. Since then, an ever-increasing number of new technologies has helped shape the way we live. Think of the discovery of electricity, and the invention of the light bulb, the telephone, the internal combustion engine, the computer and the Internet.



The first personal computer was built more than 40 years ago in 1975, but it was not until the mid-1990s that a significant number of people had access to one on a regular basis. The last 20 years have seen a massive change in how computers have been integrated into our lives, not least with the introduction of the smartphone. People in the developed world use computers in so many aspects of their daily lives that it is almost impossible to imagine how our society could exist without them.

Industry

Before the industrial revolution, most people lived in the countryside outside cities and towns, working on the land. As **automation** led to larger workshops, mills and factories, more people moved away from the countryside to find work. Towns and cities grew up around areas of manufacturing and flourished. Gradually, a society based on consumerism and enterprise developed. People now had money to buy goods and services and manufacturing boomed. This same society exists today, although there have been a number of changes along the way.

Automation and the use of robotics

Greater demand for products originally created jobs as machines needed manual labourers, machine operators and engineers to keep them running. More recently, with the introduction of intelligent machines and robotic production lines, many of these jobs have been lost. The latest fully automated production lines only require a few highly skilled engineers to ensure that smooth running is maintained.

The way in which designers, architects and engineers work has dramatically altered since the introduction of computers and specialist software.

Although sketching initial ideas and designs is still considered the best way to get thoughts onto a page, the development of those designs almost always involves the use of **computer aided design** (CAD), using specialist software packages. Detailed analysis and manipulation of the designs can be achieved quickly and accurately, saving valuable time and money.



Software can work out very complex tasks such as virtual stress testing, flow dynamics and the manufacturability of a product. This process is known as **computer aided testing** (CAT).

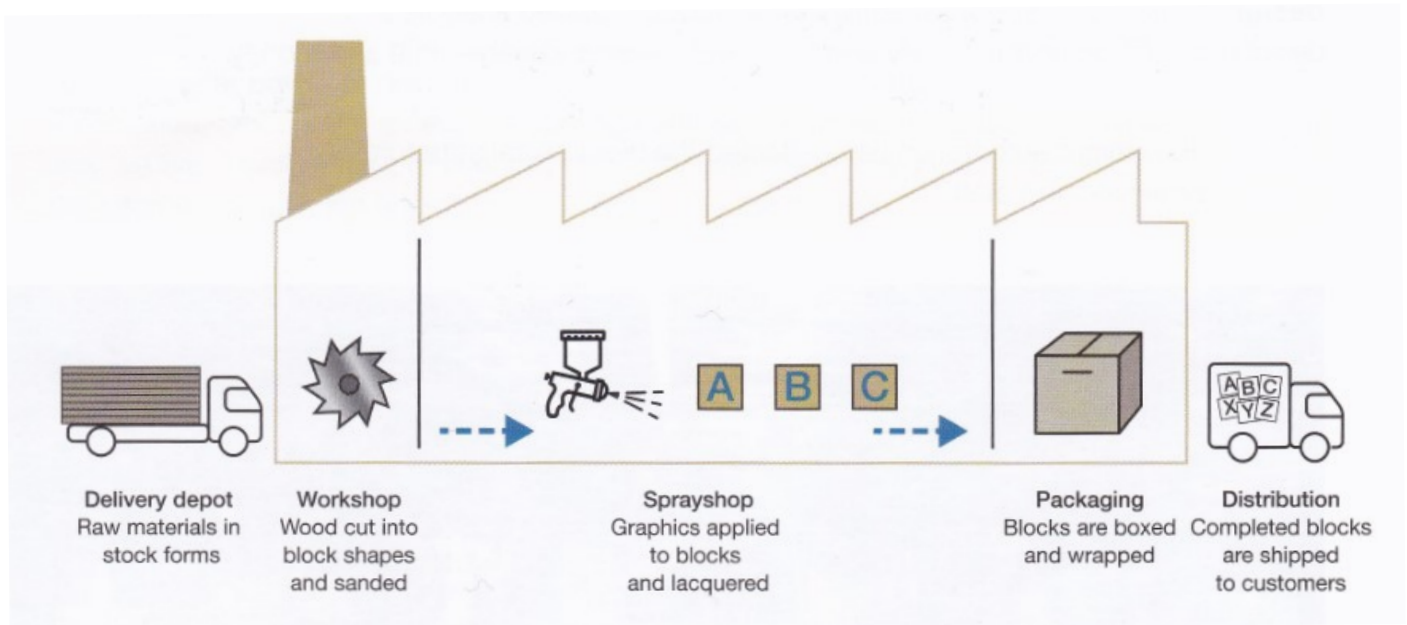
Designers can also use software to render their designs so that they look realistic and three-dimensional, giving them different finishes so they can seek their clients' and customers' opinions before **prototype** production begins.

Buildings and the place of work

The development of the Internet, improvements in communication technology and the speed of data transfer right across the globe have enabled teams of people to collaborate remotely, rather than in a single place of work. Software specifically developed to enable collaborative working can allow teams of designers to work on one project simultaneously, even from different parts of the world, 24 hours a day if necessary. Project designs can then be sent to machines to be prototyped using **computer aided manufacturing** (CAM) techniques. These techniques include **computer numerical control** (CNC) machines such as laser cutters and **rapid prototyping** (RPT) machines such as 3D printers.

A manufacturing company needs to consider the physical layout of its buildings. The workflow should be logically thought through and designed in a way to ensure each of the stages of designing, manufacturing and delivering a product to market are as efficient as possible. This will minimise unproductive time, unnecessary movement and waste materials, thereby making the company as efficient and profitable as possible.

Here is an example of a simplified production line that might produce wooden blocks.



Enterprise

New and emerging technologies are routinely used by creative people to produce innovative ideas. These ideas, nurtured sufficiently, go on to become viable products and businesses.

Enterprise is a word that encompasses many meanings, but in relation to design, it means that an idea is cultivated into a business proposal that has commercial viability as a product.

There are many opportunities for creative people to get their ideas noticed by potential investors; the Internet and the boom in social media sites allow creative people access to very large audiences. These have provided a platform for designers to attract attention more readily than by the traditional methods of sending proposals to existing companies or visiting their bank manager for approval.

There are a growing number of agencies looking for **start-up businesses** to invest in. A start-up company is usually one that has come up with an idea that has the potential to grow into a profit-making business. One of the biggest growth areas is in **app design and development** for smart devices. Computer software has made development of apps more accessible and as a result, more people are able to see their ideas come to life. The most important aspect is the idea itself.

To ensure that original ideas, discoveries and inventions remain the intellectual property of the person who invented them, a **patent** can be applied for. This is a legal process of proving that you are the first person to have registered this idea or invention. In theory, it should stop individuals and other companies using your patented idea or design without applying for permission or paying a fee for the right to use it. You may also see the registered logo next to a brand name which signifies that a trademark or service mark has been registered.



Crowdfunding

Crowdfunding has become a popular way for designers and creative entrepreneurs to raise enough money to enable the manufacture of their products. Crowdfunding is usually an Internet-based way to gain small contributions from many investors who believe the product or idea has a future. www.kickstarter.com is a particularly interesting crowdfunding site for design and technology based ideas.

Case study: TikTok + LunaTik Multi-Touch Watch Kits

On November 17th 2010 Scott Wilson used kickstarter.com to launch his idea of converting old Apple iPod nanos into multi-touch watches. He needed to raise \$15,000 to get production of the concept underway but astonishingly, raised nearly \$1million in one month.

He has gone on to make other innovative products and the business is thriving.

Image: LunaTik Multi-Touch watch



Virtual marketing and retail

Virtual marketing and **virtual retail** includes the use of websites, social media, email and digital marketing to reach a wider audience and potential client base in order to promote a product, service or idea.

Virtual campaigns using social media to spread the word have become a very popular way to launch products. Facebook and YouTube have become huge platforms to promote business and enterprise ideas. Other social media platforms include the professional network LinkedIn where business-minded people can share their ideas and services. Additionally, blogs and vlogs are targeted to appeal to new audiences, and small fortunes are being amassed by enterprising people who have a large online following.



A more subtle form of virtual marketing is **search engine optimisation**. Companies make efforts to boost their website higher up internet search results than their competition. The goal is also to make their website appear on the first page of search results for as many relevant keyword requests as possible. Virtual marketing also includes paid-for advertisements that appear beside search results.

Cooperatives

A **cooperative** is an enterprise that is commonly owned and run by its members who may comprise its workforce or its customers. Cooperatives are formed to enable a group of people with the same business interests to have greater protection and a stronger democratic voice. Cooperatives can be a cost-effective way to sell goods and services and are frequently based around a local community. They are set up to protect the rights of its members and ensure fair and just terms and conditions apply to all members.

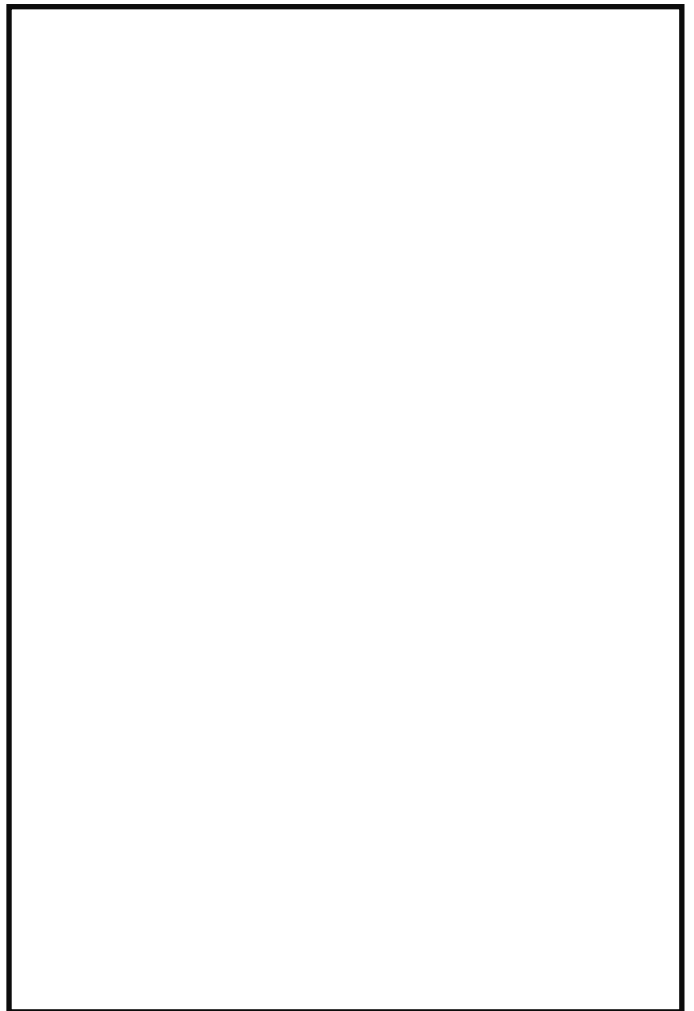
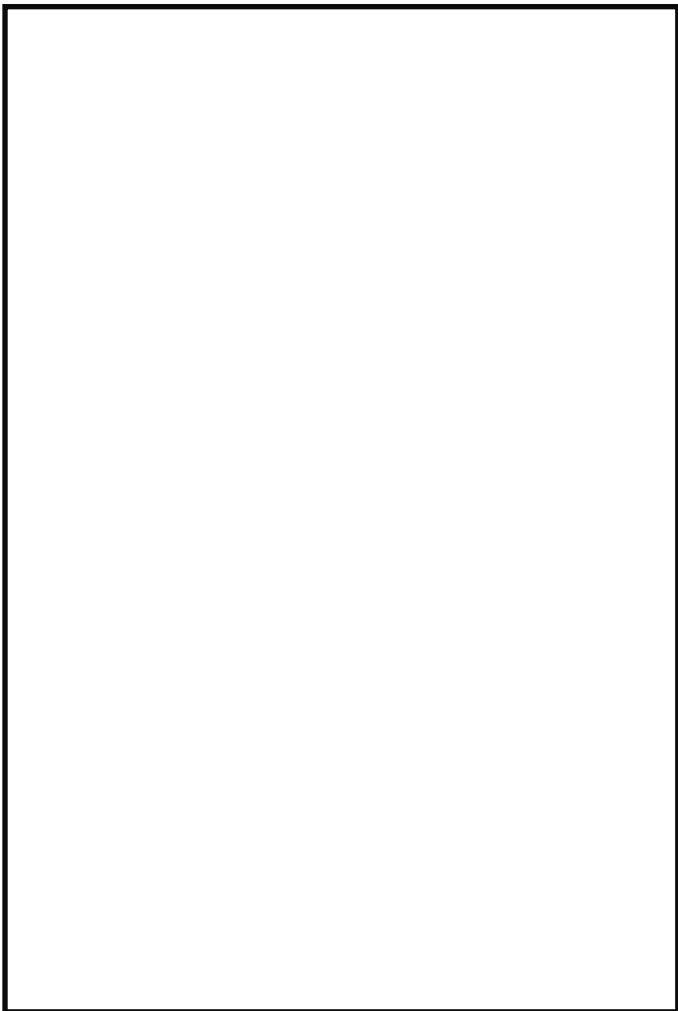
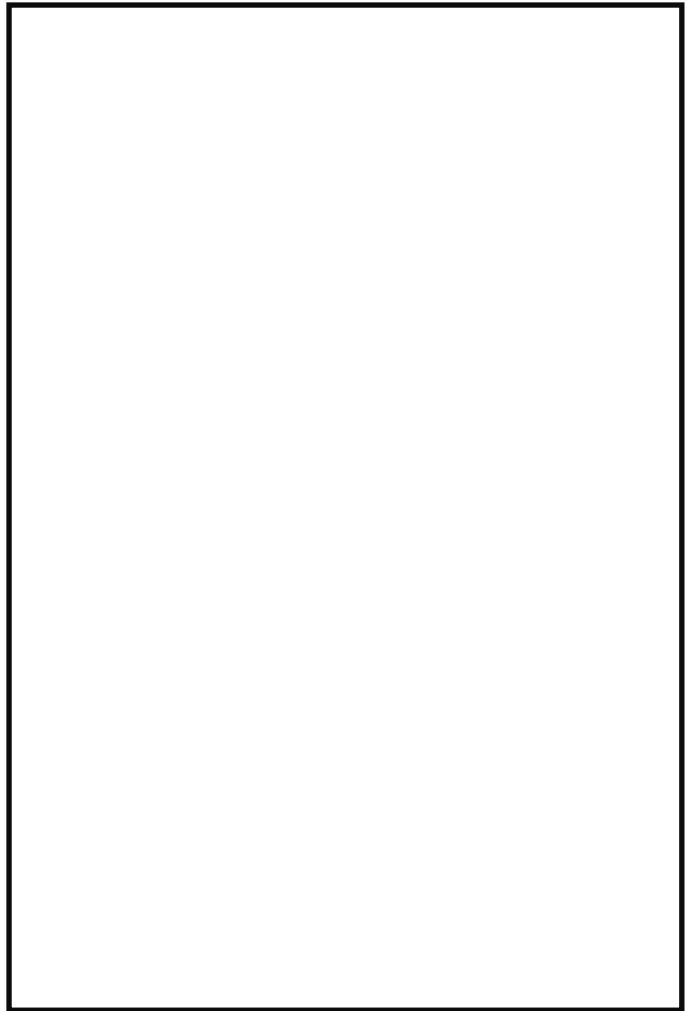
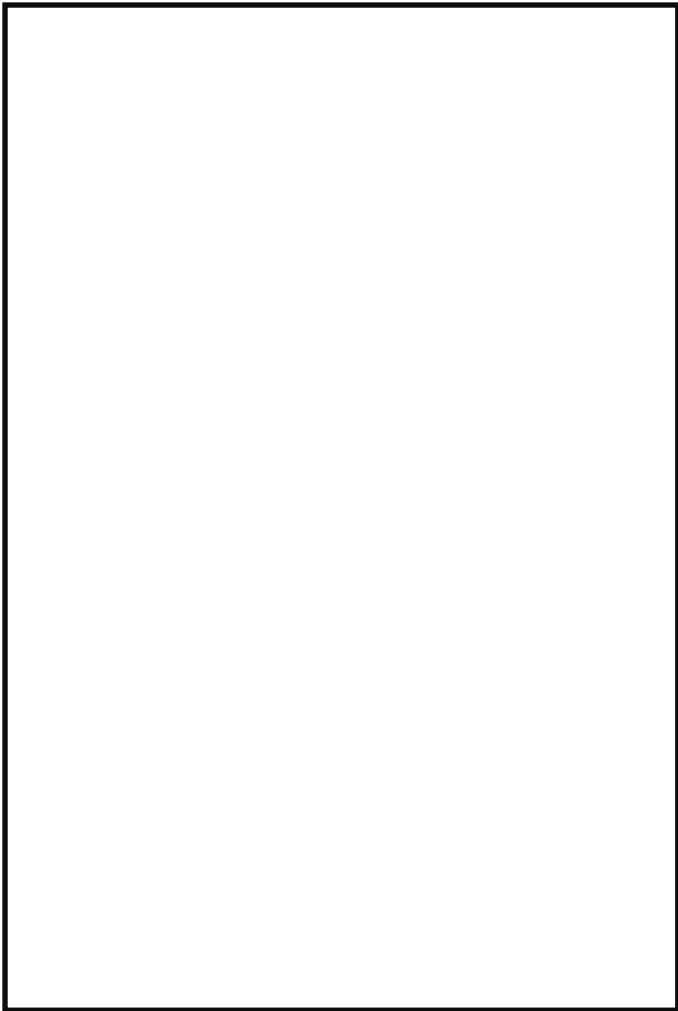
Fairtrade

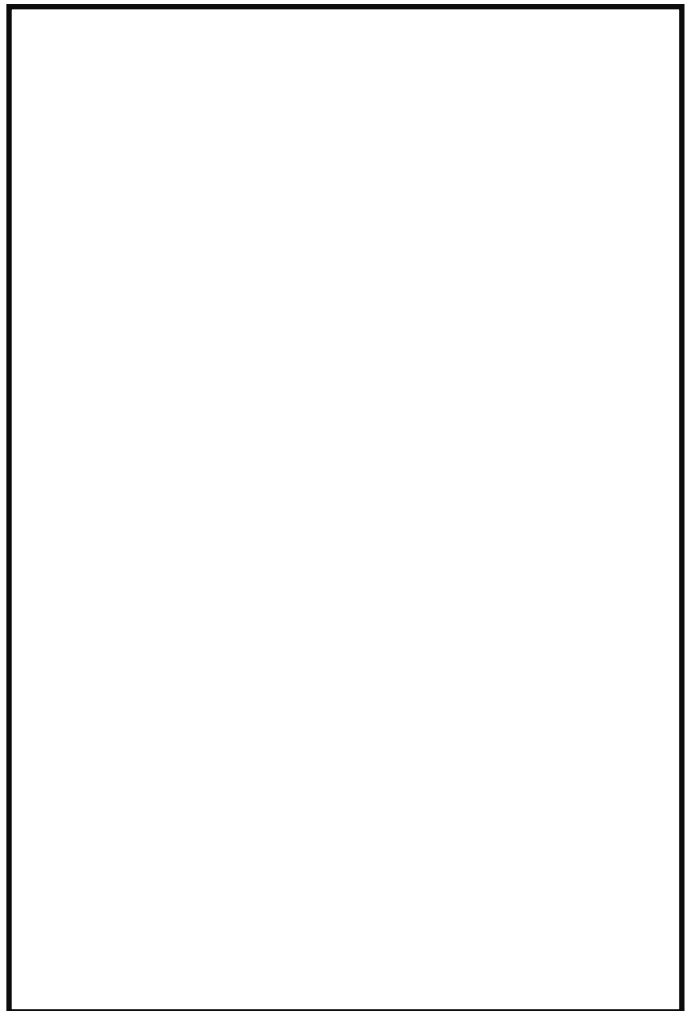
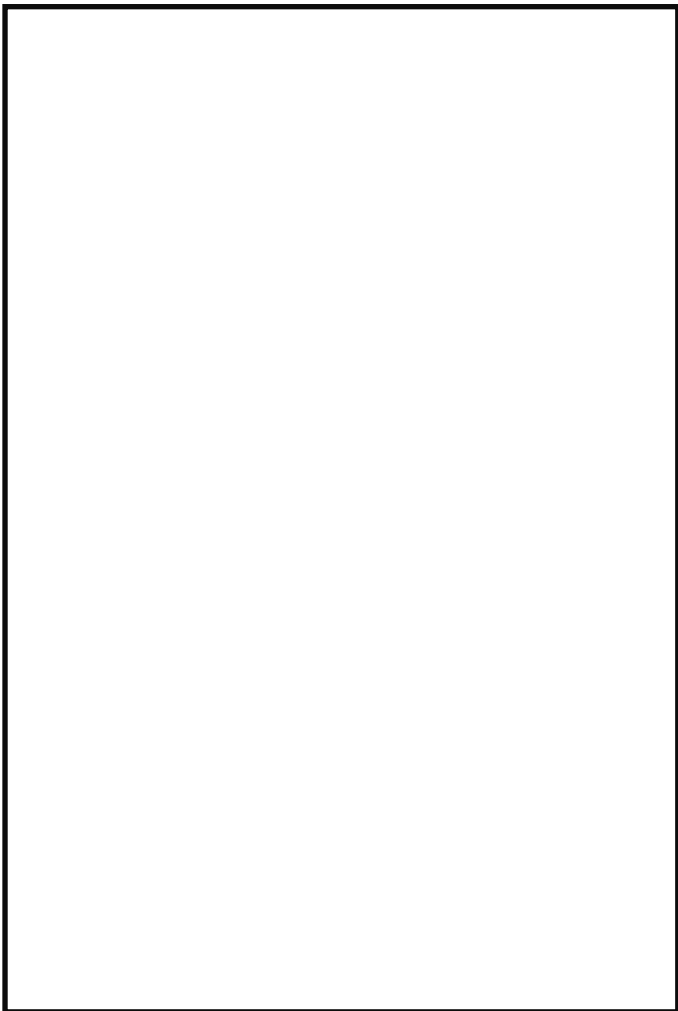
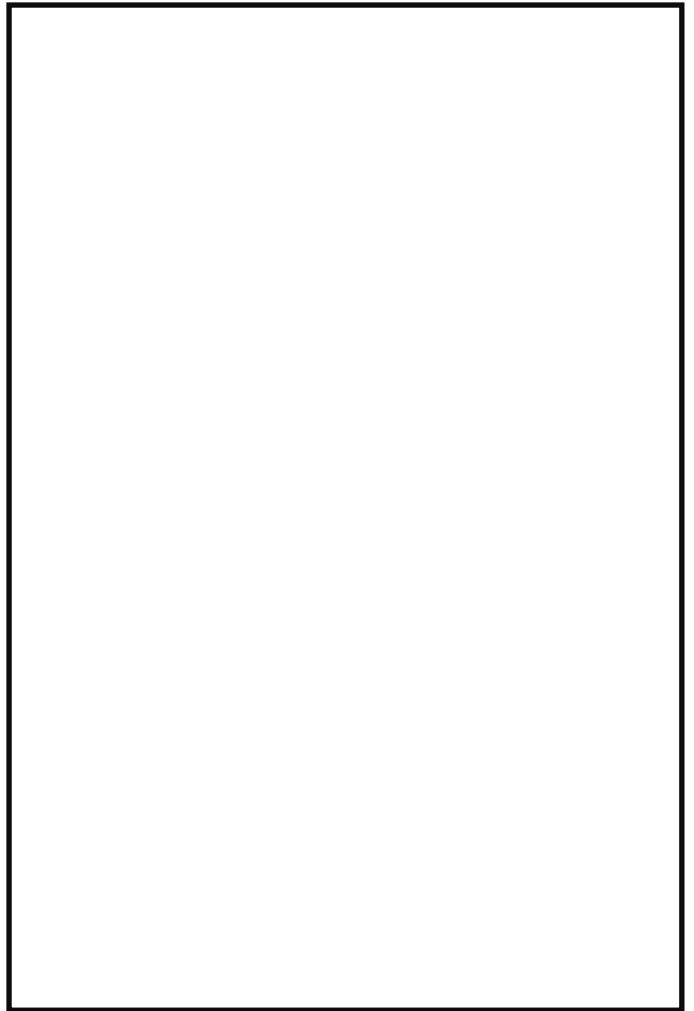
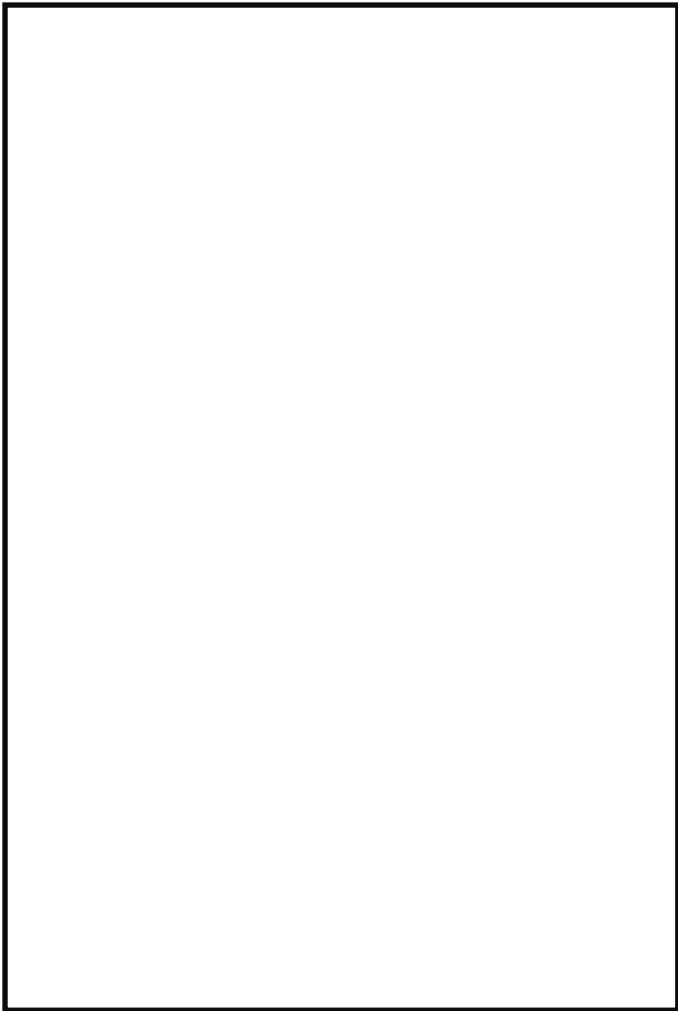
Fairtrade is about better prices, decent working conditions and fair terms of trade for farmers and workers in less economically developed countries.

Fairtrade supports the development of thriving farming and worker communities that have more control over their futures and protecting the environment in which they live and work.

It is an alternative approach that is based on partnership; one between those who grow food and those who consume it. When you buy products with the Fairtrade Mark, it means that the Fairtrade ingredients in the product have been produced by small-scale farmer organisations or plantations that meet Fairtrade social, economic and environmental standards. The standards include protection of workers' rights and the environment, payment of the Fairtrade Minimum Price and an additional Fairtrade Premium to invest in business or community projects. More than 1.65 million farmers and workers in 74 countries benefit from having Fairtrade certification for their products.









Industry and Enterprise: Questions

Q1. Which technologies (name 3) do you feel have significantly changed the way we live our lives? Justify / explain your answers. (3 marks)

Feedback:

Q2. Which technological developments (name 2) in agriculture have led to fewer people being needed to work the land to produce food? (2 marks)

Feedback:

Q3. Despite advancements in CAD, why is it still important to designers to sketch their ideas? (1 mark)

Feedback:

Q4. list 2 positive and 2 negative affects of automated robotic production lines have had on employment. (4 marks)

Feedback:

Q5. Name 2 low cost methods of self promotion and advertising that young designers could use to get their ideas noticed. (2 marks)

Feedback:

Q6. How might staff-owners of a worker cooperative be motivated differently to staff of a non cooperative organisation? (2 marks)

Feedback:

Total marks : / 14

WWW?

EBI?



Sustainability and The Environment

Chapter 2 - Sustainability and the environment

Objectives

- 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

Sustainability

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 essentials and increasingly, many non-essential products as well. The long term sustainability of the planet's resources is very much in the forefront of responsible designers' minds when new and emerging technologies are invented or discovered.

Designers now have a much better understanding of which materials are sustainable and which are not, and the effect that overharvesting and overconsumption has on the planet. Each of the specialist material sections in this book covers the sustainability of specific materials used in that area of technology.

The general principle is that resources fall into two categories:

Finite resources are ones which are in limited supply or that 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 ones which are in abundant supply and are unlikely ever to be exhausted, or ones that can be grown and replaced at the rate that they are being used.

One of the most important factors is the impact that the use of resources has on the planet, both in terms of the environment and its inhabitants. The impact can be measured in many different ways which include the following:

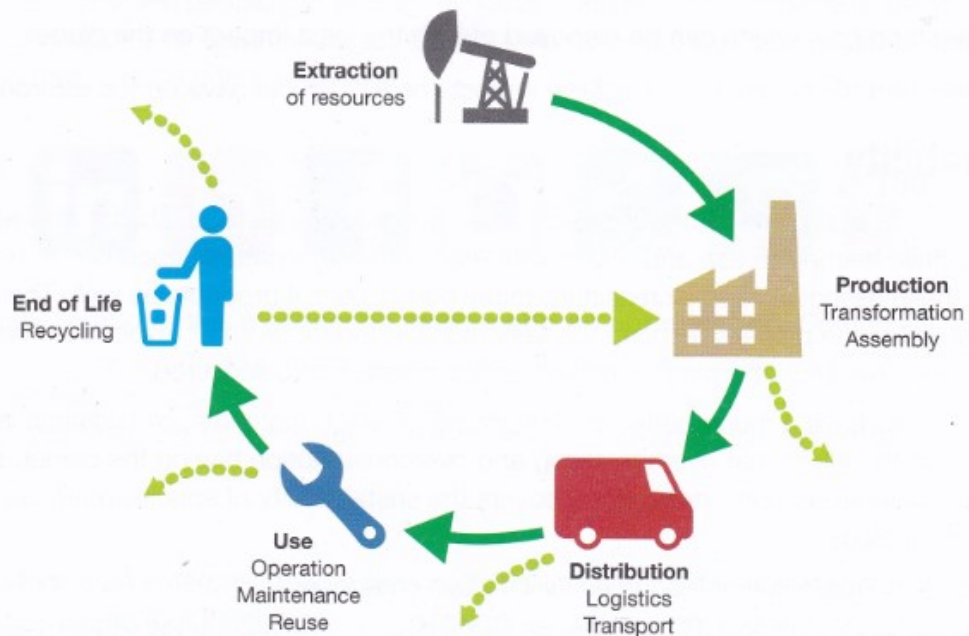
- CO₂ emissions - energy required to produce materials and whilst products are in use
- Transportation methods and the distance travelled
- Impact on the environment through mining or harvesting
- Impact on availability or scarcity
- Maintenance and repair costs, appropriate use of material
- Welfare of workers in the supply of the material, Fairtrade etc.
- Ethical and moral issues

Life Cycle Assessment

Conducting a **Life Cycle Assessment** (LCA) is a way for companies to assess the environmental impact of a product during the different stages of the product's life. The LCA will investigate the whole life of the product from 'cradle to grave'.

Although a major part of the investigation looks at the amount of energy used, measured by CO₂ emissions, the LCA can also look at the ethics and provenance of the product.

There are five main stages to an LCA:



Extraction and processing: The amount of energy used to extract raw material from the earth, or to produce it through farming or other methods, and process it ready for manufacturing

Manufacturing and production: The energy required to manipulate the raw and refined materials into a product ready for sale

Distribution: The 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 the product and/or dispose of any waste

The LCA can highlight a number of ethical questions to be considered by a company such as:

- where can energy be saved?
- where can working conditions be improved?
- where can emissions be reduced?
- where can material be saved?
- do our actions have a negative effect on communities or natural environments?

Responsible companies can then decide how to neutralise any negative effects by taking positive action to counteract them, for example by planting trees or choosing more environmentally friendly versions of a material.

Waste disposal

We are now living in a society where everybody should take responsibility for recycling. This is to ensure that the resources we have will last as long as possible and that landfill sites do not fill up too quickly. Manufacturing companies are also required to recycle as much as possible and in many areas of manufacturing, strict limits are set by national and international organisations. Areas such as consumer electronics and the automotive industry have very rigid requirements.

Careful planning of waste disposal within a company can have many positive effects including the following:

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

Most businesses are charged additional fees to dispose of waste materials. Any form of reduction in waste is likely to save a company money, meaning that the products can be manufactured more cheaply, with the reduced unit cost making the company more competitive or profitable.



Environment

Ever since our early ancestors used simple tools to help feed, clothe and shelter themselves, humans have placed a demand on the earth's natural resources in order to develop a modern lifestyle. Until the industrial revolution, this demand was quite limited and was not considered to severely affect the environment. However, historians have found evidence that, in some parts of the world, excessive use of wood for boat building and house construction caused localised deforestation.

There has been a population explosion since the beginning of the 20th century which has led to accelerated use of all natural resources. In 1920, just a century ago, the planet's population was less than two billion, having taken well over 100 years to grow by one billion. It currently takes just 12 years to increase by a billion. In spring 2017, the world population was 7.5 billion.

The consequences of such a large population are that resources are being used up at a very fast rate, and the impact on the environment is becoming increasingly noticeable. Some new technologies are being developed to try to reduce this negative impact, and are being adopted by a number of forward-thinking designers and manufacturers.

Continuous improvement

The philosophy of making small but continuous improvements is adopted by most modern manufacturers. It requires the whole workforce to work together to find any possible way to make adjustments to working practices in order to save time, money and resources. The theory behind the Japanese term **Kaizen** has helped to reduce waste and improve efficiency dramatically around the world. Kaizen simply means change for the better. Under the Kaizen philosophy, an employee that discovers a potential saving will be rewarded and celebrated for their actions. This encourages a sense of teamwork and can lead to greater productivity and less waste in the system.



Efficient working

Efficient working practices such as Just In Time and lean manufacturing methods (see Chapter 4) are adopted by businesses in order to save money and gain a competitive edge over their competitors. Some companies employ management consultants to find the most effective ways to run a business, other larger companies have staff who continually look for efficiency savings. A common practice among many businesses is to operate an 'energy walk'. This is a simple concept where a trained member of staff goes around turning off unnecessary lighting, heating and other appliances. It has proved to be cost effective and it lowers CO₂ emissions.

Pollution

It is almost impossible to make a product without causing some form of pollution. It may be created directly through processing materials or indirectly through energy consumption in manufacture or during the product's use. A business has a number of options to reduce the levels of pollution caused by the manufacture of a product and these are discussed in detail in Chapter 21. By conducting a Life Cycle Assessment (LCA), a company will find out how much pollution is being created and therefore enable them to plan a reduction strategy accordingly.

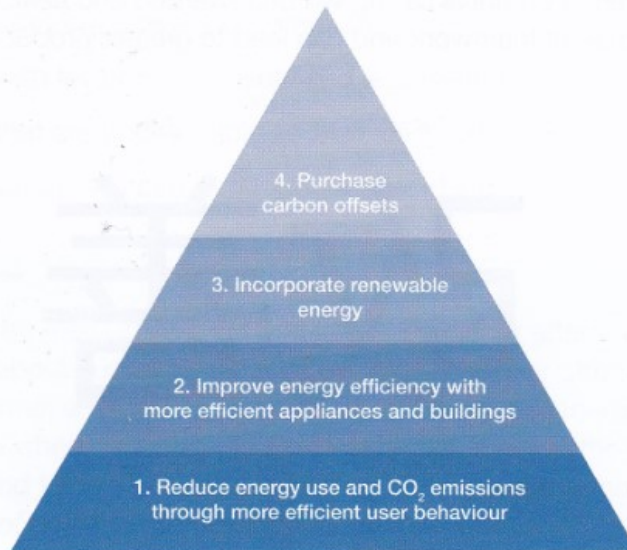
Global warming

Owing to the worldwide population explosion since the industrial revolution mixed with the boom in global manufacturing, unprecedented levels of carbon dioxide (CO₂) and other greenhouse gasses such as methane (CH₄) and nitrous oxide (N₂O) have been released into the atmosphere. Many scientists attribute these, and other factors driven by human activity, as the main causes of a gradual rise in the average temperature of Earth's atmosphere and oceans.

Global warming is becoming increasingly hard for sceptics to deny, as according to the National Centre for Environmental Information, fifteen of the last sixteen warmest years on record have occurred since 2000.

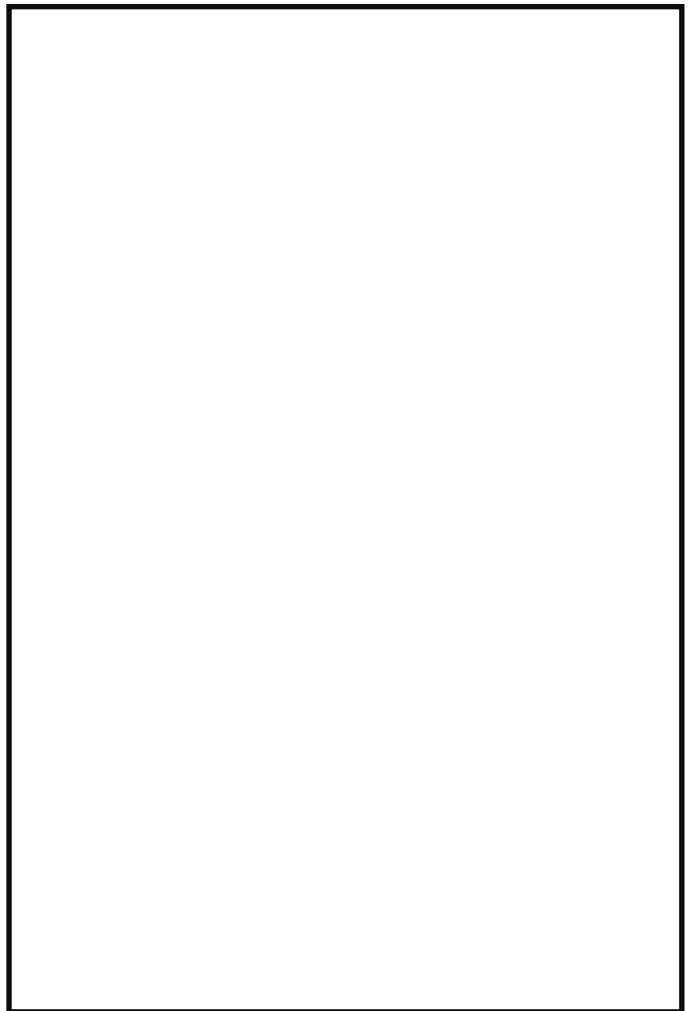
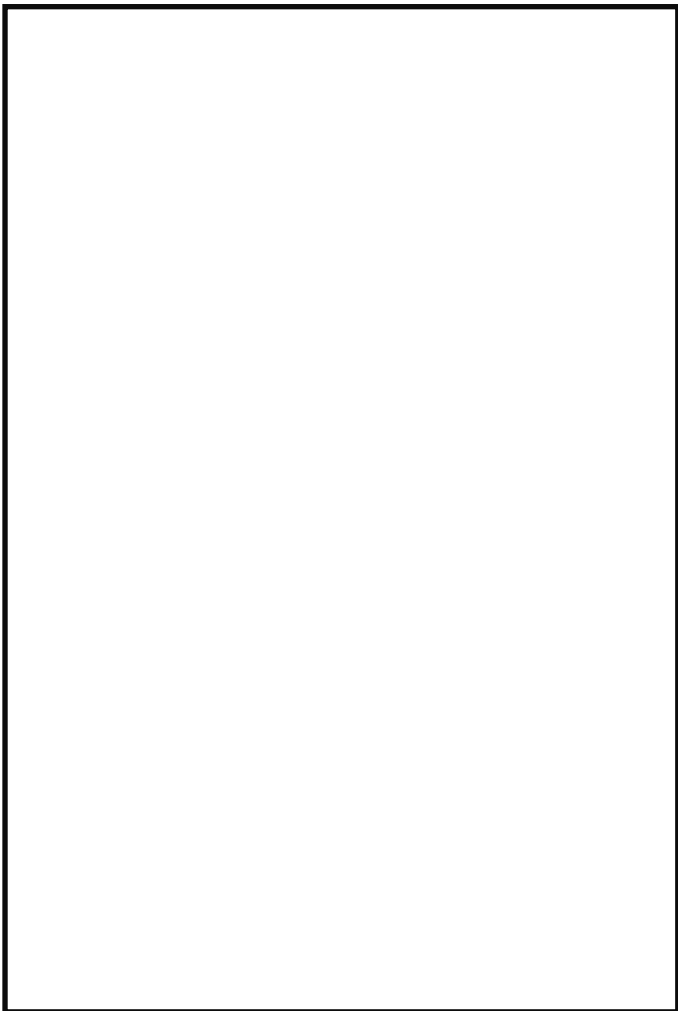
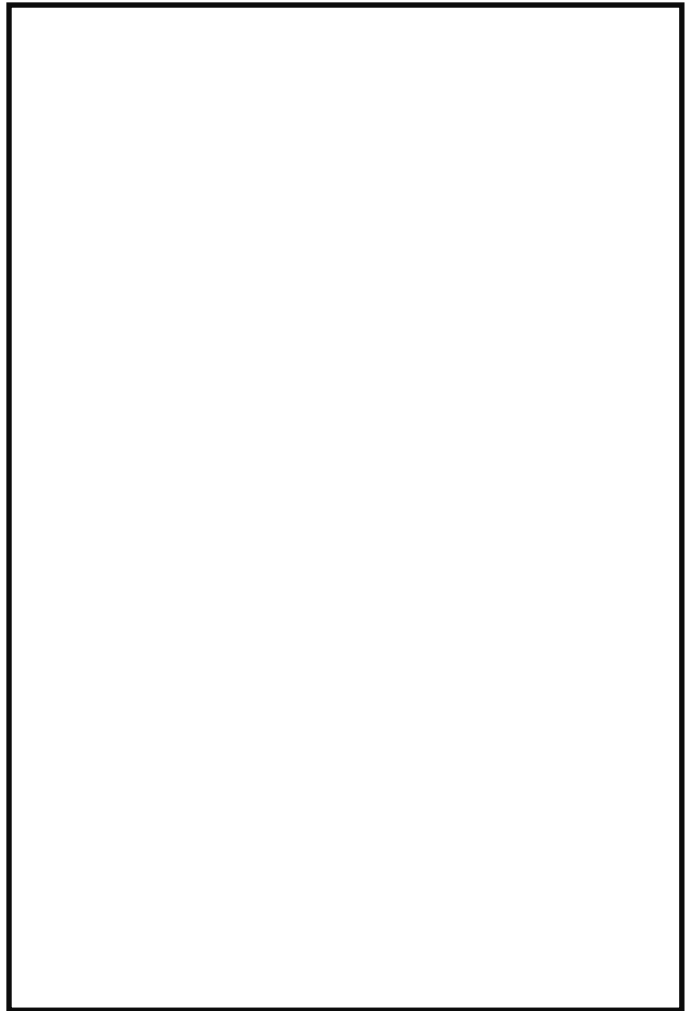
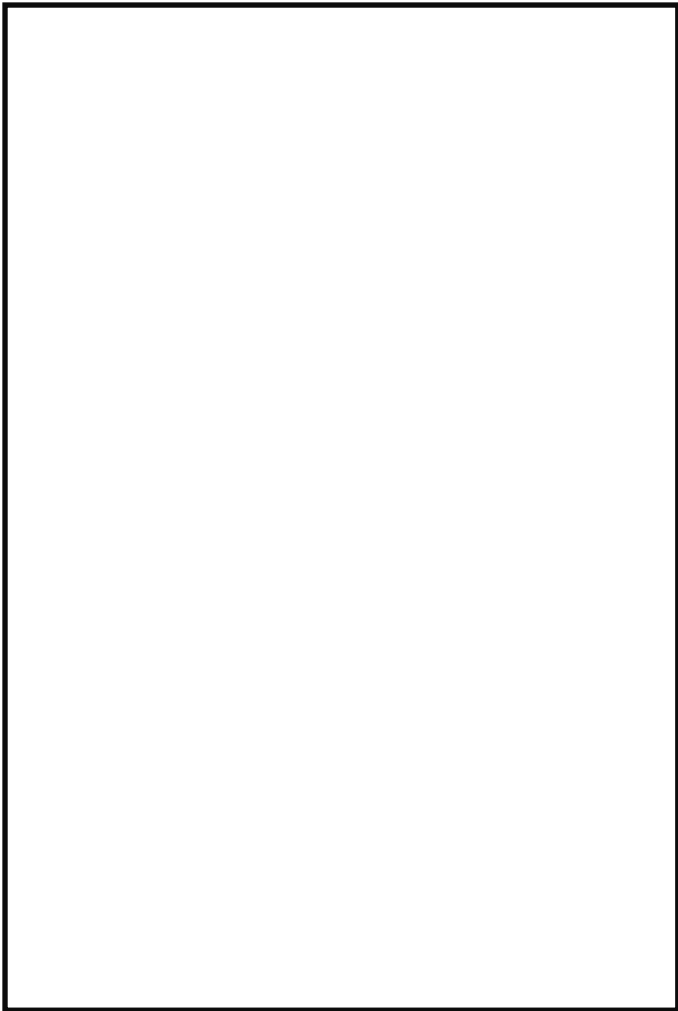
Carbon offsetting

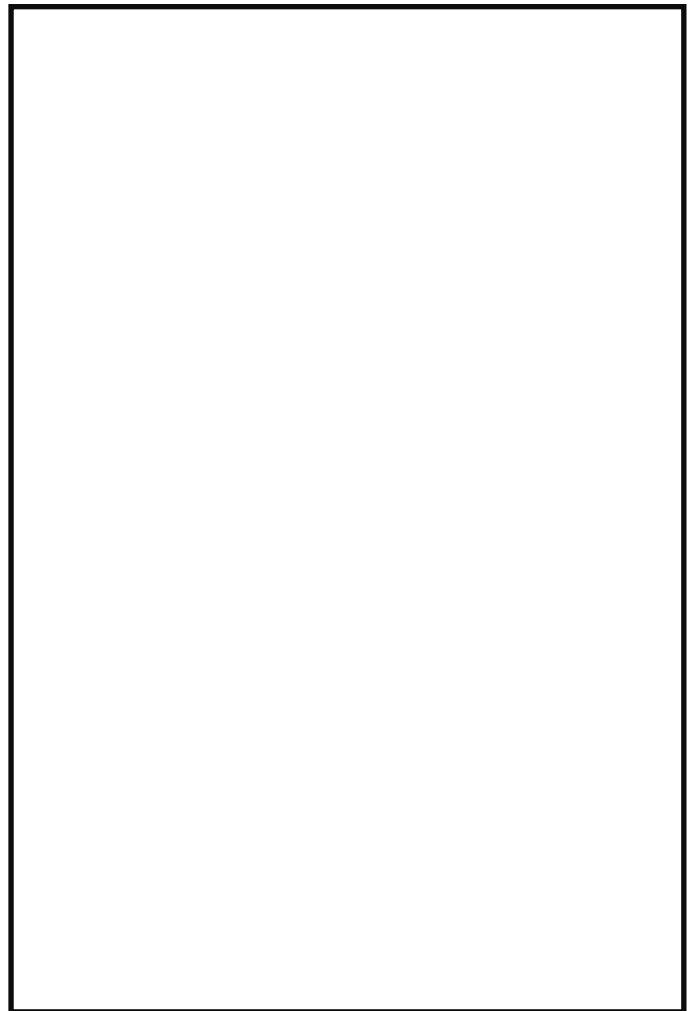
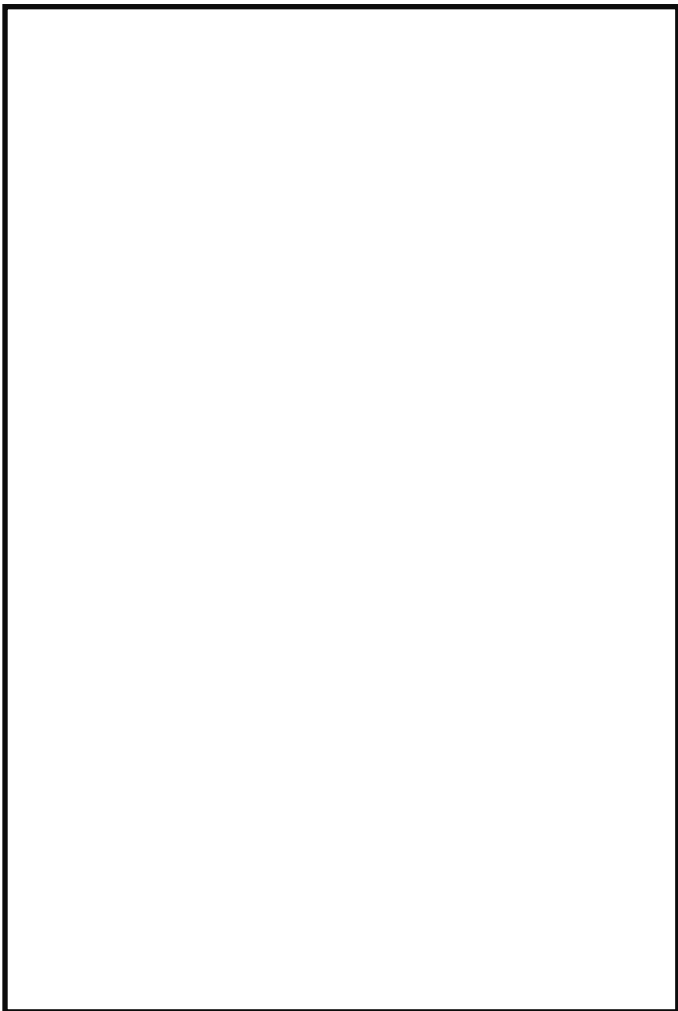
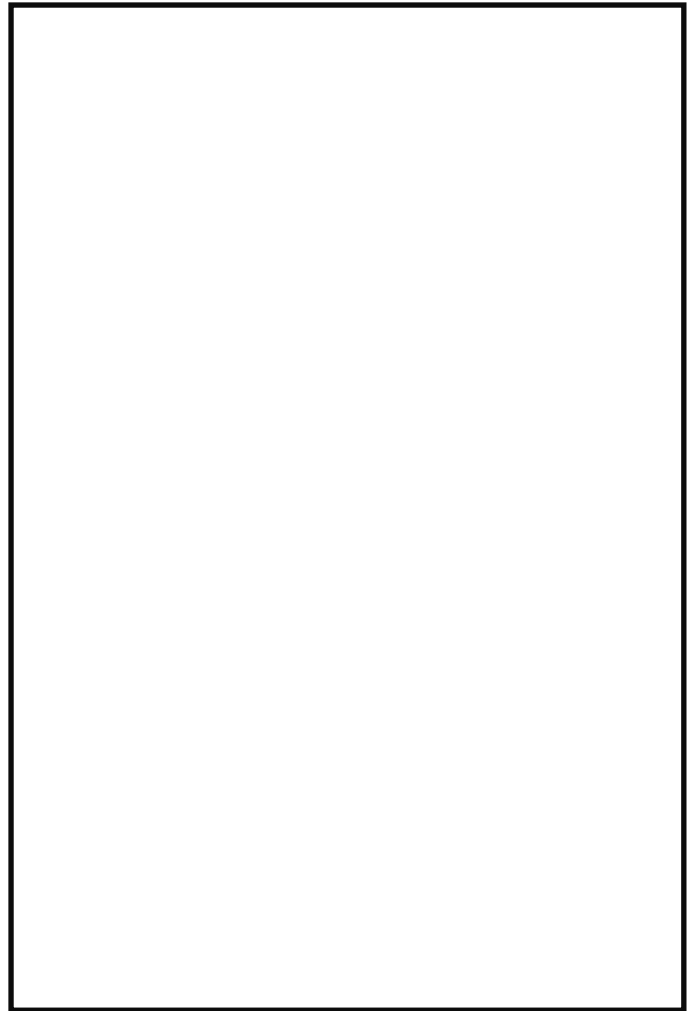
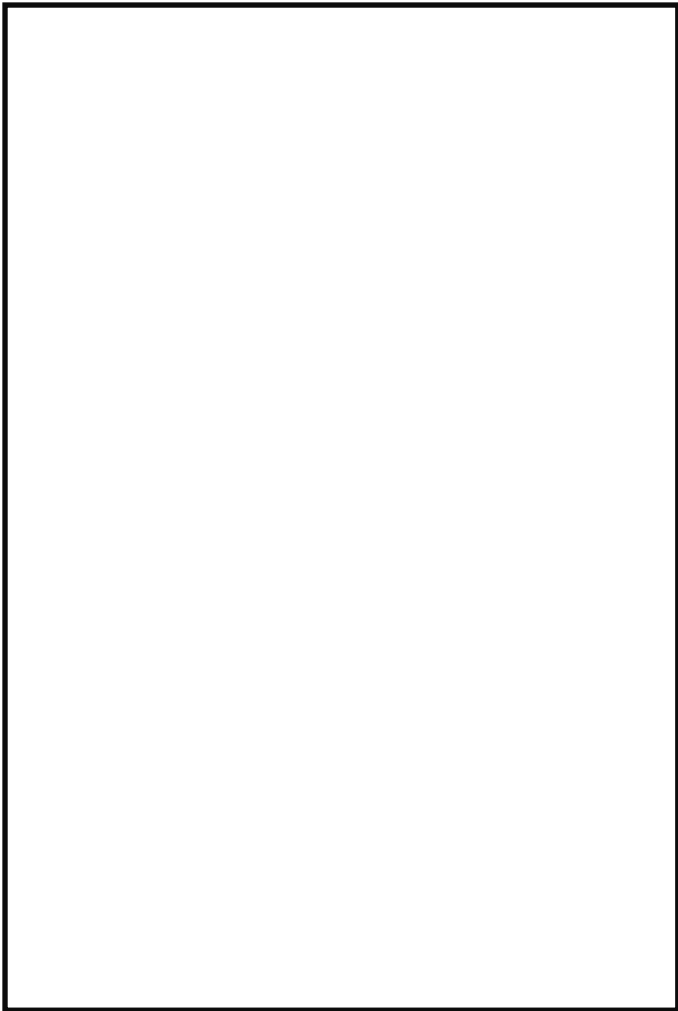
It is very unlikely that goods being produced will have no negative impact on the environment. However, companies are able to consider their products sustainable and environmentally friendly by offsetting their negative impact through investment in positive activities that reduce carbon emissions. A product is considered to be carbon neutral if it produces zero net emissions when the LCA has taken all actions into consideration.



The pyramid above shows what steps can be taken to reduce carbon emissions by companies and consumers. When all reasonable steps have been taken, there may still be a carbon deficit and the purchasing of carbon credits may be the only way to achieve zero net emissions.

A number of organisations sell carbon credits to companies and consumers to help them reduce their carbon emissions. The money raised is invested in carbon-reducing activities such as mass planting of trees and forest regeneration, development and production of renewable energy and the conservation of finite resources.







Sustainability and The Environment:

Questions

Q1. Give 2 examples of finite resources and 2 examples of non finite resources. (4 marks)

Feedback:

Q2. Why should finite resources be avoided or used in limited amounts? (1 mark)

Feedback:

Q3. What is a life cycle assessment (LCA) and what can a company learn by conducting a LCA? (2 marks)

Feedback:

Q4. What are the 5 stages of life cycle assessment? (5 marks)

Feedback:

Q5. Wind up radios and torches have had a positive affect on developing countries. Give 2 reasons why wind up radios and torches are a sustainable and environmentally friendly alternative to battery or mains powered devices in a developing country. (2 marks)

Feedback:

Q6. Explain how carbon off setting can reduce the overall CO2 emissions of a company? (1 mark)

Feedback:

Q7. The Paris agreement of 2015 was the first global climate agreement involving 195 countries, Find out the main aim of the agreement... (1 mark)

Feedback:

Total marks : / 16

WWW?

EBI?



People Culture and Society

Chapter 3 - People, culture and society

Objectives

- Understand how technology push and market pull affect consumer choice and employment
- Understand changes in job roles due to the emergence of new ways of working
- Be aware of changes in fashion and trends and how they affect designers and manufacturers
- Understand how new products can have both a positive and negative impact on society

People

Developing a detailed understanding of the market place in order to launch new technologies is one of the most difficult aspects for designers and manufacturers. Many aspects need to be taken into consideration when launching a product, and many companies now employ specialist management consultants who analyse data to see which products would be successful in which areas.

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. The reasons for this are discussed in this chapter.

Consumer choice

The global manufacturing sector has grown substantially over the last century and the rapid increase of international trade agreements has meant that products can be shipped all over the world. The Internet has helped to create a global marketplace where designers and manufacturers can trade goods relatively freely with consumers. This has led to a huge increase in choice and also means that prices are kept low through wider competition.

Technology push

When a new scientific discovery becomes public it is never long before designers, engineers and technologists use it or turn it into a product, despite there being no consumer awareness or demand for such a product. This is called **technology push**, as it drives forward current thinking and creates new and exciting developments. Large manufacturing companies employ teams of designers to work in their research and development (R&D) departments.

R&D is one of the most important areas for a company, as they need to produce new and exciting products to ensure they keep their market share. Being the first to market with a new technology can be the difference between success and failure.

When a new technology first comes to the market it is usually very expensive. This is due to the High R&D costs and there are normally a number of issues to correct in the first few models of a new product. As the number of unit sales increases, the cost per unit is reduced. Consumers Who are early adopters of new technologies significantly help support their development.

Touch screen technology has come a long way since its discovery in 1965. It was not until 1973 that it was first used in a product, and it was not used in phones until 1990. The amount of R&D involved to bring products to market should not be underestimated. As a result of ongoing R&D we now have reliable touch screen components in a huge number of products at incredibly cheap prices.

Market Pull

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

The smartphone is a good example of market pull. Consumers once carried numerous bits of electronic equipment with them; a phone, a pager, a diary, a camera, an MP3 player, a SatNav and so on. This was bulky, inconvenient and very expensive.



The technologies for all of these products already existed, and so through demand the smartphone was developed. Improved battery technology and the miniaturisation of electronic components also helped.

The next market pull for smartphones seems to be around flexibility and wearability, and there is an increasing demand for very low power consumption and fast wireless charging.

This market pull combined with the technology push of new discovery (for example **graphene**, a flexible and incredibly strong, conductive material) should continue to bring some very interesting and exciting products to market.



Changing job roles

The pace of development of new technologies and in particular, the growth in digital and social media, means that some of the traditional jobs of the last century cannot be relied on to last. As ever-increasing automation leads to a reduction in the need for manual labour, a change in job roles and working conditions is inevitable. Rather than creating mass unemployment, it is widely believed that the human workforce will become 'up-skilled', which means people will be trained for jobs that have a higher value. The workforce of today will need to be flexible: workers may well be performing important jobs that just do not exist today, working in ways that are driven by technological change.

Culture

Culture is an amalgamation of the ideas, beliefs, customs and social behaviours of a society or group of people. It often manifests itself through ritual, art and fashion. It is important for designers to be aware of the society around them and to try to understand the different cultures that exist within it.

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, from a manufacturer's point of view, is that they may require a limited range of products.

In the United Kingdom, 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.

Fashion and trends

Different cultures, influences and beliefs combined with a consumer driven economy result in a product design market that is invariably influenced by the 'latest thing'. It is quite natural for consumers to want to be part of a group and to fit in or buy into a particular lifestyle.

Designers and manufacturers can play to people's insecurities by designing and making products that people feel they must have. Fashion clothing is a prime example, where the latest design is only cutting edge for one season at best. Other products also succumb to fashion or trends.



When the Apple iMac G3 first came out in 1998 it was considered to be a ground-breaking piece of design. It had a transparent casing and came in a range of contemporary colours. The trend then became to show the inner workings of a product in a modern and stylish way. Within weeks of the launch, a range of related and non-related products popped up everywhere. The Apple design had a huge influence over mainstream culture and still remains so today, due to relentless R&D and clever marketing.



Designs influenced by fashion and trends are commonplace. The style of a font used in an advertisement may be chosen to give the impression of an expensive or exclusive product, or a rival company may use a font to imitate a brand leader. Marketing a product to the right audience in the right way is vital.

It is not always easy for companies to pitch their products correctly as there are a number of considerations to take into account before the launch of a new product. Religion, culture, history, language and many other factors need to be thoroughly thought through before a product is trialled. Then, throughout the testing process, a wide group of users should be consulted to ensure the product is not only fit for purpose, but also that it does not offend any potential users or other members of the community.

Products can fail for a number of reasons; some avoidable and some not so easy to predict. One of the easiest mistakes for a company to make is the use of a brand name that means something else in a different country.



Plopp chocolate has been a Swedish favourite since 1949

Another potential pitfall is a brand name that when turned into a web address, creates a word with a quite different meaning, such as 'childrenswear.co.uk'. This type of error has caught a few companies out over the years and proves why market testing is so important.

Ensuring that cultural influences and sensitivities are considered is essential. It would not be good for a company's image if a product was inappropriately placed – a roulette game being sold in a country where gambling was illegal could be disastrous.

Some companies happen to get their products right first time and the design actually becomes part of the culture. Companies have been known to upset their loyal customers by trying to make improvements that have gone on to be rejected, and the original design kept. Even when improvements are essential, the essence of the product remains, as in these two Italian design classics, the Bialetti "Moka Express" and the Vespa scooter.



Faiths and beliefs

A designer has to be responsible for considering the wider implications of a product launch within certain communities. Cosmopolitan and mixed communities are perhaps more difficult to prepare for because of the wide range of faiths and beliefs. There are many more potential pitfalls in mixed communities; however, they can be more understanding and tolerant of other views than some, where one faith or belief is followed by the majority.

Case Study: £5 note

Hindu, Sikh and some other faith-based communities may choose to follow a vegetarian diet, and this is part of their culture. In addition to not eating meat, many followers of these faiths, as well as vegans and vegetarians, take every opportunity to avoid using animal products in their day-to-day lives.

The revelation in 2016 that the new polymer Bank of England £5 note contained tallow, an animal fat-based substance, upset a number of communities. There was a prompt call for the Bank of England to find an alternative way to produce the note and in the first two days of an official petition well over 100,000 signatures were received.

Shortly after the Bank of England admitted that the new polymer £5 note contained the animal by-product, some establishments refused to take the notes as a method of payment. One café owner was repulsed by the idea that the note contained tallow and believed that her customers supported her view. They received no complaints.



The Bank of England say they currently have no plans to change the manufacturing process.

Society

At the forefront of responsible design are companies that 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 produced by carbon neutral means
- Products that are made from renewable materials
- Products that reduce carbon emissions and/or other greenhouse gasses in use
- Products that reuse existing materials or use recycled materials
- Products designed to be 100% recyclable
- Products that are designed to help or ease suffering or that promote fair trade
- Products that are made and sold locally to avoid transportation costs and associated pollution
- Organisations that are not-for-profit and where all money is reinvested to support good causes

Many forward thinking companies try to achieve one or more of these targets and as a result they are considered to be more 'eco-friendly' or more responsible than some of their competitors. This may give them an advantage over their competitors, as some consumers will usually take the greener option as long as they feel the additional cost of the goods or service is worth it. Unfortunately, if the greener option is too expensive, then the advantage is easily lost.

Positive and negative aspects of new products

When new products are launched they can be judged against the criteria above. This enables the positive or negative impacts that a particular product may have on society to be evaluated. Some products have obvious positive effects and others have the opposite.

If somebody were to choose a new car for the commute to work, would it be wise to choose a modern electric car? Currently, these are very expensive to purchase and have a fairly short range (e.g. 200 miles), but have very low running costs and produce almost zero emissions in use. Alternatively, would it be better to purchase a petrol or diesel car that is much cheaper to buy, but more expensive to run? If frequent long journeys are made, this might be a sensible choice, but it will create more greenhouse gases. Consumers make this type of decision every day and the collective impact that these decisions have on society is significant.

Design for the disabled and the elderly

Most developed and developing countries are striving to become more inclusive and to cater for the disabled and the elderly. New and emerging technologies have allowed designers and manufacturers to create products and designs ranging from simple tools and household gadgets, to transportation methods and access to buildings, that dramatically improve the lives of many.

Inclusive design is important for any new product. A designer should maximise the number of people a product will appeal to, whilst being aware of whom it may exclude and whether any design modifications can be made to make it accessible for all.

There are four main ways for designers to produce products so that the majority of the population are catered for. However, there is often a small, but equally important, group of potential users who may be left out.

Type of production	Example
One size fits all	Door frames Baths
A range of sizes to cover all	Shoes Clothes
Adjustability to allow use by all	Car seats Shower head height
Adaptability to suit location or user	Children's booster seats Car roof bars

Despite these methods being adopted by most responsible designers, some members of the population find themselves falling outside the range of those being catered for. Door frames are traditionally six foot six inches (1981mm) tall. As an increasing number of the population is now reaching and even exceeding this height, the one-size-fits-all approach to door frames needs to be reconsidered and a metric standard of 2040mm has been introduced.

Modification of products is an area that offers inclusivity, as specialist equipment and adaptations can be made to help those who find themselves outside the normal range.



Modern technologies play an important role in this field of design, making products lighter, tougher and more adaptable than ever before. The use of carbon fibre and other light modern materials has allowed disabled people to take part in all sorts of activities that would have been virtually impossible before their discovery and invention. For example, equipment for Paralympians is frequently at the cutting edge of inclusive design and utilises the most up-to-date materials.



The world's population is becoming increasingly elderly as advances in medicine lead to people living longer. Unfortunately, not all who live longer are as healthy or as strong as younger people, and therefore any products that address particular difficulties or offer a better quality of life will find an increasing market.

Different religious groups

A further issue for designers to consider is designing products that will not offend or have a negative impact on different religious groups. Communicating honestly and openly with members of religious groups during the design and development stage of a product will help to reduce any potentially tricky issues.

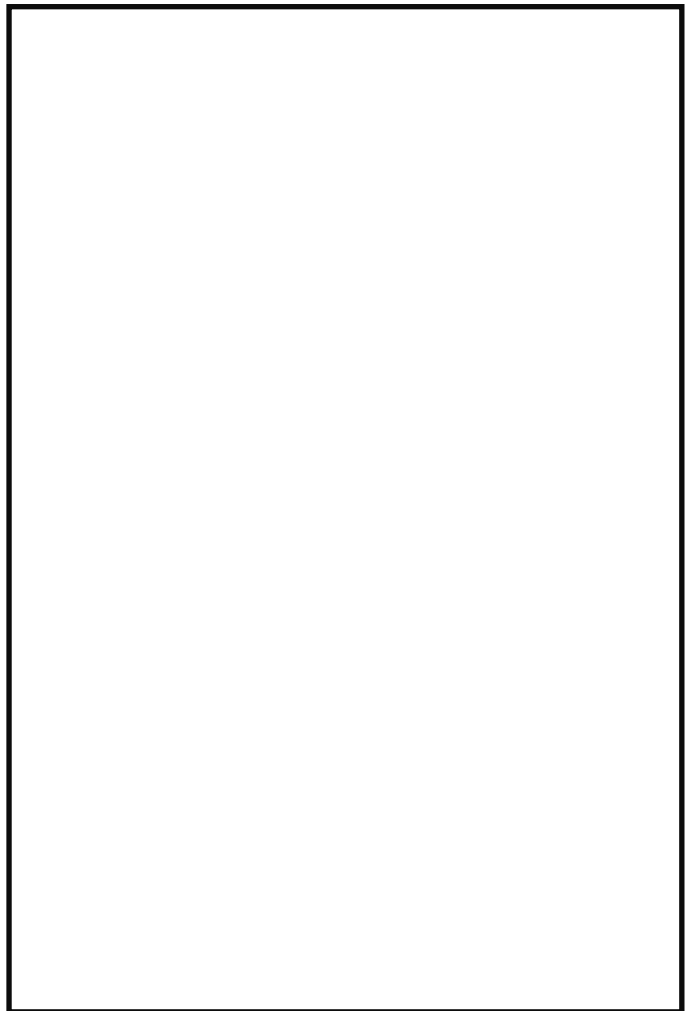
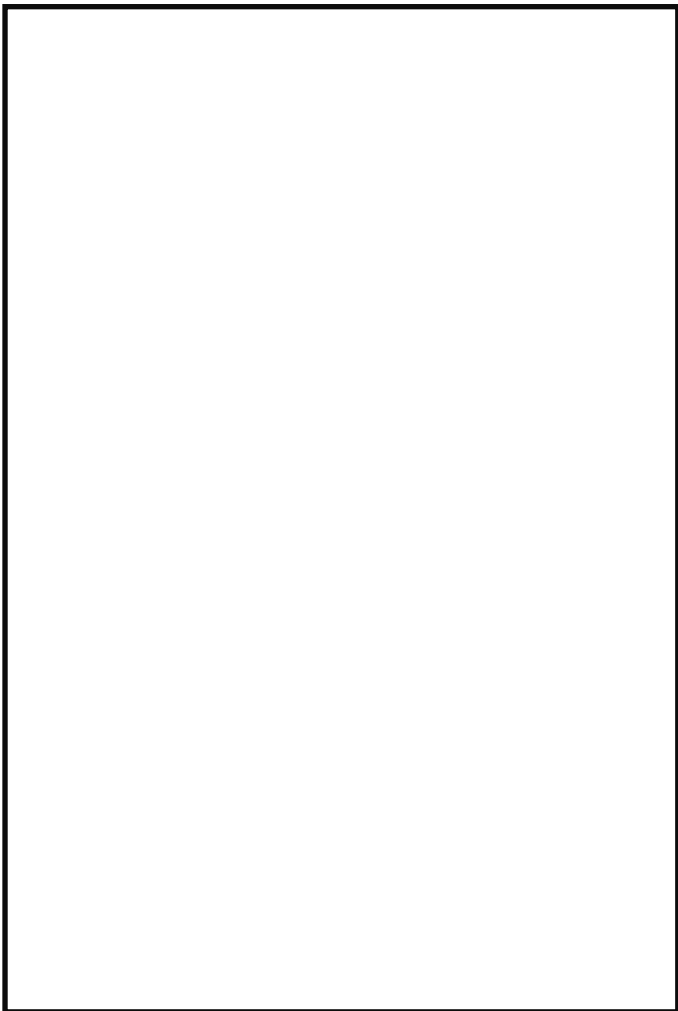
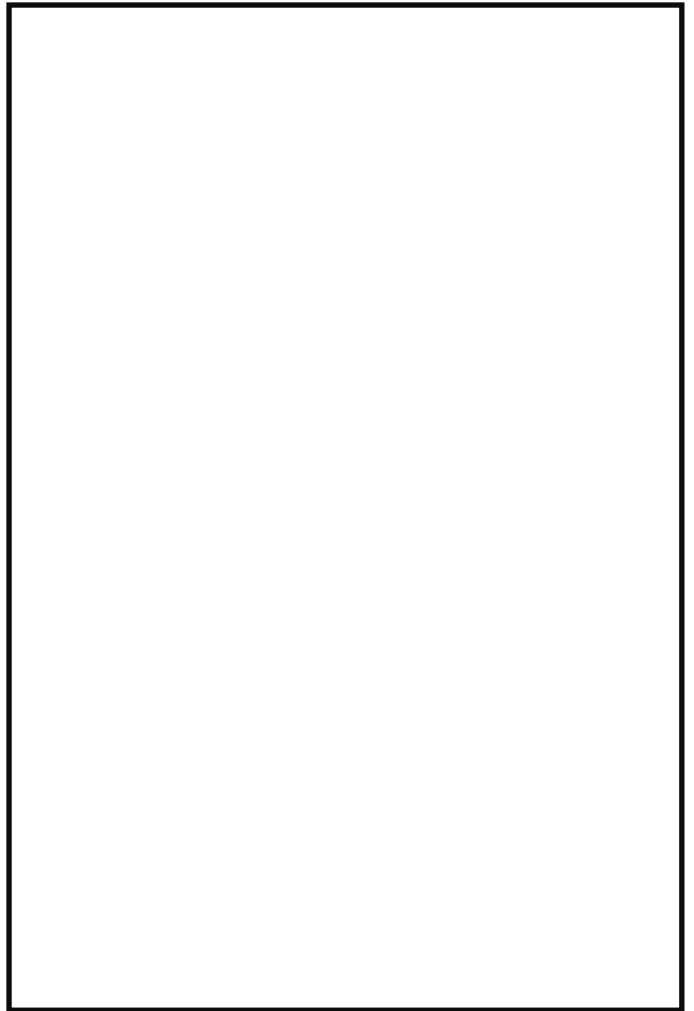
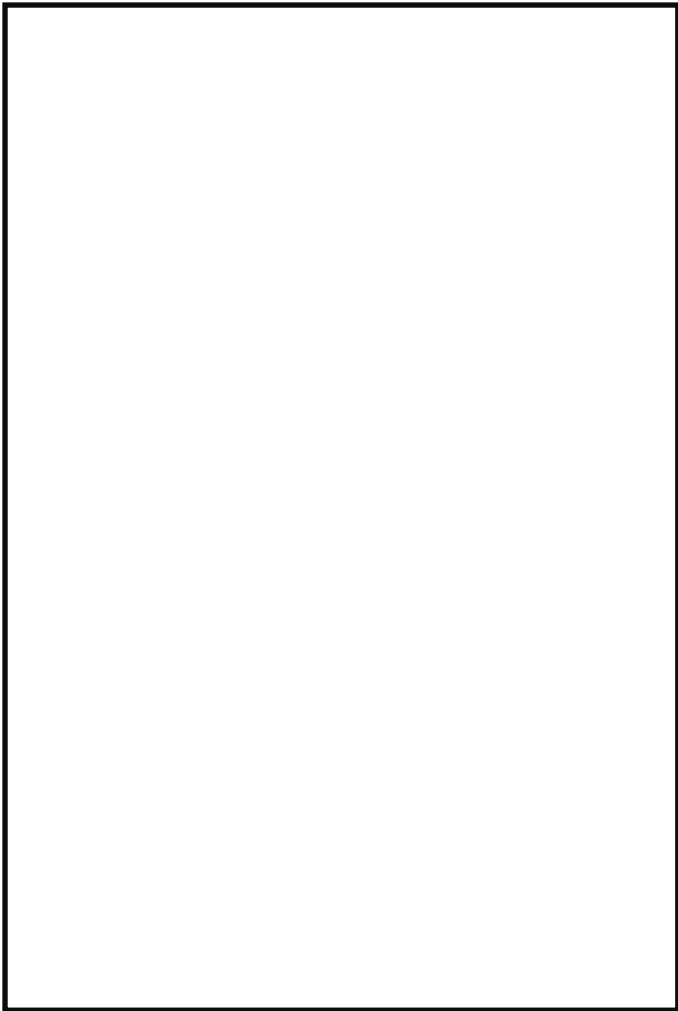
There are some obvious areas that can be awkward for businesses to get involved in, such as products relating to alcohol, relationships out of marriage and gambling, as laws and beliefs vary dramatically from country to country and among different religions.

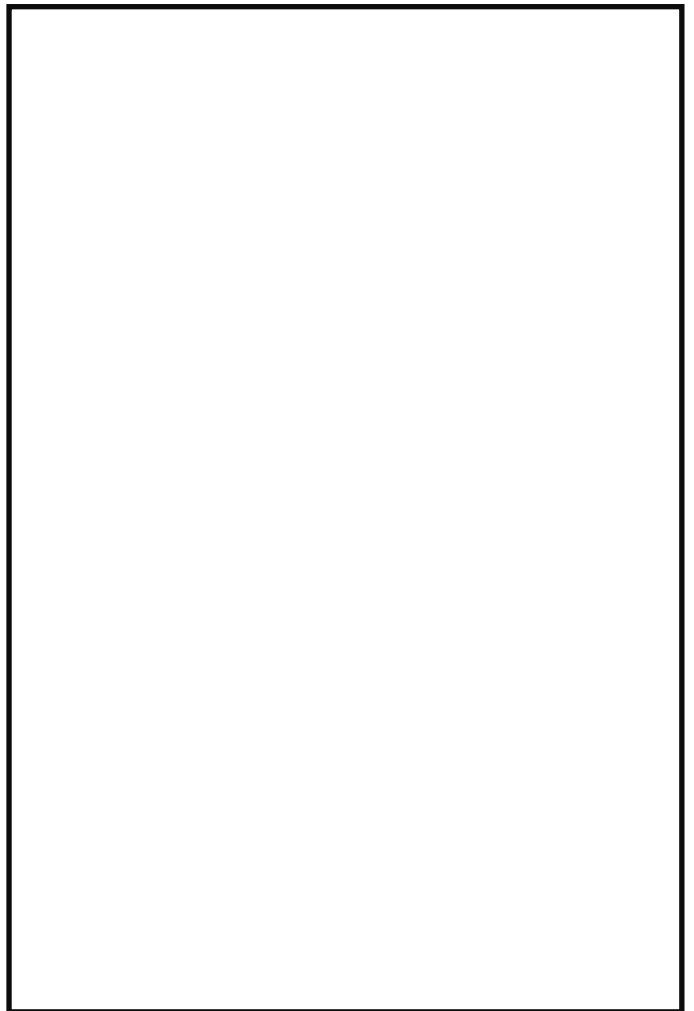
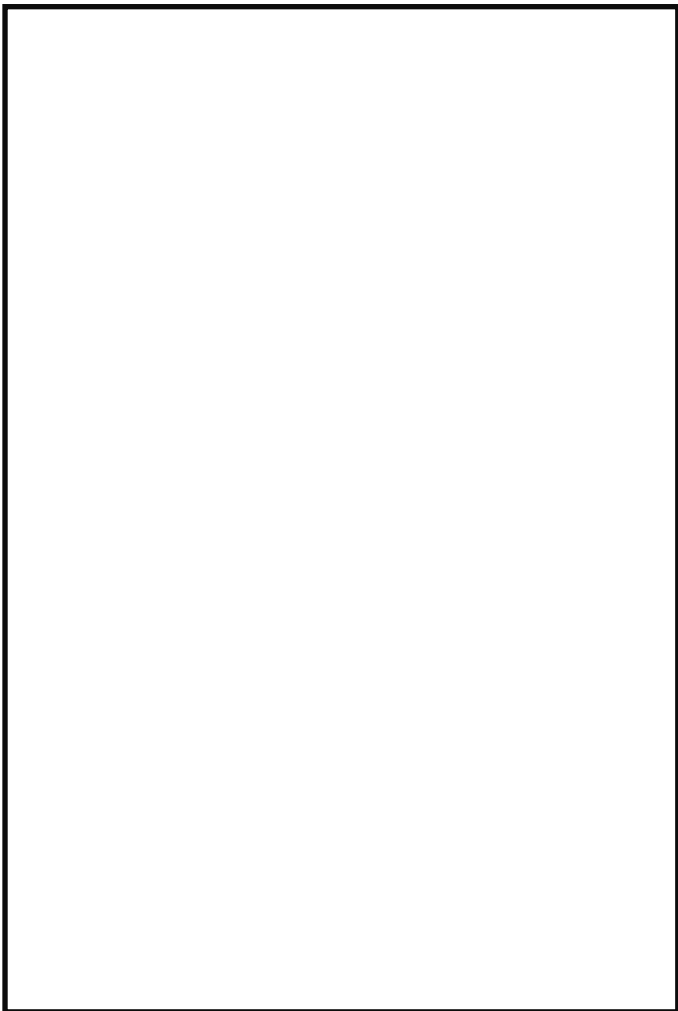
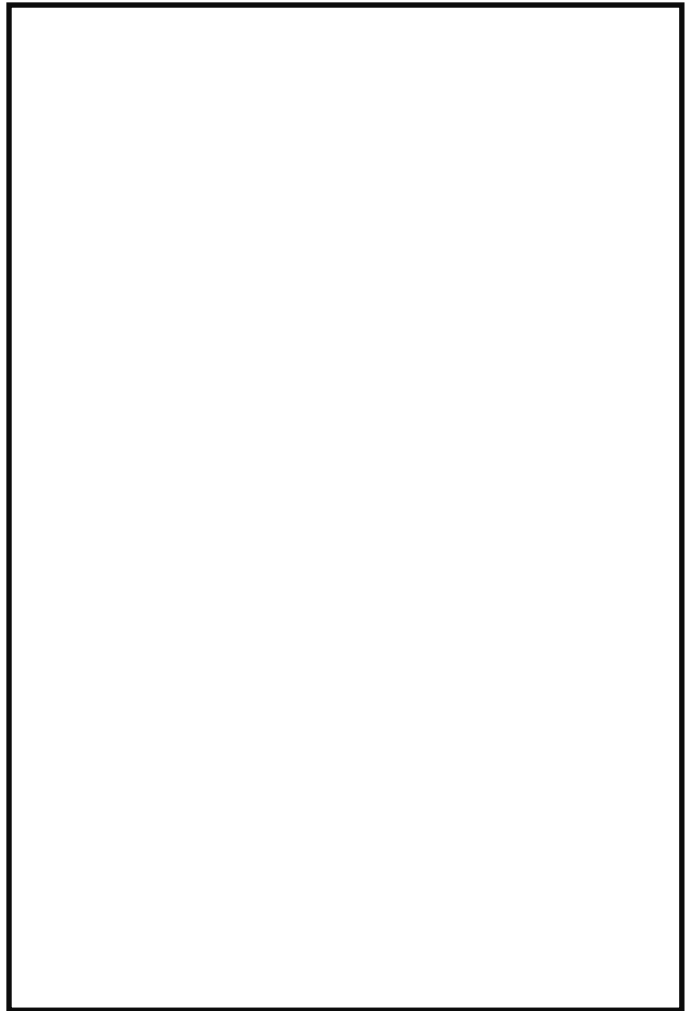
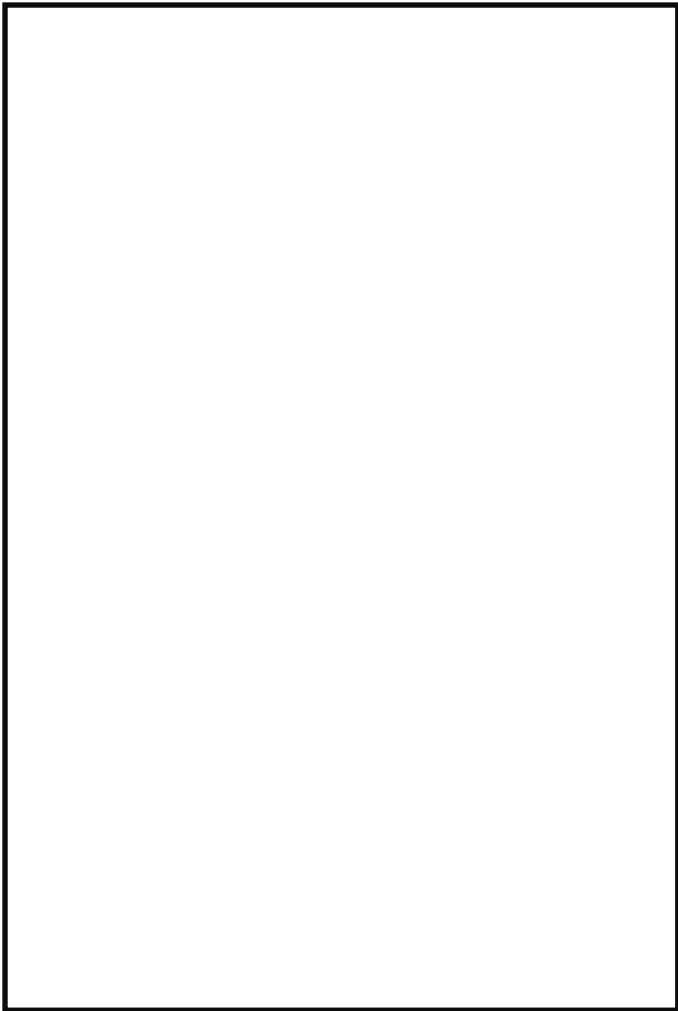
Case study: PUMA®

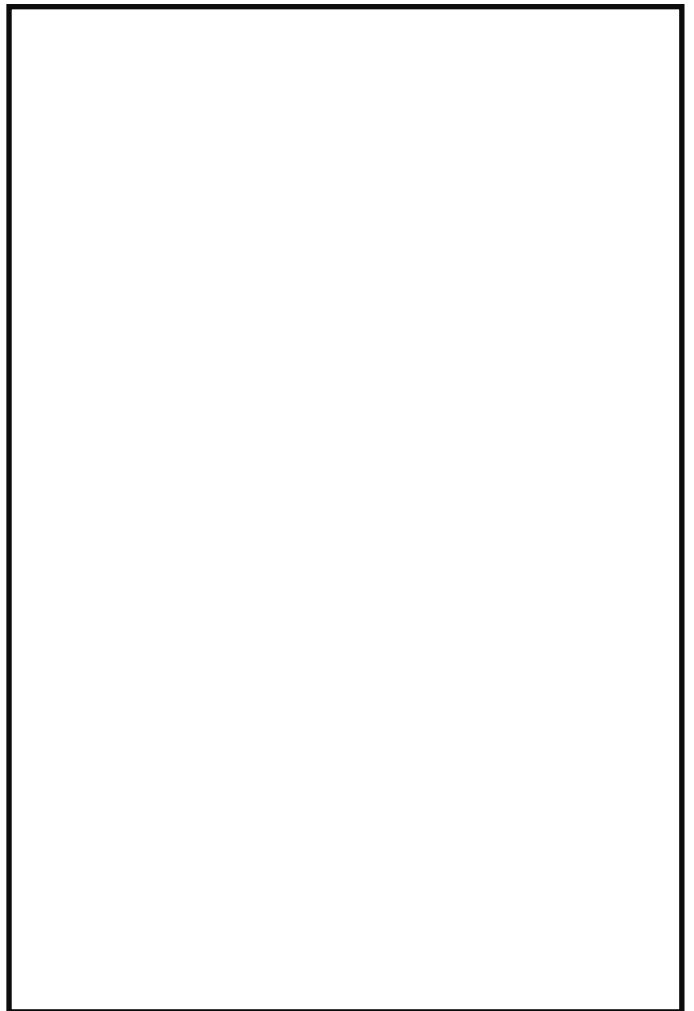
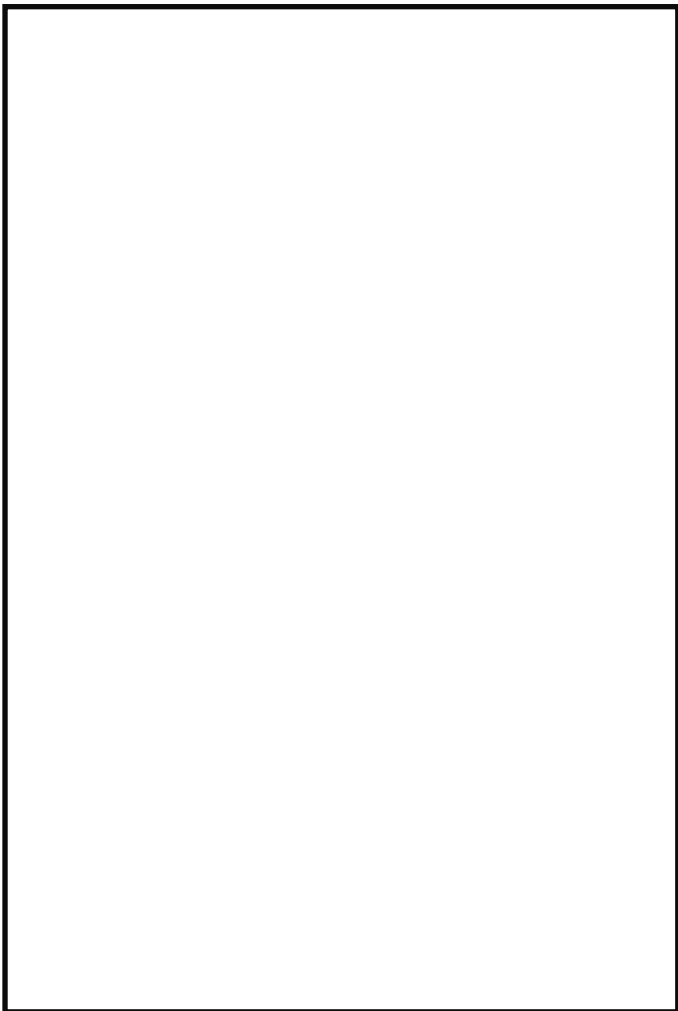
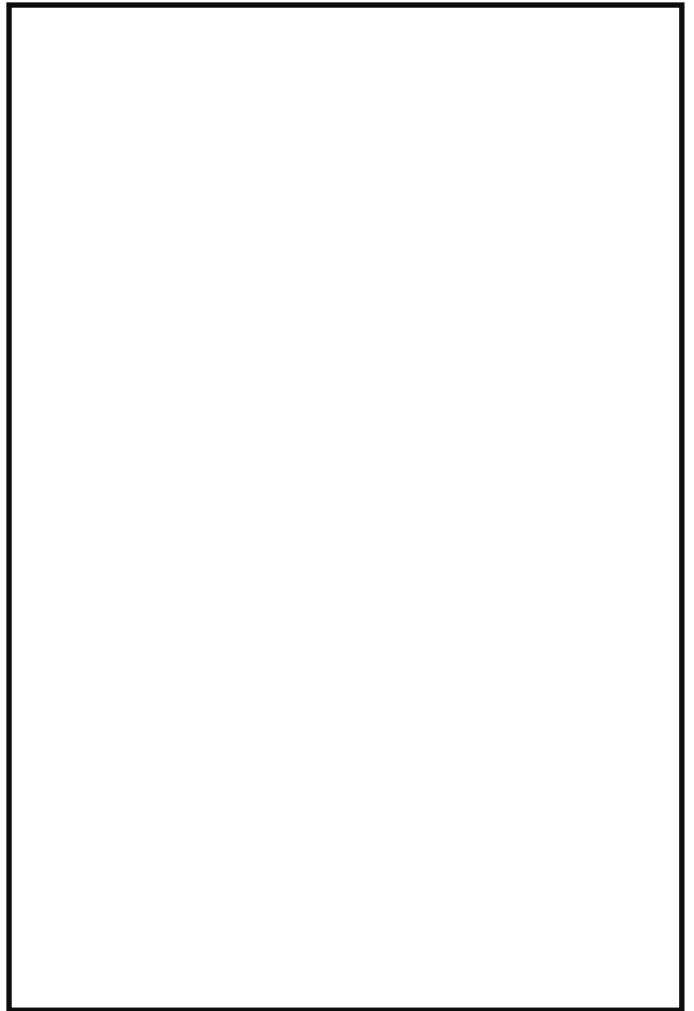
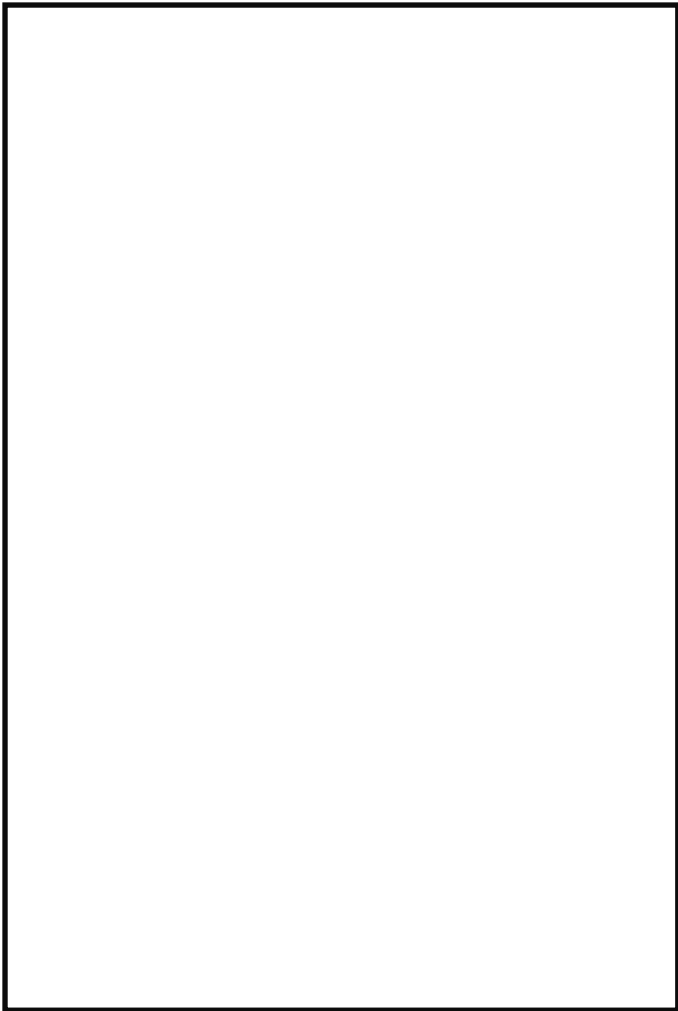
In 2011 the sportswear manufacturer Puma designed a pair of trainers that was based on the colours of the national flag of the United Arab Emirates, to celebrate the country's 40th National Day.

Unfortunately, the shoes caused an outcry among Emiratis who were unhappy at seeing their flag represented on footwear, which is considered dirty. They saw it as an insult to the nation. Puma responded by apologising and withdrawing the trainers from sale.











People, Culture and Society:

Questions

Q1. Name 3 products which would sell well in one country but would not in another. Justify your answers. (6 marks)

Feedback:

Q2. Give one positive and one negative factor for a global market place for:

A) the manufacturer

B) The consumer

(4 marks)

Feedback:

Q3. How has the development of rechargeable batteries affected the function and the form of the mobile phone over the last 30 years? (2 marks)

Feedback:

Q4. Why does being first to market with a new product give a company a competitive advantage? (4 marks)

Feedback:

Q5. Give 2 advantages and 2 disadvantages of satellite navigation over a traditional map. (4 marks)

Feedback:

Q6. Discuss 3 ways you think smart phones functions or appearances will change in the future...

Feedback:

Q7. Digital photography has hugely changed the way we take and view photographs. Give 2 ways that digital photography has changed job roles from the traditional cellulose acetate film process. (2 marks)

Feedback:

Q8. What should a company do to keep up to date with current trends in their sector? (1 marks)

Feedback:

Q9. Name 3 types of market testing that a company should do to test if a product is ready for release? (3 marks)

Feedback:

Total marks : / 26

WWW?

EBI?