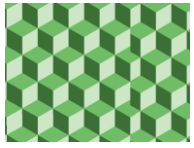
1. Socio Economic Influences - Be Aware Of, And Able To Discuss, How Socio Economic Influences Have Helped To Shape Product Design And Manufacture.

1	**Post WW1: The Bauhaus And Development Of Furniture For Mass Production** 	The Bauhaus **is over 100 years old**, a shocking fact given that Bauhaus design still feels incredibly fresh and current. In fact, despite the passage of time and a general fashion for maximalist luxury, the Bauhaus **marriage of form and function** is still the last word in taste and sophistication. The Bauhaus was founded in 1919 in the city of Weimar by German architect Walter Gropius (1883–1969). Its core objective was to combine all the arts. Gropius described a utopian craft guild combining **architecture**, **sculpture**, and **painting** into a single creative expression. The Bauhaus would turn out artisans and designers capable of creating **useful and beautiful objects** appropriate to this new system of living. The Bauhaus combined elements of both fine arts and design education. One of the visions of the Bauhaus was to stress the importance of **designing for mass production.** They generated designs for **mass-production**, designs that were **simple**, **rational**, and **accessible** to all people.. The school adopted the slogan "**Art into Industry**." During the turbulent and often dangerous years of World War II, many of the key figures of the **Bauhaus emigrated to the United States**, where their work and their **teaching philosophies influenced generations of young architects and designers**. Breuer and Gropius taught at Harvard. Josef and Anni Albers taught at Black Mountain College, and later Josef taught at Yale. Moholy-Nagy established the New Bauhaus in Chicago in 1937. Mies van der Rohe designed the campus and taught at the Illinois Institute of Technology.
2	**WW2: Rationing, The Development Of 'Utility' Products** 	**Utility furniture** was furniture produced in the United Kingdom during and just after World War II, under a **Government scheme** which was designed to cope with **shortages of raw materials** and rationing of consumption. Introduced in 1942, the **Utility Furniture Scheme** continued into post-war austerity and lasted until 1952. The combination of a severe lack of timber suitable for furniture making and the increased demand for new furniture due to the losses of housing caused by bombing had created a severe furniture shortage. The scheme enabled the **state to direct the entire furniture commodity chain**, from the regulation of timber supplies to the management of final consumption. The wartime office of the Board of Trade specified a small **set of designs for manufacture**, designated individual firms for the production of **Utility furniture**, and controlled distribution through the issue of **buying permits** to households. When the scheme began, allocations of 'units' were provided to **newly married couples** setting up their first home and to existing households who had lost furniture as a result of **bombing**, whilst later in the war the families of pregnant women and/or with growing children also were prioritised.
3	**Fashion And Demand For Mass Produced Furniture**	Designers must be well informed, not only with **current and future applications of technology**, but with what has gone before. Designers cannot afford to design in a vacuum without external stimulus. They will reflect on fashions through history to gain inspiration. Many products are produced in batch production on a large scale. This production method can better meet the needs of the times (fashion) and is a typical feature of modern industrial design. With the continuous development of society, people's demand for home furnishings has also increased, which has promoted the large-scale production of household products through the large-scale mass production mode of machinery being adopted, which can effectively reduce the labour cost required for production, thereby reducing the overall production cost of household products.
4	**Decorative Design.** 	**Decorative design** is a **design** drawing that was created to be applied as a **decoration** on disposable items or other objects that are **decorative**. Disposable items are meant clothing and linen household, including objects for **decorative** ornaments such as **decorative** wall. **4 kinds of decorative designs;** ❑ Naturalistic Design – Imitating the **effect of nature** – leaves, trees, stones, fauna & flora. ❑ Abstract Design - uses visual language of shape, form, color and line to create a composition ❑ Geometric Design - **Geometric art** is inspired from **geometry**. Generally, It is **designed** with the circles, square and rectangles. ❑ Biomorphic Design – Based on **naturally occurring patterns** or shapes reminiscent of nature and **living organisms**   

2. Major Developments In Technology – Be Able To Discuss, How Major Developments In Technology Are Shaping Product Design And Manufacture

1	Micro Electronics 	The most important technological development in recent years has been in the field of microelectronics. Not only have products reduced in size through technological advances but multi-functional products have become possible. For example, the mobile phone has reduced in size considerably from models first introduced in the 1980s. The **miniaturisation** of mobile phones has been possible due to three key developments. ❑ **Advanced integrated circuits** (ICs) or microprocessors that allow more circuitry to be included on each microchip, increasing functionality and power. ❑ **Advanced battery technology** including Lithium-Ion rechargeable batteries, providing a lightweight means of storing a lot of energy resulting in smaller and thinner fuel cells. ❑ **Advanced liquid crystal displays** (LCDs) enabling colour screens that are brighter and require much smaller current, meaning greater energy efficiency and slimmer housings.
2	New Materials	The continued development of **smart materials** has seen them being applied to a whole range of innovative products and systems where their ability to respond to changes and return to their original state is a real advantage. Some smart materials are: ❑ **Smart glass** – used to change light transmission properties of windows or skylights when a voltage is applied i.e. changes opacity from transparent to translucent. ❑ **Shape memory alloys (SMAs)** – Used in spectacle frames as the crystal structure of this advanced composite, once deformed, can regain or remember its original shape. ❑ **Smart fluid/oils/grease** – Used in a car's suspension system to dampen the ride depending upon road conditions, e.g. second generation Audi TT. The fluid contains metallic elements that alter the viscosity of the fluid when a magnetic field is applied.
3	New Methods Of Manufacture	With today's modern cutting-edge capabilities, that factories could be heading for a more **data-driven factory** of the future where **consumers, operators and designers** will all share information on everything from **initial concepts right through to manufacture**. ❑ **3D printing** Customised, personalised manufacturing, Cost-effective production, Greater flexibility in production, Reduced speed to market ❑ **Internet of Things** It essentially means to link machines, computers, sensors and humans to improve efficiency by enabling new levels of information processing, monitoring, collection and analysis. By incorporating this into factory life, it allows more precision in the final product. ❑ **Robotics** Robotic Automation has found its way into many different areas in manufacturing. Robots perform tasks like welding, assembly, shipping, handling raw materials, and product packing. ❑ **Augmented reality** Workers would simply use a pair of goggles which would have text, information and instructions displayed on the lenses for the worker to read as they perform complex tasks on the factory floor. These goggles (or anything similar for that matter) enable the workers to carry out much more complex tasks and the augmented reality will allow for great precision and accuracy, as well as notifying the worker of the risks being imposed.
4	Advancements In CAD/CAM	❑ **CAD** software is **used** to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for **manufacturing**. ❑ **CAM** helps Improve Productivity of **CNC** Machines. Most **CAM-CAD** systems provide high-speed machine tool paths, which help manufacturers minimise **their cycle times, reduce tool and machine wear**. High-speed tool paths enable manufacturers to **improve their cutting quality and accuracy**.

3. Social, Moral And Ethical Issues – Discuss, The Responsibilities Of Designers And Manufacturers

1	**Products Are Made Using Sustainable Materials And Ethical Production Methods**	Increasingly, customers want to have a positive impact on the environment. Research shows that 88% of consumers want brands to help them be more environmentally friendly. Fashion is notorious for its wasteful practices that are hurting the environment. Fashion production releases 10% of the world's carbon emissions, more than international flights and maritime shipping combined. The fashion industry is responsible for 20% of all water pollution worldwide.
2	Development Of Products That Are: **Culturally Acceptable**	**Cultural Products;** **Artefacts** – Individual objects created, adopted or adapted by members of the culture. **Art Forms** – These products pervade the culture and exist beyond particular social institutions. They reflect the aesthetic look, sensibilities and philosophy of the culture.
3	The Development Of Products That Are: **Not Offensive To People Of Different Race, Gender Or Religious Belief**	Cultural differences are the various **beliefs, behaviors, languages, practices and expressions** considered unique to members of a specific ethnicity, race or national origin. Increasingly, Product Designers must deal with multiple ethnic groups with very different cultures. Thanks to globalisation, you are likely to have target markets in Japan, France, China, Germany and all sorts of other nations. It is important to recognize that people from different cultures have differences in a variety of ways. Cultural issues can arise when a new product does not take into account the fact that a particular **shape, colour or name** can have very different meanings to different groups of people. Designers need to take care **not to offend groups** of people with different traditions and beliefs. A careful choice of name, shape and colour can help promote a sense of unity between different global cultures.
4	**Development Of Products That Are Inclusive**	Besides specialised products for people with **disabilities** we need products that work for "people" some of them having less ability than others. **Inclusive design** is a design approach that aims at integral design **for all**, also people with **permanent**, **temporarily** or **situational** limitations. Inclusive design aims to design products that are **useful for all people**.
5	Design And Manufacture Of Products That Could Assist With Social Problems;	**Poverty, Health And Wellbeing, Migration And Housing** 'Everyone has the right to a standard of living adequate for the health & wellbeing of themselves and their family, including food, clothing, housing and medical care' **Conflict, poverty and victimisation** often result in humanitarian organisations providing basic infrastructure for massive temporary communities of destitute **migrants** all over the world. One of the requirements in refugee crisis is to provide temporary accommodation. **'Better Shelter'** was designing by **Ikea** in response to this need.
6	**The Impact Of Fairtrade On Design And Consumer Demand**	How often have you walked around in the supermarket trying to decide what product by which brand to choose? The options are many. Some people look for the **price tag** while others are more influenced by the esthetic appeals of the **packaging design**. Some people might look for **ethical or environmental** aspects of the brand.
7	**Designing Products To Consider The Six Rs Of Sustainability**	Whenever environmental impact is being reduced, '**The 6 Rs**' can be called upon to ensure an in-depth analysis has been done. **Reuse** – Can the materials be reused for another purpose once a product is finished with? **Recycle** – Can the materials be disposed of correctly so that it can be recycled? **Rethink** – Can the way a product is made be redesigned so that less material is used? (Dematerialization) **Refuse** – Refusing to use materials could be a consideration; could a material that is sustainable be used instead? **Repair** – When a product is broken, can it be repaired rather than discarded?

4. Product life cycle

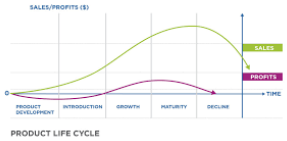
1 Be able to **describe & discuss** the following stages of a products life cycle; **Design Introduction, Evolution, Growth, Maturity, Decline And Replacement**.

Design Introduction

The development stage of the product life cycle is the **research phase** before a product is introduced to the marketplace. This is when companies bring in investors, develop prototypes, test product effectiveness, and strategise their launch. Due to the nature of this stage, companies **spend a lot of money without bringing in any revenue** because the product isn't being sold yet. *(Apple $2.5 Billion on R&D per year.)*

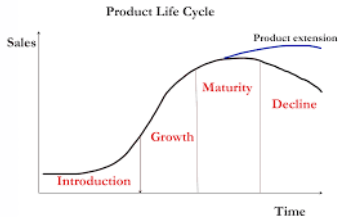
Evolution

The evolution stage is when a product **is first launched** in the marketplace. This is when marketing teams begin building product awareness and reaching out to potential customers. Typically, when a product is introduced, **sales are low and demand builds slowly.**



Growth

During the growth stage, consumers have accepted the product in the market and customers are beginning to truly buy-in. That means **demand and profits** are growing, hopefully at a steadily rapid pace.



Maturity

The maturity stage is when the sales begin to level off from the rapid growth period. At this point, companies begin to **reduce their prices** so they can stay competitive amongst growing competition.
This is the phase where a company begins to become more efficient and learns from the mistakes made in the introduction and growth stages.
Marketing campaigns are typically focused on differentiation rather than awareness, prices might be lowered, and distribution becomes more intensive.
During the maturity stage, products begin to enter the **most profitable stage**. The cost of production declines while the sales are increasing.

Decline & Replacement

If the product doesn't become the preferred brand in a marketplace, there will be a decline. Sales will decrease during the heightened competition. Additionally, consumers might lose interest in the product as time goes on. If a company is at this stage, they'll either **discontinue their product**, sell their company, or innovate and **iterate** on their product in some way.
To extend the product life cycle, successful companies can implement new advertising strategies, reduce their price, add new features to their increase value proposition, explore new markets, or adjust brand packaging.

2 **Students Should Be Familiar With Examples Of How Designers Refine And Re-develop Products In The Lifecycle Of Specific Products.**

The evolution of products means the gradual change that occurs in products as designers and manufacturers incorporate new ideas, materials, technologies, manufacturing methods and other aspects which offer scope for improvements and increase sales. Examples of how some products have evolved with the creation of desirable new features to maintain customers demand;
Smart Phones- Higher definition cameras, powerful processors, larger screens, subtle changes in shape and form, larger memory etc…
Television- Slim design, LED's, Organic LED's (OLED), 'Smart' capability, HD, UHD, Curved screens, HDR, 3D…
Digital Cameras- Increased pixel count, faster speed for bursts of shots, articulated screens, electronic viewfinders, HD / UHD movie capability, Water resistance, Multiple card capacity, etc…
Progressive feature upgrades in new models result in consumers feeling they need to replace their device (**Planned Obsolescence**) to keep it up to date. Currently mobile phone owners keep their phone for 2 to 3 years, but not so long ago customers would upgrade their device every 18 months. Other strategies to maintain sales & revenue include developing complementary devices such as smart watches / ear pods etc…