1. Scales Of Manufacture

Be Able To Describe, The Different Scales Of Production Giving Example Products And Specific Manufacturing Methods;

1	**One-off/Job Production / Bespoke**	Involves producing **custom work**, such as A one-off product for A **specific customer** or A small batch of work in quantities usually less than those of mass-market products

Birthday cake, F1 Car, Specialist jewellery, Large Buildings / Towers, Wedding Dress, Prosthetics for limbs.

Skilled workforce, Specialist machines, High quality products manufactures, Expensive to buy / make, High standard of quality control, Made for a specialist client / market.

2	**Batch Production**	A method of manufacturing where the products are made to specified amounts, within a time frame.

Flat packed furniture, Special edition cars, Baked goods, Clothing, Computer chips, Computer software, Electrical goods, Newspapers/magazines

A production line is set up (one task for each stage) semi-skilled / unskilled workers (Flexible – can be redeployed to make another product), Production lines run for a limited period of time.

3	**Mass/ Line Production**	Also known as **flow production** or **continuous production**, is the production of large amounts of standardized products, including and especially on assembly lines.

Recycling centers, Paper production, canned goods, over-the-counter drugs, some household appliances.
The emphasis in mass production is on keeping manufacturing costs low by producing uniform products using repetitive and standardized processes. As products became more complicated to produce, mass production also became more complex.

Automated production line, Unskilled / skilled workforce, Production line runs **24/7/365**, A **very high level** of **investment** in machinery & equipment, **Quality control** at every stage of production.

1. Scales Of Production

4	**Unit Production Systems (UPS)**	A **unit production system** (UPS) is a type of line layout that uses an overhead transporter **system** to move components from work station to work station for assembly.
5	**Quick Response Manufacturing (QRM)**	**Quick response manufacturing** (QRM) is a strategy for reducing lead-times across all functions of an organisation. The resulting improvements in speed and responsiveness increase the organization's agility and responsiveness, resulting in competitive advantage.
6	**Vertical In-house Production**	A manufacturer could buy one of its key **suppliers** to guarantee access to the **raw materials** it needs to produce goods. It might also sign a contract with **a retailer** to guarantee a certain level of sales in the future. This allows a company to **reduce costs** across various parts of production, ensures tighter **quality control**, and ensures a better **flow and control of components** across the supply chain.

Key Acronyms

UPS	
QRM	
JIT	
FMS	
EDI	

4. Sub-assembly

Students should be aware of, and able to explain, sub-assembly as a separate line of manufacture for certain parts of a product.

A sub-assembly is a collection of parts put together as a unit, to be used in the making of a larger assembly or a final item. What may be a subassembly at one point, however, may be an assembly at another.

2. Efficient use of materials

Develop An Awareness Of The Relationship Between Material Cost, Form, And Manufacturing Processes, And The Scale Of Production.

1	**The Development Of Designs Which Use Materials Economically And With Regard To Their Characteristics.**	❑ Making use of standard size sheets / boards. ❑ Nesting of a large number of parts to avoid unnecessary waste. ❑ Employing Blow moulding or Rotational moulding as they generate less waste than a two part injection mould which requires fixing together. ❑ Efficient use of materials such as in the use of Castellated I Beams or tubular low carbon steel (Wassily Chair)
2	**The Use Of Manufacturing Processes Which Increase Accuracy And Reduce Waste.**	❑ The use of automated machinery avoids the use of slow, inefficient humans. ❑ The use of CNC machines to allow for repeatability & accuracy, but also flexibility of what they manufacture.
3	**The Savings To Be Gained When Comparing Bulk Production With One-off Production.**	Making 'one' can be expensive and time consuming. Manufacturing in mass or line production results in a much lower unit cost. Materials can be bought using economies of scale and automation can be employed on the production line to make the products.
4	**The Advantages Of Just In Time (JIT) Manufacture**	'Just in Time' is a system based on efficient organisation, from receiving a customer order, the manufacture of the product on the production line and finally distribution. This system is often called '**lean manufacture**'. ❑ Money is not **wasted** on extra materials. ❑ The customer is supplied with an order **quickly**. ❑ **Efficiency** at every stage becomes the culture. ❑ Allows **rapid changes** to be made to the production line. ❑ Manufacturing / production **downtime** is kept to a minimum.

3. The Use Of Computer Systems

Be aware of how computer systems are used to plan and control manufacturing, reduce waste and respond quickly to changes in consumer demand

1	**Modular/Cell Production**	❑ Cellular manufacturing involves the use of multiple "cells" in an **assembly line** fashion. ❑ Each of these cells is composed of one or multiple different **CNC machines** which accomplish a certain task. ❑ The **product moves** from one cell to the next, each station completing part of the manufacturing process. ❑ Enables **quick identification** of problems. ❑ Improvements in **productivity** and **quality**. ❑ Reducing the amount of **inventory**, **space** and **lead time**.
2	**Just In Time (JIT)**	❑ A system based on receiving a customer order, the manufacture of the product on the production line and finally distribution. ❑ Just in time relies on a good, **efficient working relationship** between the supplier / suppliers, the manufacturer and the distributer.
3	**Quick Response Manufacturing (QRM)**	**Shorten the time** between when an order is received until the delivery of the product. Also includes reducing the time required to bring a new product to the market.
4	**Flexible Manufacturing Systems (FMS)**	A **production** method that is designed to easily adapt to changes in the type and quantity of the product being manufactured.

Computer Controlled Systems In Production, Distribution And Storage	**Automatic Ordering**	A system **automatically** reorders items in a warehouse when a minimum quantity is reached, it **reorders** a sufficient number of parts to replenish them and bring them back to a safe working levels.
	Stock Management	❑ The practice of **ordering, storing, tracking, and controlling inventory**.
	Electronic Transfer Of Data	❑ (EDI) is the **electronic** exchange of business information using a standardised format; a process which allows one company to send information to another company **electronically** rather than with paper.