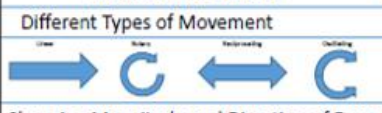

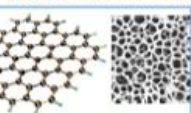





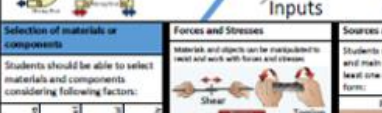
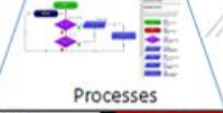



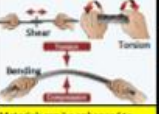








MECHANICAL DEVICES		PART 1: CORE AND TECHNICAL PRINCIPLES		DEVELOPMENTS IN NEW MATERIALS	
Different Types of Movement 		<b>SYSTEMS APPROACH TO DESIGNING</b> 		<b>Modern Materials</b> 	
Changing Magnitude and Direction of Force 				<b>Composite Materials</b> 	
<b>Rotary Systems</b> 		<b>Inputs</b> 		<b>Technical Textiles</b> 	
<b>Levers</b> 		<b>Processes</b> 		<b>Smart Materials</b> 	
<b>Linkages</b> 		<b>Outputs</b> 			
<b>Selection of materials or components</b> Students should be able to select materials and components considering following factors: <b>ACES</b> <b>CAFE</b>		<b>Forces and Stresses</b> Materials and objects can be manipulated to resist and work with forces and stresses. 		<b>Design Strategies</b> Generalize imaginative and creative design ideas using a range of different design strategies, including: <ul style="list-style-type: none"> <li>• Collaboration</li> <li>• User centred design</li> <li>• A systems approach</li> <li>• Iterative Design</li> <li>• Avoiding Design fixation</li> </ul>	
		<b>Sources and Origins</b> Students should know the sources and main processes of converting at least one material into its workable form: <b>Paper and Board</b> <b>Timbers</b> <b>Metals</b> <b>Polymers</b> <b>Textiles</b>		<b>Designing and Making Principles</b>	
		<b>Environmental, social and economic challenge:</b> <b>Information:</b> <b>Increase in carbon dioxide levels:</b> <b>The need for fair trade:</b>		<b>Communication of design ideas</b> Develop, communicate, record and justify ideas including: Freehand sketching, 2D and 3D drawings, system and schematic diagrams, Annotated drawings, Exploded diagrams, Working drawings, Audio and visual recordings, Mathematical modelling, Computer based tools, Modelling	
<b>Part 2: Specialist Technical Principles</b>		<b>Part 3: Designing and Making Principles</b>			
<b>Ecological and social footprint</b> Ecological issues in the design and manufacture of products		<b>Using and working with materials</b> Properties of materials; must know and understand how different properties of materials and components are used in commercial products and how these affect use and performance.			
		<b>Stock forms, types and sizes</b> Commercially available types and sizes of materials and components: <b>Papers and Boards:</b> <b>Timber:</b> Planks, boards,			
<b>Alessi</b> - A house ware and kitchen utensil company in Italy, producing everyday items from plastic and metal created by famous designers for example Philippe Starck in a post-modern style.				<b>Apple</b> - The Apple Computer Company was founded on April 1 <sup>st</sup> 1976 by Steve Jobs, Steve Wozniak and Ronald Wayne. The company's hardware products include the iPhone, iPad, Apple Mac, iPod, and Apple TV. Software includes MacOS, iOS, iTunes, Safari, iLife, iWork, Apple Music, iCloud and App Store.	
<b>Heatherwick Studio</b> - A company who employs around 180 architectural designers and makers in London. Work includes the Olympic Cauldron.				<b>Joe Casely-Hayford</b> - An English fashion designer of men's and women's clothing. Studied at Saint Martins School of Art in 1978. He is famous for dressing The Clash, Lou Reed, Liam Gallagher, Jarvis Cocker, Take That and Suede.	
<b>Pixar</b> - An American computer animation film studio based in California that is a subsidiary of the Walt Disney Company. Pixar has produced 18 feature films beginning with Toy Story in 1995.				<b>Raymond Loewy</b> - A French born American Industrial Designer who achieved fame for the magnitude of his design efforts across a variety of industries. Among his designs were the Shell, BP, and Air Force One Logos. The Coca Cola vending machines, and the Concorde and NASA interiors	
<b>Tesla</b> - Nikola Tesla an inventor and mechanical engineer best known for his contributions to the design of the modern alternating current (AC) electric supply system.				<b>Zaha Hadid</b> - An Iraqi-British architect. Major works include the Olympic Aquatic Centre London 2012, Broad Art Museum USA, and the Guangzhou Opera House China.	
					

## The Categorisation Of Textiles

### Woven Textiles

Woven fabrics are made up of a **welt** - the yarn going across the width of the fabric - and a **warp** - the yarn going down the length of the loom. The side of the fabric where the welts are double-backed to form a non-fraying edge is called the **selvedge**.

#### Plain Weave e.g. Calico

In plain-weave fabric the warp and welt are aligned so that they form a simple cross-over pattern. Plain-weave is strong and hardwearing, so it's used for fashion and furnishing fabrics.

#### Twill Weave e.g. Denim

In twill-weave fabric the crossings of welt and warp are offset to give a diagonal pattern on the fabric surface. It's strong, drapes well and is used for jeans, jackets and curtains.

### Non Woven Textiles

**Nonwoven fabric** is a fabric-like material made from staple fibers (short and blunt fibers) being bonded together by chemical, mechanical, heat or solvent treatment. They are cheap to produce but not as strong as woven or knitted fabrics.

#### Felted Wool Fabric

**Felt** is a textile material that is produced by matting, condensing and pressing fibers together. Felt can be made of natural fibers such as wool, or can be made from many products for example this nonwoven table top.

#### Bonded Fibers / Webs

**Bonded fiber fabrics** are made from webs of synthetic fibers which are bonded together with heat or adhesives. It can be made into many things for example these dish cloths.

### Knitted Textiles

A knitted fabric is a textile that results from knitting. Its properties are distinct from woven fabrics in that it is more flexible and can be more readily constructed into smaller pieces.

**Weft Knitted Fabrics** are made by looping together long lengths of yarn. They can be made by hand or machine. The yarn runs in rows across the fabric. If a stitch is dropped it will ladder down the length of the fabric. The fabric is stretchy and comfortable and is used for socks, T-shirts and jumpers.

**Warp Knitted fabrics** are made by loops interlocking vertically along the length of the fabric. Warp knits are slightly stretchy and do not ladder. Warp-knitted fabric is made by machine. It is used for swimwear, underwear and geotextiles.

### Natural Fibers

Natural fibers come from plants, animals and mineral. They usually have short fibers, called staple fibers. The exception to this rule is silk which has long fibers sometimes 1 km!

#### Animal - Wool

Good for jumpers, suits and blankets and has the following qualities: warm to wear, absorbent, dries slowly, breathable, repels rain, soft or coarse handle, can shrink, should be dry cleaned, good drape, not durable, creases drop out.

#### Vegetable (Plants)- Cotton

Good for making jeans, T-shirts and towels and has the following qualities: good to wear, very absorbent, dries slowly, soft handle, good drape, durable, creases easily, can be washed and ironed.

### Synthetic Fibers

Synthetic fibers are man-made, usually from mineral resources. They are continuous filament fibers, which means the fibers are long and do not shatter back to be spun into yarn.

#### Polyester

Good for raincoats, fleece jackets, children's nightwear, medical bandages and working clothes and has the following qualities: low weight, very absorbent, dries quickly, soft handle, good drape, very durable, crease resistant, easy care, can be recycled.

#### Acrylic

Good for jumpers, fleece jackets and blankets and has the following qualities: warm to wear, non-absorbent, dries quickly, stiff handle, lightweight, good drape, durable, can be recycled, easy care.

### Vocabulary to describe the properties of textiles

Aesthetic properties	Functional properties	Comfort properties
Handle	Strength	Absorbency
Drape	Durability	Breathability
Colour	Crease resistance	Elasticity
Appearance	Flame resistance	Softness
	Stain Resistance	Stretch
	Water Resistance	Warmth
	Aftercare cost	