

Year 10 Half Term 1

Materials

| Modern & Smart Materials | | | Papers & Boards | | |
|--------------------------|--------------------------------|---|-----------------|--------------------------|--|
| 1 | Smart Materials | They change their properties in response to stimuli, e.g. temperature, light, stress, moisture or pH and return to their original state when the stimulus is taken away. | 11 | Grid Paper | Grid paper may have a square or isometric pattern printed on it. |
| 2 | Shape Memory Alloys | Alloys that 'remember' their original shape. They can be easily shaped when cool, but they return to their original shape when heated above a certain temperature. | 12 | Bleed-Proof Paper | Used by designers when drawing with felt-tips and marker pens. The ink doesn't spread out (bleed) — it stays put. |
| 3 | Thermochromic Pigment | Change colour reversibly in response to light. | 13 | Layout Paper | This paper is thin and translucent and is used for general design work — particularly sketching ideas. |
| 4 | Photochromic Pigment | They react to temperature so when the temperature changes, the product changes colour. The colour changes back when the object returns to its original temperature. | 14 | Cartridge Paper | This is high quality and has a textured surface. It is great for sketching with different drawing materials like pencils, crayons and inks. |
| 5 | Modern Materials | A modern material is a material that has been engineered to have improved properties. | 15 | Tracing Paper | This is semi-transparent and is used to copy images. |
| 6 | Graphene | A super-thin layer of graphite. It's incredibly light and strong and is a great conductor of heat and electricity. | 16 | Foil Lined Board | This board has an aluminium foil lining. It's often used to package food. |
| 7 | Metal Foams | A metal (e.g. aluminium) that contains many gas-filled spaces which make the material lightweight. They also keep some of the metal's properties too — they're stiff, tough, and strong under compression. | 17 | Foam core board | This is polystyrene foam between 2 thin layers of card. It's stiff, lightweight and the thin outer card layer can be scored. |
| 8 | Titanium | An extremely corrosion-resistant metal with a high strength-to-weight ratio. | 18 | Duplex board | This has a different colour and texture on each side. It's often used where only one surface is seen, so that only one side needs to be smooth for printing. |
| 9 | Liquid Crystal Displays | The liquid crystals used are made of a mixture of chemicals. When an electric current is applied, the crystal's shape is modified — this in turn changes the image seen on the screen. They are thin, lightweight and energy efficient. | 19 | Corrugated card | This is made up of a fluted inner core sandwiched between two outer layers (the liner), which can be printed on. The flutes add strength and rigidity. |
| 10 | Composite Materials | Composites are made from two or more different materials bonded together. They often have different (more useful) properties than those of the individual materials they're made from. | 20 | Ink jet card | This is a card used for ink jet printing. It's designed so that the ink doesn't bleed. |

| Metals | | | Electronic Systems | | |
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| 21 | Ferrous Metals | They contain iron and are magnetic. They are prone to rust and therefore require a protective finish, which is sometimes used to improve the aesthetics of the product it is used for as well. | 32 | Block diagrams | They are clear, simple diagrams showing all of the input, process and output elements that make up the system being designed. |
| 22 | Non-Ferrous Metals | They do not contain iron and are not magnetic. They do not rust. | 33 | Flowcharts | They are clear diagrams showing the individual steps that will take place in the process. |
| 23 | Alloys | They are mixtures of metal with an element to improve its properties or aesthetic. Non-ferrous metal may require a protective finish. | 34 | Circuit diagrams | Used simplified universal symbols to represent the electronic circuit and its components. A circuit diagram shows how the components are connected |
| Plastics | | | 35 | Inputs | Input devices take a signal from the physical or 'real world' and turn it into an electronic signal that processes the device. |
| 24 | Thermoplastics | They can be heated and shaped many times. | 36 | Switches | They allow current to flow through them when the contacts inside are joined together. |
| 25 | Thermosetting Plastics | They can only be heated and shaped once. | 37 | Sensors | They are used to detect changes in light level, temperature and pressure to turn a circuit on. |
| Textiles | | | 38 | Process Device | They take the signal from the input stage of a system and act on it by changing it in some way. |
| 26 | Natural Fibres | They come from plants, animals or insects. They are easily renewable and biodegradable. | 39 | Semi-Conductors | They control whether it is going to conduct. |
| 27 | Synthetic Fibres | They are made mainly from non-renewable coal and oil refined into monomers, which join together in a process called polymerisation. They do not degrade easily. | 40 | Integrated circuits | They are tiny chips that contain resistors, capacitors and transistors, which work together to complete the process they have been designed for, eg a timer, counter or microcontroller. |
| 28 | Blended Fibres | Blended fibres are mixtures of fibres that combine properties of two or more fibres. | 41 | Microprocessors | The main processor inside a computer is designed to be programmed to perform different functions. |
| 29 | Woven Fabrics | They are made by interlacing yarns on a loom. Fray easily when cut. Don't stretch much | 42 | Outputs | They allow a system to present information back into the 'real' world. |
| 30 | Non Woven Fabrics | They are made from fibres which have not been spun, weak, easily torn cheap to produce.eg. felt, interfacing. | 43 | Light outputs | When current flows through the filament it heats up and light is produced. |
| 31 | Knitted Fabrics | They are made from loops, stretches, loses shape, unravels easily, and are warm. Eg. Jersey, sweatshirting, fleece. | 44 | Sound outputs | Can be produced using buzzers or speakers. |