GCSE Design and Technology Revision

An overview

Matthew Williamson fabric

Consider –

- Use of line
- Use of colour
- Type of repeat pattern
- Tonal contrasts
- Use of imagery
- Inspiration for his work
- Composition

Orla Kiely fabric

Consider –

- Source of inspiration
- Style and stylisation of imagery
- Type of repeat pattern
- Use of colour
- Use of contrasts in tone and colour

Laura Ashley fabric

Consider –

- Chosen subject matter and style used
- Use of colour and palette used
- Type of repeat pattern
- Target market commercially/appeal
- Composition

Stella McCartney Adidas Jacket

Consider –

- Use of branding and effect on sales
- Source of inspiration and stylisation of subject matter
- Use of colour and contrasts
- Composition of garment aesthetically
- Influence of trends/association with sports brand

Sources of power

Fossil fuels – coal, gas and oil will eventually run out. Burning them adds to global warming.

Nuclear power – uses uranium. The waste is hazardous and can have effects over 1000's of years. Very efficient and cost effective though.

Renewable energy - Wind, Solar, Tidal, Water, Wave. The energy/resource is not depleted when used.

Biomass – burning natural materials for heat. Produces atmospheric pollution. Not as much as fossil fuels. Crops grown for this purpose.

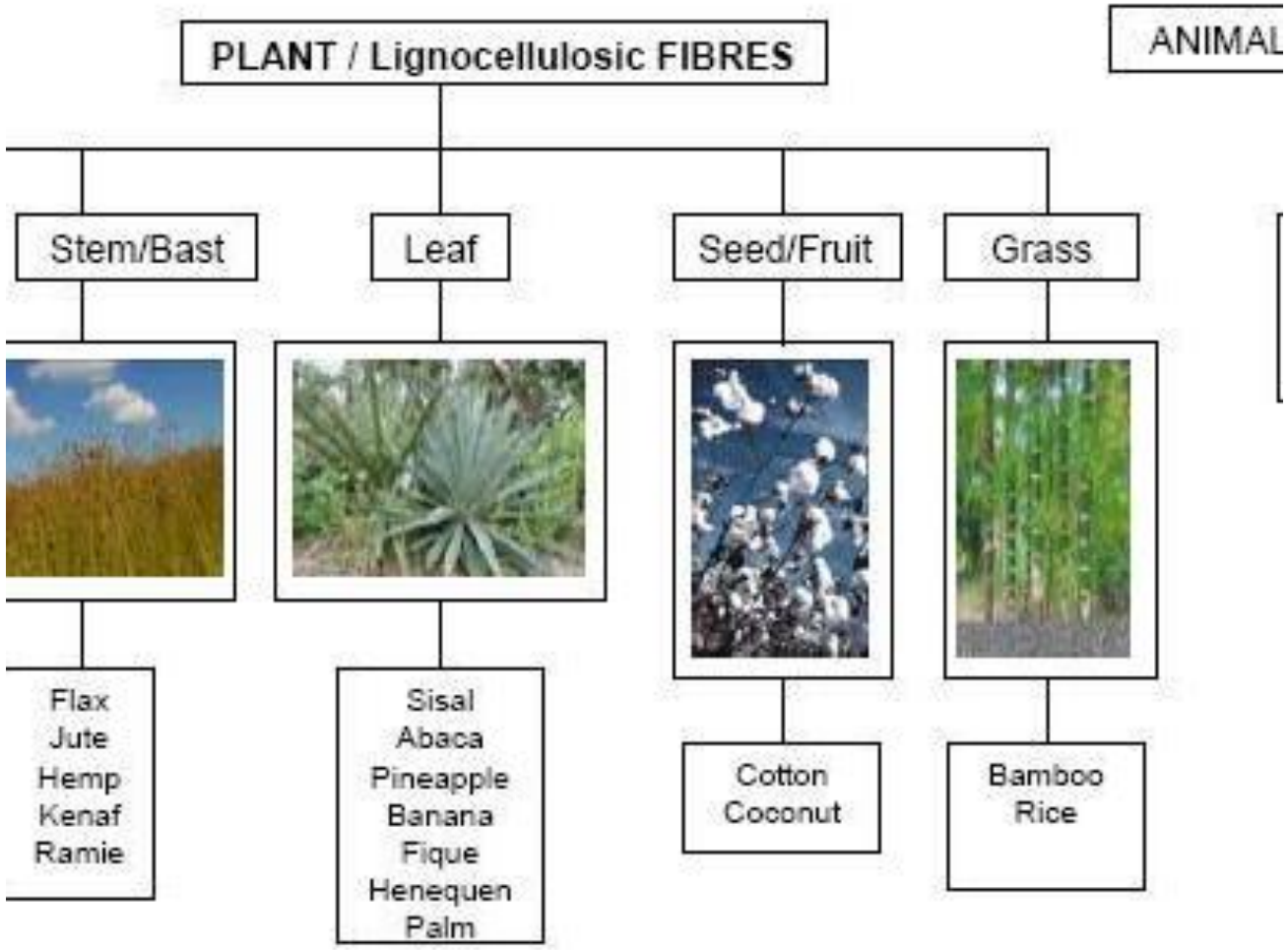
Natural Fibres/polymers

Sourced from plants – Cotton, hemp, sisal, ramie, coconut, bamboo, banana, jute, flax etc

Sourced from animals – alpaca, camel, sheep (wool), goat(cashmere, mohair), rabbit (angora), silk worm (silk), llama etc

Properties – breathable, absorbent, comfortable (although wool can be itchy), insulative from heat (cotton, flax/linen), insulative from cold (animal hair/wool), lustrous and strong (silk)

Fibres from animal sources need moth protection. Wool/animal hair can be felted and needs special care with washing.



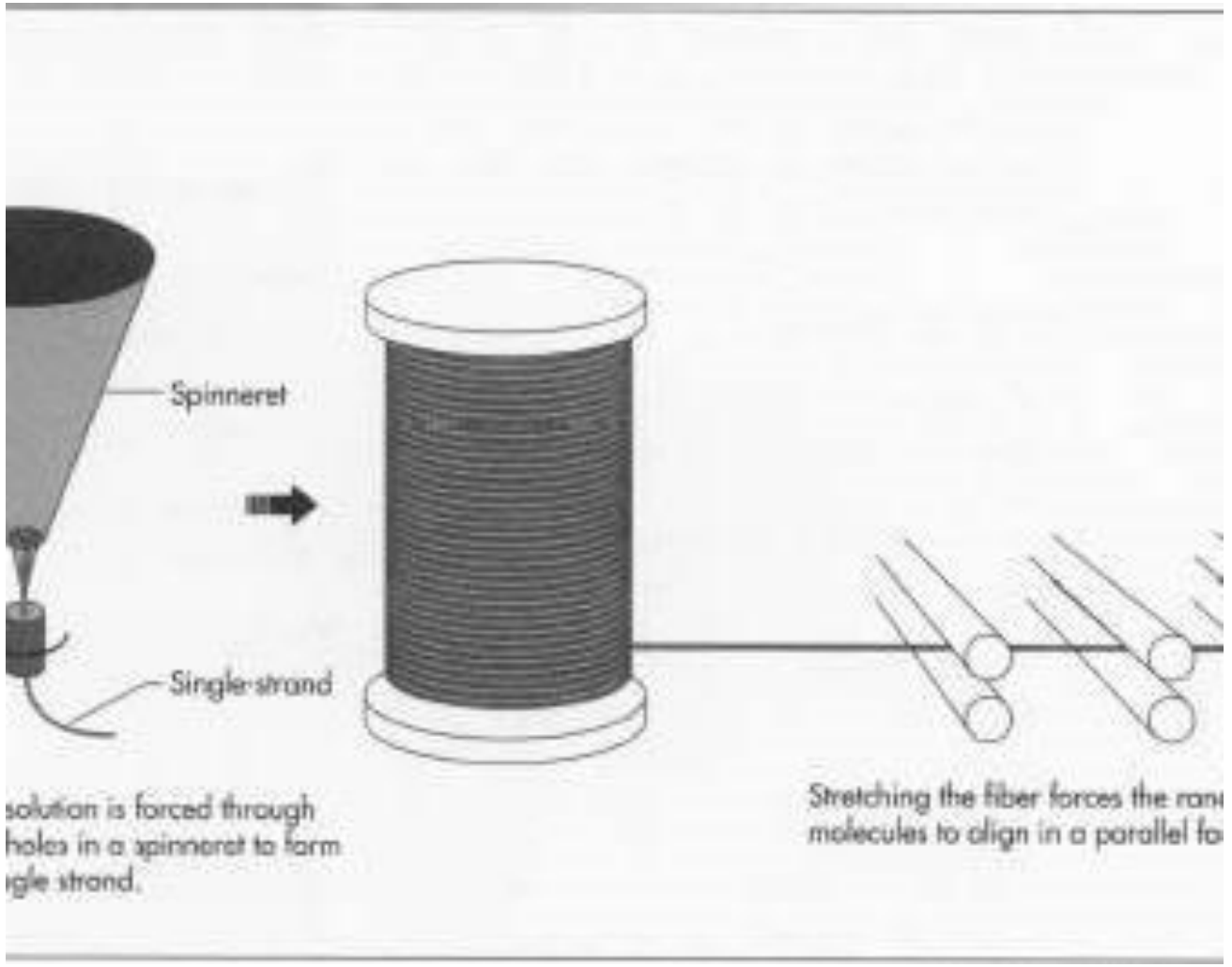
Synthetic Fibres/polymers

Polyester – strong, abrasion resistant, not absorbent, crease resistant, can be heat set, smooth

Polyamide (nylon) – very strong, abrasion resistant, not absorbent, can be heat set

Elastane – stretchy, crease resistant, needs to be blended with other fibres, washable at low temp

Acrylic – light weight, soft, warm, wool like.

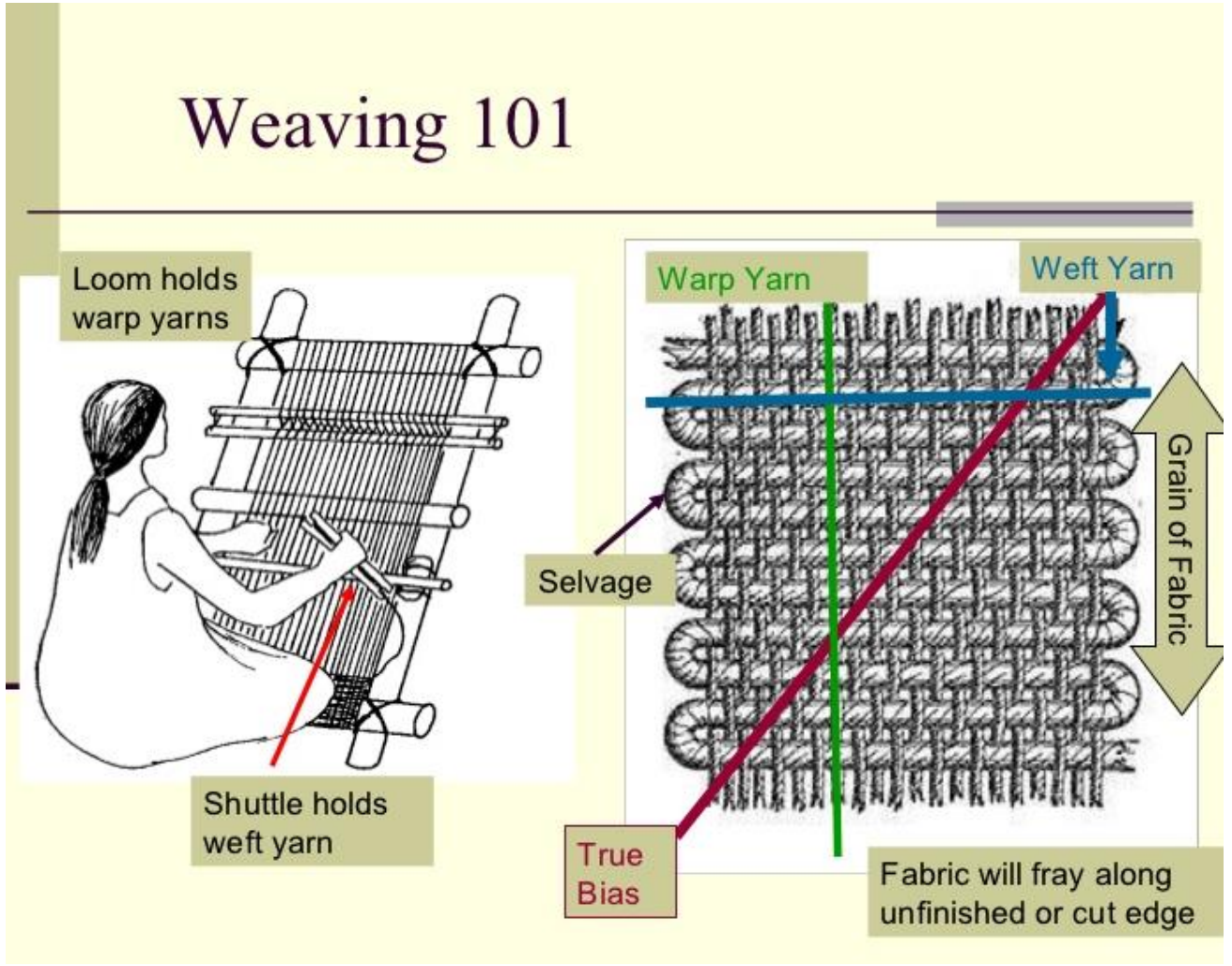


Fabric construction techniques

Woven – twill (diagonal pattern, very strong, thicker, under 2, over 2 but pattern moves diagonally on each row), satin (lustrous, snags easily, frays easily, under 4, over 1), plain (smooth surface, cheap to produce, under 1, over 1, widely used) , basket (basket pattern, over 2, under 2), triaxial weave, jacquard weave.

Knitted – warp knitted (industrially knitted eg t shirt fabric, stable, rolls at edges though, stretchy), weft knitted (knitted in rows, stretchy, unravels/ladders easily)

Non woven – bonded (cheap to produce, weak, often used for disposable products), felted (can be moulded, can be seamless, insulative), needle punched (cheap, used for large amounts of protective/insulative fabrics)



Stitched Decoration Techniques

Applique – Use a stencil to cut out applique fabric shapes. Use bondaweb to adhere fabrics together. Finish edges and prevent fraying with satin stitch or blanket sttich.

Hand embroidery – Chain stitch, back stitch, herringbone stitch, running stitch etc. Use embroidery hoop to keep fabric taught. Mark design with tailor's chalk 1st. Keep stitches even in size. Secure threads with extra stitches at beginning and end.

Machine embroidery – Use a darning foot for freehand machine embroidery and lower feed teeth on machine. Use stitch n' tear to reinforce fabric. Also CAD CAM machine embroidery. Images are converted to coordinates (CNC). Ths technique ensures accuracy and consistency.

Printing and Dying techniques

When using cold water dyes, natural fibres must be used as they are absorbent. Use a mordant to fix dyes. If large areas of fabric are dyed, fabric is wetted 1st so dye is evenly distributed.

Resist Dye techniques – batik, tie and dye, tritik. Use of wax, string, thread or bands, flour paste etc resists the dye to create patterns. This is removed after dying, when dry.

Printing techniques – roller, screen, flock, stencil, transfer, digital, sublimation.

Consider equipment and techniques used and whether suitable for job, batch or mass production.

Making techniques

Seams – plain open seam, hong kong (bound) seam, French seam, flat fell (double stitched) seam, piped seam

Shaping techniques – Darts, gathers, pleats (knife, box, inverted), shirring elastic, casings with cord/elastic, smocking, flounce

Edges – Bias binding, machine sewn hem, blind hem, overlocked edge, facing

Features - Godets, bows, Suffolk puffs, cut aways, pockets (patch, welt, inside, pleated, with flap..)

Consider step by step method, equipment and techniques used.

Components

Decorative components – sequins, beads (bugle, rocaille, seed), ribbon, lace trim, iron on gems

Fastenings – zips, buttons, press studs, hook and eyes, velcro, cord, elastic cord

Structural components – elastic, stitch n' tear, bondaweb, interfacing (heavy, medium and light weight. Can be iron/stitch on), skrim, boning, polyester wadding, toy stuffing

Consider what type of products they are suitable for, how to sew them onto a product and safety factors for your end user.

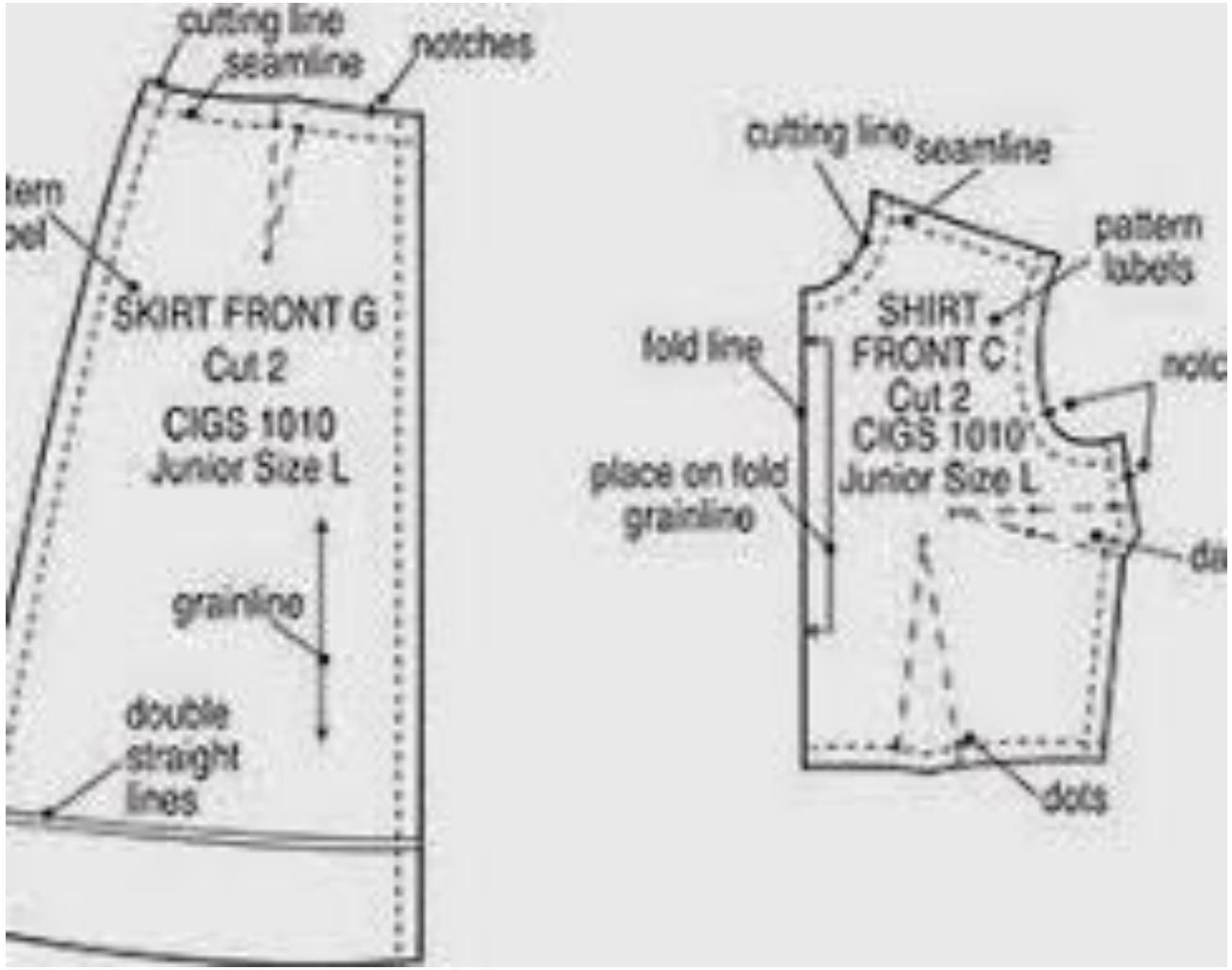
Pattern cutting

Commercial pattern symbols - Straight of grain, place on fold, notches, seam line (seam allowance is usually 1.5cm), lengthen/shorten lines, cutting line, darts, centre dart

Lay planning –

- Line up selvages together (these are the sides).
- Decide which way up the fabric should go (fabric pattern or nap will make this obvious).
- Place pattern pieces close together to minimise wastage. Make sure they are the right way up if fabric has a pattern or nap.
- The grain line or fold grain line should be parallel with the selvages.
- Pin and cut out pattern pieces. Tack darts.
- Assemble product in a logical order. Eg for a top – shoulder seams, then insert sleeves, then sleeve and side seams, then facings and hems.

Remember computer software is used in industry to work out the most economical lay plans. If fabric has a pattern or a nap this will affect lay planning. Wasted fabric is expensive.



Manufacturing

Production systems – job, batch, mass, flow, just in time (JIT), progressive bundle system, line production, cell production..

- What equipment would be used **eg** for cutting fabric – shears, band saw or laser cutter
- Health and safety – staff training, signage, labelling of chemicals, protective clothing, working conditions, storage of materials, risk assessment, COSHH (control of substances hazardous to health)
- Flow charts to show: method, quality control checks, feedback loops, input of materials, techniques and tolerances, sub assembly. Input, process, output

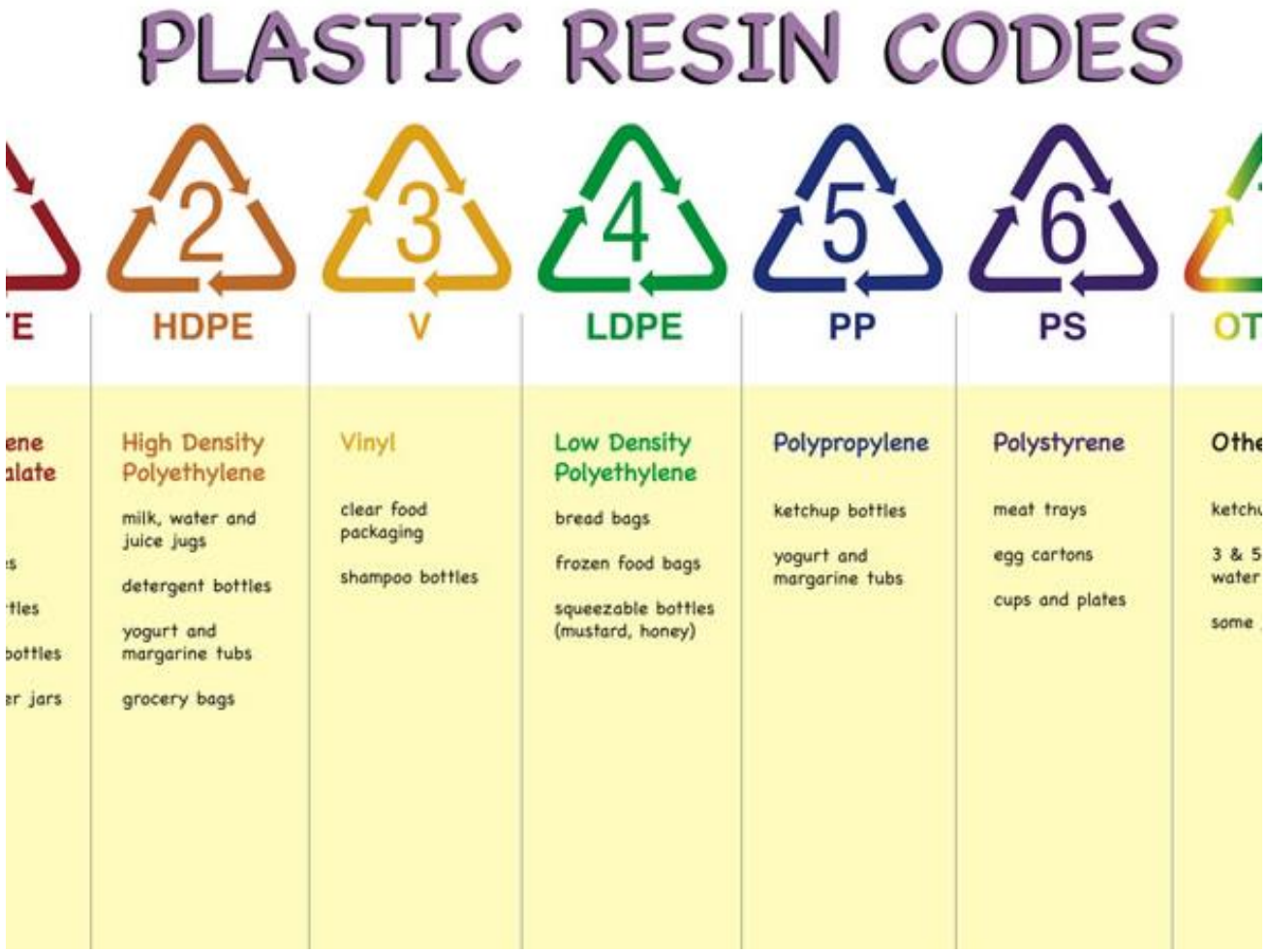
Resistant materials

Woods – **hard woods** ash, balsa, oak, beech, mahogany **soft woods** pine, larch, spruce
Manufactured boards laminated, compressed, MDF, plywood, chip board

Plastics – HDPE, LDPE, PP, PETE (for water bottles), vinyl etc

Metals – Copper, steel, iron, aluminium, zinc, tin. Consider which ones are magnetic, corrosion resistant, heavy, strong, ductile…

Techniques to mould and form resistant materials – vacuum forming (plastic), steam bending (wood), strip heater (plastic), milling (metal), casting (metal), soldering (metal), extrusion (plastic), laminating (wood and plastic)…



Smart, modern & technical materials

Smart materials are designed materials that have 1 or more properties that can be significantly changed by external stimuli eg temp, stress, moisture, PH, electric fields etc. Eg thermochromic and photochromic pigments, shape memory alloys, polymorph, conductive polymers, phosphorescent materials, microencapsulation

Modern materials – use of new technology Graphene (light, thin, hard, conducts electricity and heat), nanomaterials (adds strength but not weight, antibacterial, less absorption), Teflon (non stick coating), corn starch polymers (sustainable plastic)

Technical materials – eg conductive fabrics, nomex, Kevlar, gore tex, microfibre

Mechanisms

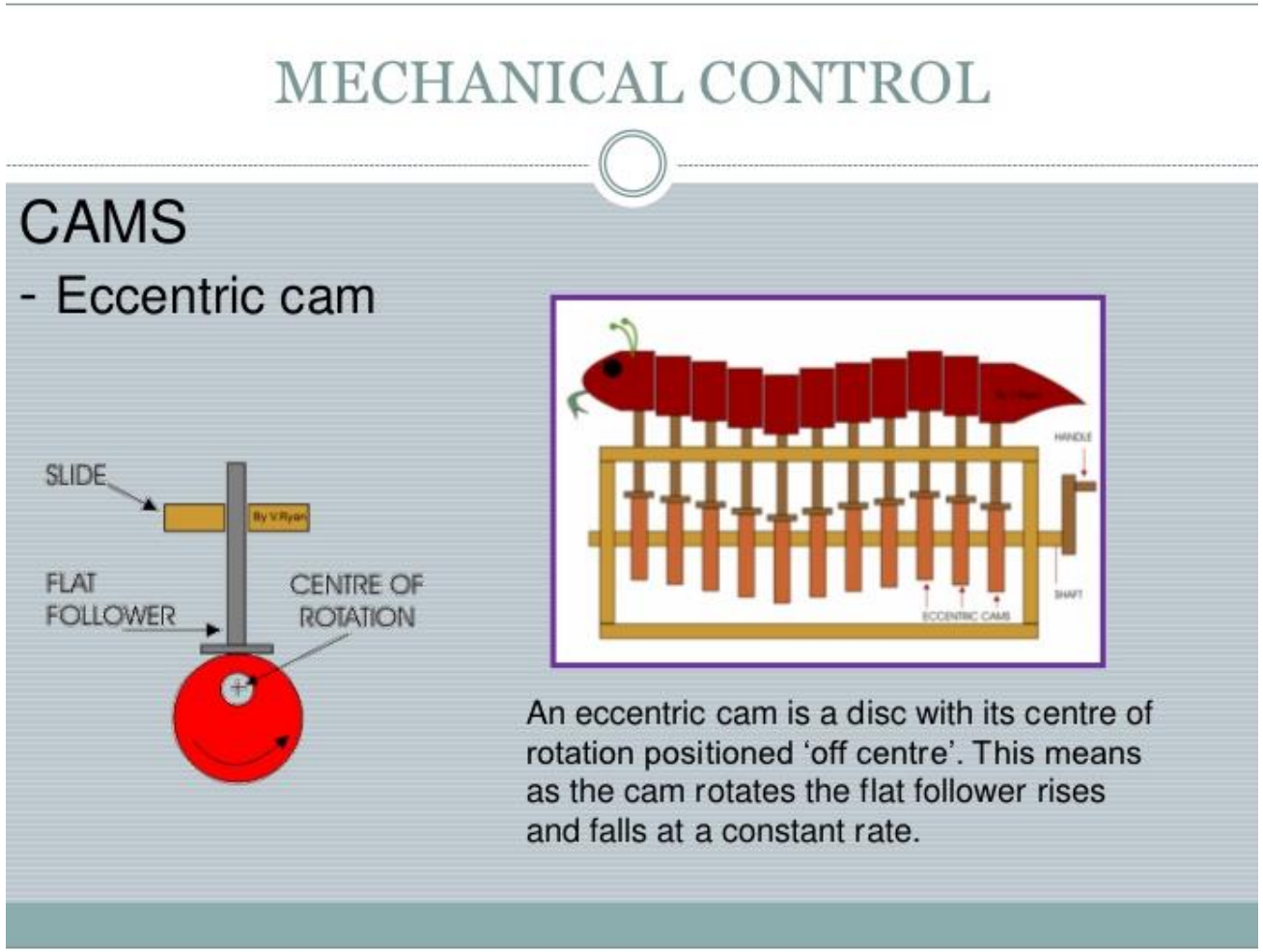
Types of motion – linear (push/pull), reciprocating, rotary, oscillating. *Torque* is a twisting force.

Friction – resistance of motion when one object rubs against another. Heat build up. Lubrication may be needed

Velocity ratio = driven pulley/driver pulley

Vel. ratio = driven sprocket/driver sprocket

Examples - Levers (1st, 2nd, 3rd class. Load, effort, fulcrum), linkages, cams (eg cylindrical, spiral, eccentric, disc, flat) and followers (rise, fall, dwell), gear trains, crank and slider, chain and sprocket, pulleys and belts, ratchet and pawl, bell crank, rack and pinion



Papers and boards

Papers – cartridge (has slight texture for drawing on), grid (printed grids for quick modelling and working drawings, isometric has grid lines at 30’ angles), layout (for quick sketching/tracing)

Boards – corrugated (fluted, lightweight for protection, loadbearing), duplex (can be printed, used in food packaging), foil lined (food packaging), foam board (modelling as is stiff and strong), inkjet (for printing), solid white board (smooth, strong and can be printed on)

Sizes – A0, A1, A2, A3, A4, A5, A6

Production aids – die cutters, craft knives and cutting mats, ruler, protractor, French curves, light box

Finishes – lamination, bonding using glue, embossing, varnish, plastic film, high gloss laquer, coloured foil, flittering (glitter), printing

Electronic systems

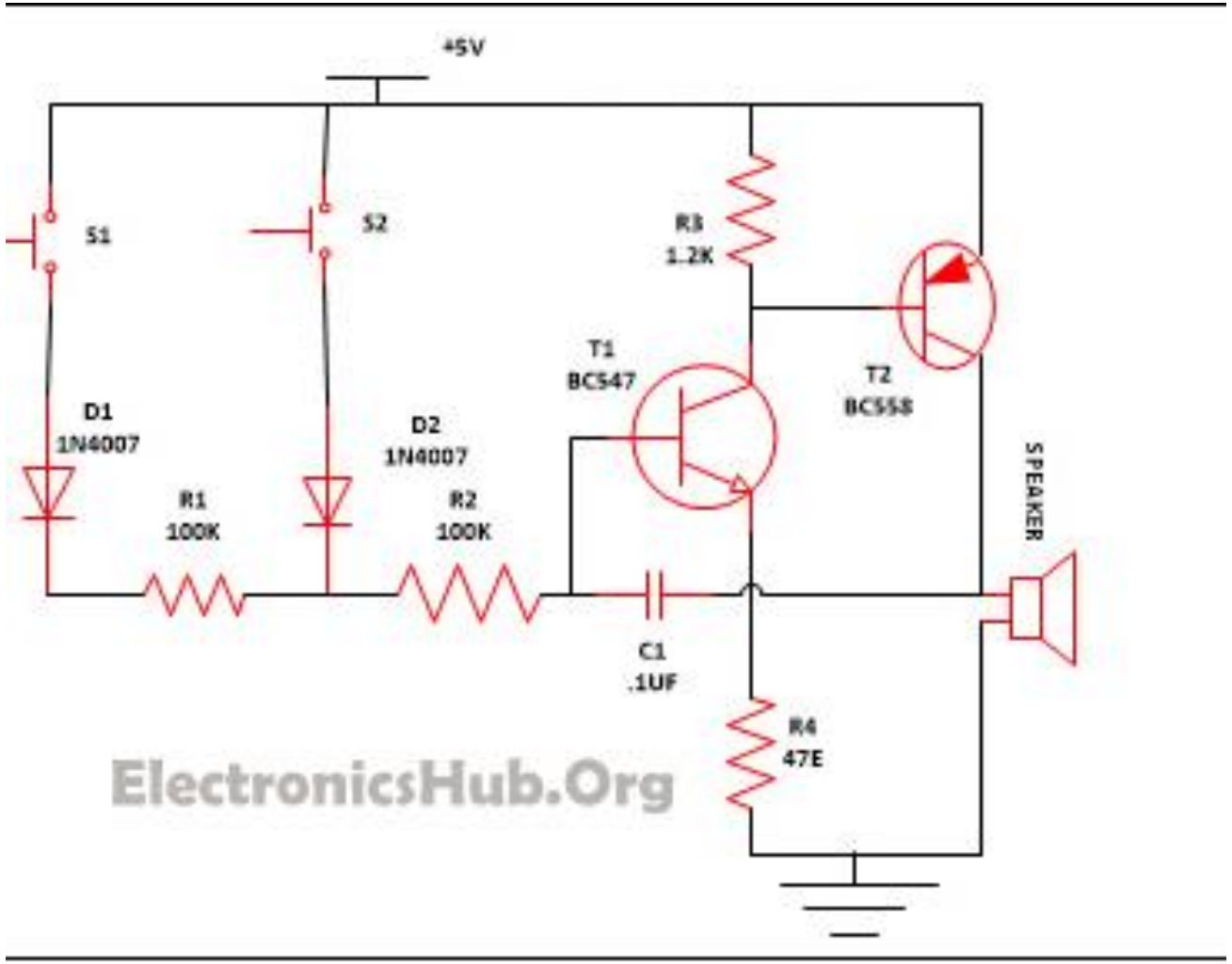
Key terms – Input, process, output, feedback

Electronic circuit – is a complete course of conductors through which a current (amperes) can travel. The path starts and ends at the same point or 'loop'. Learn the symbols used in circuit diagrams.

Parts of a circuit: Voltage source – eg battery causes current to flow **Load** – consumes power eg light bulb **Resistors** - Resist the flow of current to control it (measured in ohms. **Diode** – lets current flow in 1 direction only (anode and cathode at each end, needs + charge to anode and – charge to cathode) **LED** – light emitting diodes emit light when current passes through them **Transistor** – voltage is applied to a base terminal and controls current that flows across the other 2 terminals.

Integrated circuit – contains electronic circuit, transistor, diodes etc which are all photographically etched onto silicone. Products like mobile phones contain these.

Also learn about ways in which **microprocessors** and **microcontrollers** are used in different electronic products.



Maths for DT

Types of skills needed –

- Estimate quantity/cost of fabric or components needed. Standard fabric widths:90cm, 115cm, 150cm, 200cm, 240cm.
- Calculate areas of rectangle, triangle, surface area/volume of shape/form. In order to calculate quantity of materials or components needed.
- Use angles to measure, mark out or create tessellated patterns.
- Graphs, bar charts, histograms – plot, draw, interpret. Analyse data, present design decisions.
- Recognise and use: decimal form, ratios, fractions, percentages
- Know unit measurements:kg, g, mg, km, m, mm, kj, j, tera, giga, mega, kilo, centi, milli, micro, nano.