

Year 7 Knowledge Organiser – Design and Technology - Resistant Materials



Health



Safety

Mandatory Signs

A specific instruction or action that must be followed by individuals to comply with rules, and regulations,

Staying safe using hand tools

- Always wear special safety gear like goggles, gloves, and closed-toe shoes to keep your eyes, hands, and feet safe from anything that might hurt them.
- Use your tools only when a teacher is there to help you and watch over what you're doing.
- Keep your work area nice and clean so you don't trip over anything or get distracted while you're working.
- Treat your tools gently and make sure to tell a teacher if you see any tools that look broken or not working right.
- Always point your tools away from yourself, and never put your fingers near the sharp parts to keep yourself safe from accidents

PPE stands for **Personal Protective Equipment**, which includes items like goggles, gloves, and masks that you wear to keep yourself safe from things that might hurt you while you're



Safety rules for using a Band Facer

- Always wear safety goggles to protect your eyes from wood dust.
- Tie back loose clothing and long hair to prevent injury.
- Use the band facer only with adult supervision and after receiving proper training on its safe use.
- Keep your hands and fingers away from the sanding belt to prevent injuries.
- Turn off the band facer and wait for the sanding belt to come to a complete stop before leaving the machine.



Wood comes from trees, which are living plants found in forests and other natural areas. Trees can be split into two main types: hardwoods and softwoods.

Hardwoods	Softwoods
Come from broad-leaved trees	Come from cone-bearing trees
Usually denser and stronger	Often less dense and less strong
Grow more slowly	Grow more quickly
Examples include oak, maple, and mahogany	Examples include pine, cedar, and spruce
Often used for furniture and flooring	Often used for construction and making paper

Hardwoods



Comes from **deciduous** trees

This is a broad-leaved tree which loses its leaves in the winter.

Beech
Oak
Ash
Teak

Softwoods



Comes from **coniferous** trees

This tree is an evergreen (green all year), needle-leaved, cone-bearing tree.

Pine
Spruce
Cedar
Fir



Manufactured woods are special kinds of wood that are made by people in factories using small pieces of wood. These woods are created to be strong and durable for different kinds of projects.

Plywood: Plywood is a type of manufactured wood made by gluing many thin layers of wood together. It's strong and often used to make furniture, houses, and even some toys.

(Medium Density Fiberboard): MDF is another kind of manufactured wood made by pressing small wood fibre's together with a special glue. It's very smooth and easy to paint, so it's used to make things like cabinets, shelves, and even some decorations.

Managing a forest means we plan long term for the future, plant enough trees, allow them time to grow and then cut them down when needed. Careful management will mean every year more and more trees are planted to ensure there is enough for the future. It is common good practice to plant far more trees than is needed.



Unit guiding question: How can we share design ideas with other people?



Follow this Link to tutorials on the Telford Langley School D&T YouTube channel.

The threshold concept that is truly essential to enable you to access future learning is ...

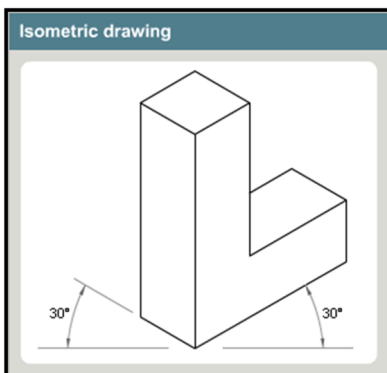
To understand that ideas can be graphically communicated to other people.

To understand that appropriate 3D drawing techniques can enhance design ideas

To understand that Computers can streamline the design process.

You Will:

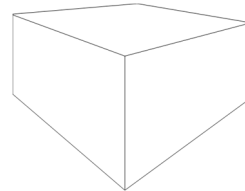
- Be able to add simple notes and labels on designs.
- To recognise the different styles of 3D drawing commonly used.
- To be able to use basic rendering techniques.
- To know what CAD is.
- To be able to use CAD to produce simple shapes
- To be able to use drawings and CAD to produce a simple design



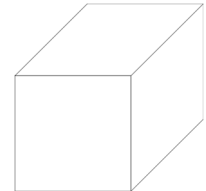
The only two angles you need in isometric drawing are 30 degrees and 90 degrees. You never draw horizontally.

A grid is used to help you draw. Staying on the grid lines makes sure you are drawing at the correct angles.

There are different ways to

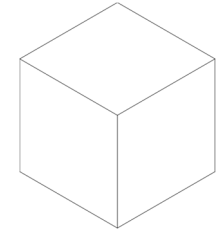


Perspective drawing



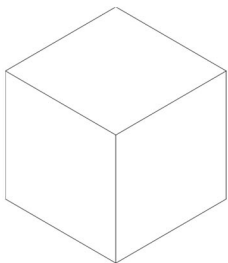
Oblique

Isometric drawings do not attempt to show any perspective at all. This means that dimensions and proportions are shown accurately.

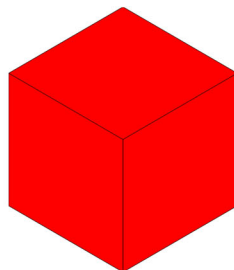


Isometric

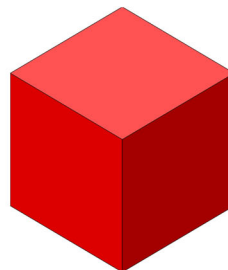
Enhancing drawings. Tone is used to enhance 3D drawings. Tone is how light or dark something is and by showing shadows and highlights we can make drawings look more realistic and 3 dimensional.



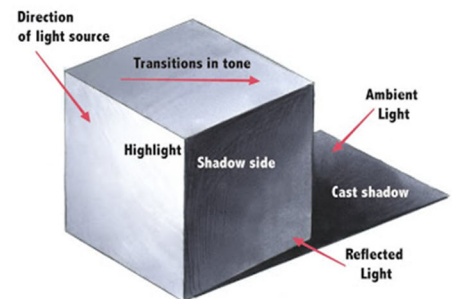
Line Drawing



Coloured



Rendered using shade and tone



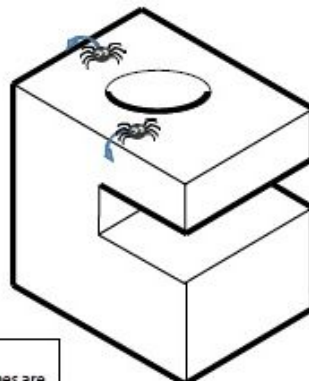
THICK AND THIN LINE TECHNIQUE

Applying thick and thin line technique to a drawing is one of many ways that a designer can enhance the form (shape) of a design drawing.

Look carefully at your drawing and imagine a spider walking over the shape.

If the spider is able to disappear around an edge, then this edge will be drawn with a thick line.

If the spider is still visible once it has crawled over an edge, then this edge will be drawn with a thin line.

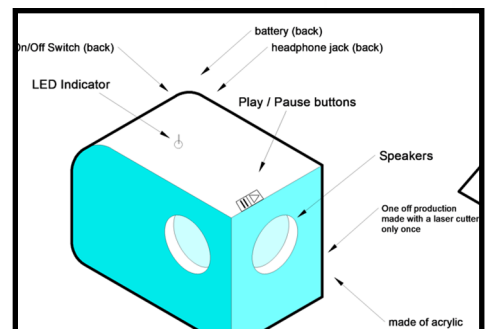


TASK

Go back to the three isometric drawings you did and add thick and thin lines. Try adding a hole to one of them.

Top Tip!

Follow the spider and make sure the thick lines are correct before you put them in.



Computer Aided Design

(CAD) is used to make more accurate drawings and **ANNOTATION** is added to describe parts of our designs and communicate our ideas.



Unit guiding question: How do electronic systems work?



The threshold concept that is truly essential to enable you to access future learning is ...

- To understand that electrical components can be described as input, output, process or passive.
- Understand that different electrical components can be combined to make a system.

"A system is a set of things which are connected and work together to perform a specific function."

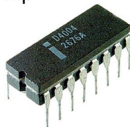
All systems have



Transistor



PIC Chip



Process components are the clever part of the system. They are complicated components like transistors and PIC chips

LDR



Toggle Switch



Variable Resistor.



Input components are sensors, switches or variable resistors. Inputs CONTROL the system.

L.E.D



Speaker

motor



Output components are things that put something out such as light or sound or movement.



Resistor

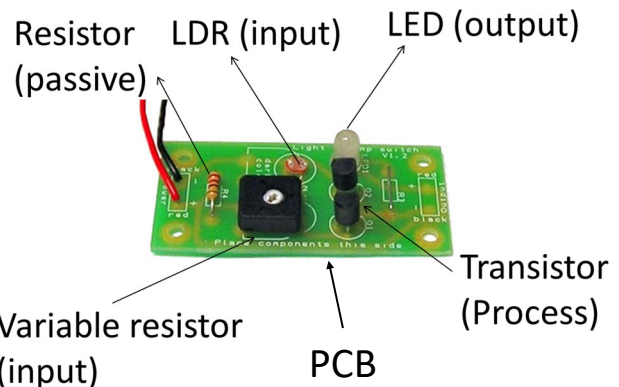


Battery



Mains Plug

Resistors are **Passive components**, they are not input, process or output, they simply reduce the flow of electricity in the circuit. Batteries and mains plugs are in a separate category called power supplies.



The components are combined to make a System. In electronics this is called a **circuit**. The components are mounted on a **printed circuit board (PCB)** using **Solder**.

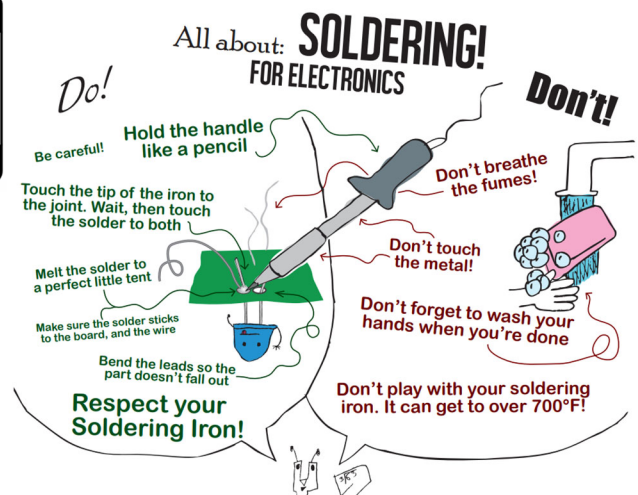
How does it work?

Electricity is the movement of electrons from one atom to another. It flows through materials like lead, tin and copper because they have good **conductivity**. Copper is used for the tracks on a **PCB** and lead or tin is used to **solder** the components to the board.



Solder melts at around 375° C so the components are heated up to this temperature with a **soldering iron**. You need to take care not to burn yourself when soldering.

Because PCBs are made up of lots of different materials it makes them very difficult to recycle. Throwing electronic products and plastics away is very bad for the environment.





Threshold Concepts:

We need food and drink to grow, be active maintain health and stay alive. A variety of food and drinks are needed for health, as depicted by the Eatwell Guide. Being active is important for health - to be active and healthy, food is needed to provide energy for the body.

The Eatwell Guide is the UK healthy eating model. It shows the proportions in which different types of foods are needed to have a well-balanced and healthy diet. The proportions shown are representative of your food consumption over the period of a day or even a week, not necessarily each meal time. Healthy eating is all about balance, meaning that there are no good or bad foods and all foods can be included in a healthy diet as long as the overall balance of foods is right.

Threshold Concept:

Front-of-pack traffic light labels help us make a healthier choice.

Some front-of-pack nutrition labels use red, amber and green colour coding. Colour-coded nutritional information tells you at a glance if the food has high, medium or low amounts of fat, saturated fat, sugars and salt: red means high, amber means medium and green means low. Aim to choose more greens and ambers than reds.

Each serving (150g) contains

Energy	Fat	Saturates	Sugars	Salt
1046kJ 250kcal	3.0g	1.3g	34g	0.9g
	LOW	LOW	HIGH	MED
13%	4%	7%	38%	15%

Kids need to be active for at least 60 minutes a day, with 30 minutes of this outside of school. This should include 3 sessions a week of activity that strengthens muscles and bones. Research shows that physical activity can

- Improves behaviour, self-confidence and social skills
- Improves attention levels and performance at school
- Develops co-ordination
- Strengthens muscles and bones
- Improves health and fitness
- Improves health and fitness
- Improves sleep
- Maintains healthy weight



Food obtained from animals is the main source of protein and include fish, milk, meat, poultry, and cheese. Whereas plants provide us with fruits and vegetables, which are an important source of fibres, proteins and carbohydrates.

Threshold Concept:

Understand that all food comes from plants or animals.

Threshold Concept:

It is important to store, prepare and cook food safely and hygienically.

Good food safety and personal hygiene practices are essential to reduce the risk of food poisoning. It is important to follow the 4C's: Cleaning, Cooking, Chilling and Cross-contamination.

