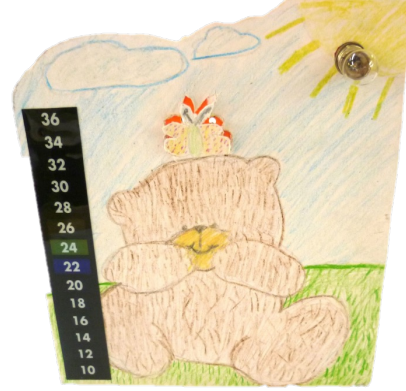


# Design and Technology - Year 7 Night Light Project - Knowledge Organiser.

## Soldering

Soldering is the process used to permanently join electronic components. Solder is the wire material which is melted using a soldering iron to form a metallic liquid that bonds to the components.

**SAFETY** - Care is needed when soldering as the iron and the components get very hot.



## Smart Materials

The thermometer on the night light is made using a Smart Material called 'thermochromic ink'.

A Smart Material is any material that changes when it is stimulated by heat, light, magnetism, stress or moisture. To be a Smart Material, it **MUST** be able to return to its original shape or colour.

## Environmental Issues.

Most polymers (plastics) are made from crude oil which is a finite resource. The oil is refined in factories, using lots of energy and causing pollution. Most plastics are not recyclable. Plastics can damage the environment.



## Key Words

Polymer - the correct word for plastic.

Pillar Drill - the equipment used to drill holes.

Development - improving your designs or ideas.

High Impact Polystyrene - The polymer used to make the nightlight.

Circuit - a path that allows current to flow.

Component - a part of an electronic circuit.

## Flux

Flux is a chemical that is inside cored solder. It helps the solder to flow and to clean grease from the joint.

**SAFETY** - Flux is toxic and should **NOT** be inhaled.



## HIPs

High Impact Polystyrene is also known as HIPs.

It is a thermoplastic, which means that it can be heated and reshaped many times. It is used to make packaging and toys as it is a tough and durable material that comes in many colours.

HIPs is expensive to buy but is easy to cut, drill and shape.

Most thermoplastics can be recycled.



## Line bending.

The line bender is used to heat the HIPs so that it can be bent into shape. When the polymer is heated, it becomes soft and flexible.

The HIPs will stay in the new shape when it cools.

**SAFETY** - The wire in the line bender gets very hot and care must be taken when using it.

15 What is flux and how does it help with soldering? What type of plastic is HIPs? How can we reduce plastic pollution?

# Design and Technology - Year 7 Squashed Tomato Challenge - Knowledge Organiser.

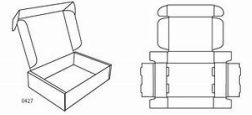
## Subsistence farming

Subsistence farming, Is a form of farming in which nearly all of the crops or livestock raised are used to maintain the farmer and the farmer's family, leaving little, if any, surplus for sale or trade. Preindustrial agricultural peoples throughout the world have traditionally practiced subsistence farming



## NETS

A net is often called a development net. It is a flat two dimensional shape, which contains score lines and when is folded and glued together forms a three dimensional shape. Nets are often used for packaging items such as orange cartons, point of sale display units, tissue boxes and so on.



## Key Words

Cultivated – Land that is worked by plowing and sowing and raising crops

Agriculture – The cultivation of animals, plants to sustain human life

Communicate – Exchange information

Nepal - Nepal, is a country in South Asia. It is located mainly in the Himalayas.

Container – An object for holding or transporting something

System - A set of things working together as parts of a mechanism or an interconnecting network

Valley - A valley is a low area between hills or mountains

## Nepal

Nepal population is equivalent to 0.39% of the total world population. Nepal ranks number 49 in the list of countries (and dependencies) by population. Nepali is the language of Nepal.

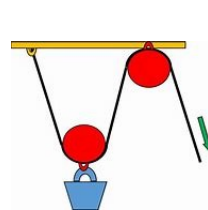


Environmental Issues.  
The five seasons of Nepal are Spring, Summer, Monsoon (rainy season), Autumn and Winter)



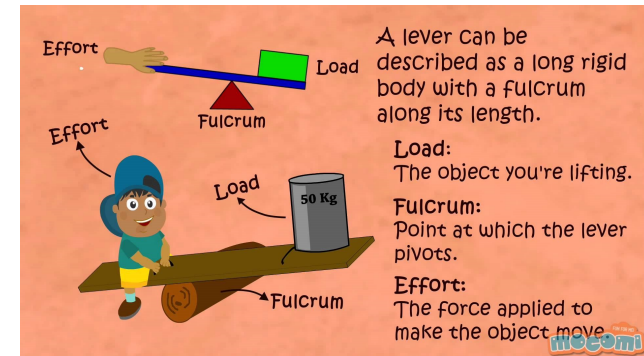
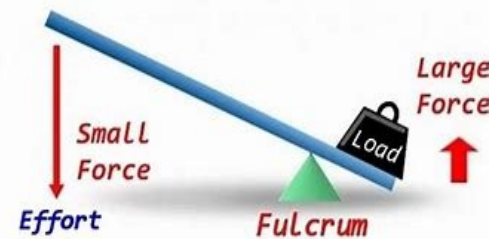
## Pulley

A pulley is a wheel on an axle or shaft that is designed to support movement and change of direction of a taut cable or belt, or transfer of power between the shaft and cable or belt.



## Lever

How Does a Lever Work?



How do Pulleys and Levers work? How do other cultures live? Problem solving and Metacognition.



# Design and Technology - Year 7 Bug Hotel Project - Knowledge Organiser 1 of 2

## What is Hardwood?

## Types of Timber

## What is Manufactured board?

**Hardwood:** Come from trees that shed their leaves each autumn.

**OAK:** Very strong and hard, easy to work with, open grained light brown colour. Use in furniture.

**BIRCH:** Hard but easy to work with. Close fine grain, very light brown colour.

Furniture and turned items

**ASH:** Tough and flexible. Open grained, light and creamy brown colour.

Tool handles, ladders, pool cues

**MAHOGANY:** Fairly strong/durable. Some interlocking grain, reddish colour

High quality furniture

**BALSA:** Soft. Off white colour. Used in modelling



These are made by gluing layers of wood fibres/veneers together.

They often use waste materials from the cutting of timber.

Top layers are often a high quality wood to give a good look or added protection. Manufactured boards come in very large sheets. Common sheet sizes are (8ft by 4ft).

Sheets are available in standard thicknesses (3, 6, 9, 12, 15 mm)



**MDF (Medium - density fibreboard):**

Made from fine wood particles combined with glue. Smooth and easily machined. Used in furniture

**PLYWOOD:** Layers of Veneer cut or shaved from timber and glued at 90 degrees to each other. Interior and exterior grades available. Used in furniture and boat building

**CHIPBOARD:** Made from chips of timber mixed with glue and pressed together. Often covered with a laminate or polymer such as Melamine Formaldehyde. Used for cupboards and kitchen worktops.



## Key Words

**Hardwood** - Trees that shed their leaves each autumn.  
**Slow growing**- expensive

**Deciduous** - loose their leaves

**Softwood** - They keep their leaves all year round. They grow faster than hardwoods. They have a more open grain and also typically cost less.

**Manufactured** - Produced in large quantities by machines

**Coniferous** - Keep leaves all year round

**Durable** - withstand being damaged

**Veneer** - A thin layer of wood normally applied to manufactured board

## What is Softwood?

**Softwood:** Come from coniferous trees. They keep their leaves all year round. They grow faster than hardwoods.

They have a more open grain and also typically cost less.

Softwood trees can come from managed forests. As they are cut down new ones are planted. They are a renewable resource.

**PINE:** Strong and durable, easy to work with. Straight grained, yellowish colour. Used in construction and furniture

**LARCH:** Tough, water resistant and durable. Straight or spiralled grain. Yellow/brownish colour. Used in boats, exterior cladding

**SPRUCE:** Strong and hard. Lo resistance to decay. Yellowish colour. Used in construction



# Design and Technology - Year 7 Bug Hotel Project - Knowledge Organiser 2 of 2

## What is Insect?

Insects have segmented bodies, jointed legs, and external skeletons (exoskeletons).

Insects are distinguished from other arthropods by their body, which is divided into three major regions:

- The head, which bears the mouthparts, eyes, and a pair of antennae
- The three-segmented thorax, which usually has three pairs of legs (which is where the term Hexapoda comes from)
- The many-segmented abdomen, which contains the digestive, excretory, and reproductive organs



## What roles do insects play?

Every insect plays a role in the ecosystem in which it is found. The act of pollination is mostly carried out by bees and butterflies; however, some ants, flies, beetles and even wasps contribute.

When an insect lands on a flower, some pollen is transferred onto its body from the stamen (the male part of the flower). This pollen is rubbed off onto a different flower of the same species, where it can fertilise the stigma (the female part) to produce seeds. Some plants are capable of self-pollinating or being pollinated by seeds in the wind, however, a majority cross-pollinate as described.

The continuation of most plant species is dependent on insects. Not only is this important for wildlife habitats, but also for humans, who rely on effective pollination for food.

It is therefore important for humans to aim to reduce the damage - one way of doing this is by providing areas where they can lay their eggs.



## Key Words

Ecosystem - where plants, animals, and other organisms, as well as weather and landscape, work together to form a bubble of life.

Habitat - the natural home or environment of an animal, plant, or other organism.

Pollination - the process in which pollen is taken from one plant or part of a plant to another so that new plant seeds can be produced

Species - a group of living organisms

Arthropods - having a segmented body, jointed limbs, and a mineralized shell covering

## What is a Hexapoda?

A class of six-legged arthropods. The name is used as another term for Insects.





# Design and Technology - Year 7 Ozobots - Knowledge Organiser.

## Input

A place where, or a device through which, energy or information enters a system.

Input devices include; Keyboards, Mouse, Light Pen, Optical/magnetic Scanner, Touch Screen, Microphone for voice as input, Track Ball, Joystick, Camera, Web cam and video camera



## Output

A place where power or information leaves a system. Output devices include; 3d printers, printers, monitors, headphones, speakers and robots

## Track

The course or route followed by someone or something



## Logic

A system or set of principles underlying the arrangements of elements in a computer or electronic device so as to perform a specified task.

## Key Words

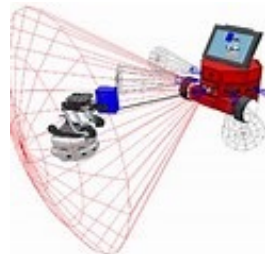
**Program:** a series of coded instructions to control the operation of a computer or other machine

**Computer control:** The computer is used to run the control program.

**Artificial intelligence:** The development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

## Sensor

Detects events or changes in its environment and sends the information to other electronics, frequently a computer processor. A sensor is always used with other electronics.



## OZOBOT

A programmable robot that will sense and complete tasks by following colour coded tracks.

## Robots

A robot is a machine that gathers information about its environment (**senses**) and uses that information (**thinks**) to follow instructions to do work.

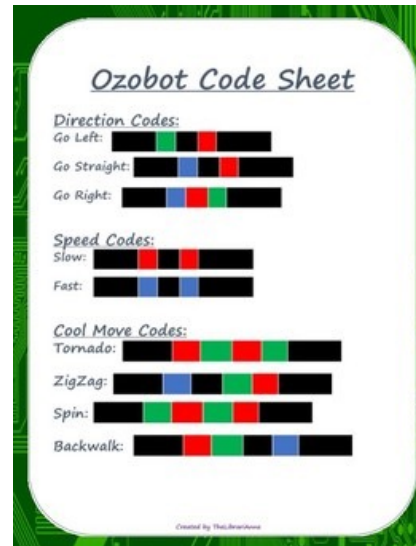
Engineers design robots to perform complex tasks more easily and with greater accuracy. Some everyday examples of robots include: automatic car washers, vending machines, automatic doors, robotic arms used in manufacturing, remote control cars and trucks, automatic teller machines (ATMs)

## Robots (Benefits)

1. Can reach places humans cannot
2. Perform tasks quicker than humans
3. Work without interference
4. Can survive hostile environments
5. Do repetitive and dangerous tasks
6. Work without a break

## (Disadvantages)

1. Set up costs are very high
2. Increase in unemployment
3. High cost maintenance and repair
4. Not easy to retrieve data
5. No emotions
6. Can be dangerous when malfunctioning



What is a robot? What is an input/output? How to make a robot follow a track. What are the impacts of robots on society?