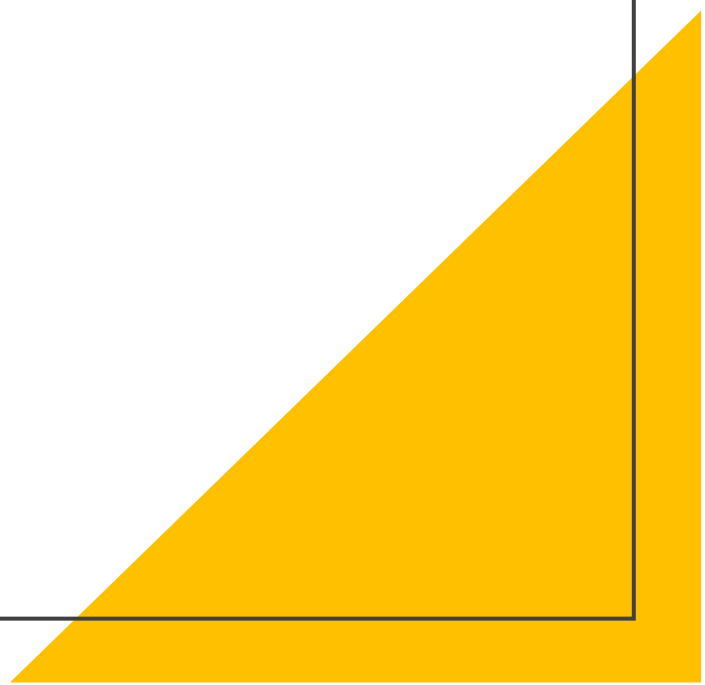




# Design Technology Knowledge Organisers



Year 1





Year 1  
Autumn

## Textiles - Puppets

|             |   |
|-------------|---|
| Decorate    | To add details to a design to improve its appearance.   |
| Design      | To make, draw or write plans for something.   |
| Fabric      | A natural or man-made woven or knitted material that is made from plant fibres, animal fur or synthetic material. |
| Glue        | A sticky liquid that can join two things together.  |
| Model       | A practise version, often on a smaller scale, that lets you test out your idea and see how it will look and work. |
| Hand puppet | A toy that you can make move by putting your hand inside it   |
| Safety pin  | A 'U' shaped pin with a cap where the needle slots in securely after fastening.                                   |
| Stencil     | A shape that you can draw around.   |
| Technique   | A way of doing something to complete a task.  |
| Template    | A stencil which you use to help you draw a shape more easily on to different materials.                           |

### Did you know?

Puppets were first invented over 3,000 years ago in Egypt.

They were made out of clay.



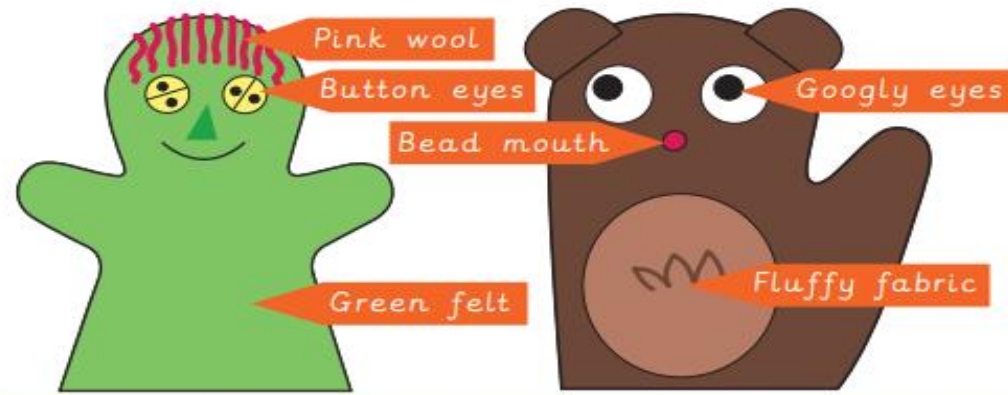
## Key facts

Kapow  
Primary

You will use a variety of techniques to create your puppet including cutting, gluing, stapling and pinning.



What colour fabric will you choose for your puppet?  
What colour hair will your puppet have?  
What kind of eyes, nose and ears will your puppet have?





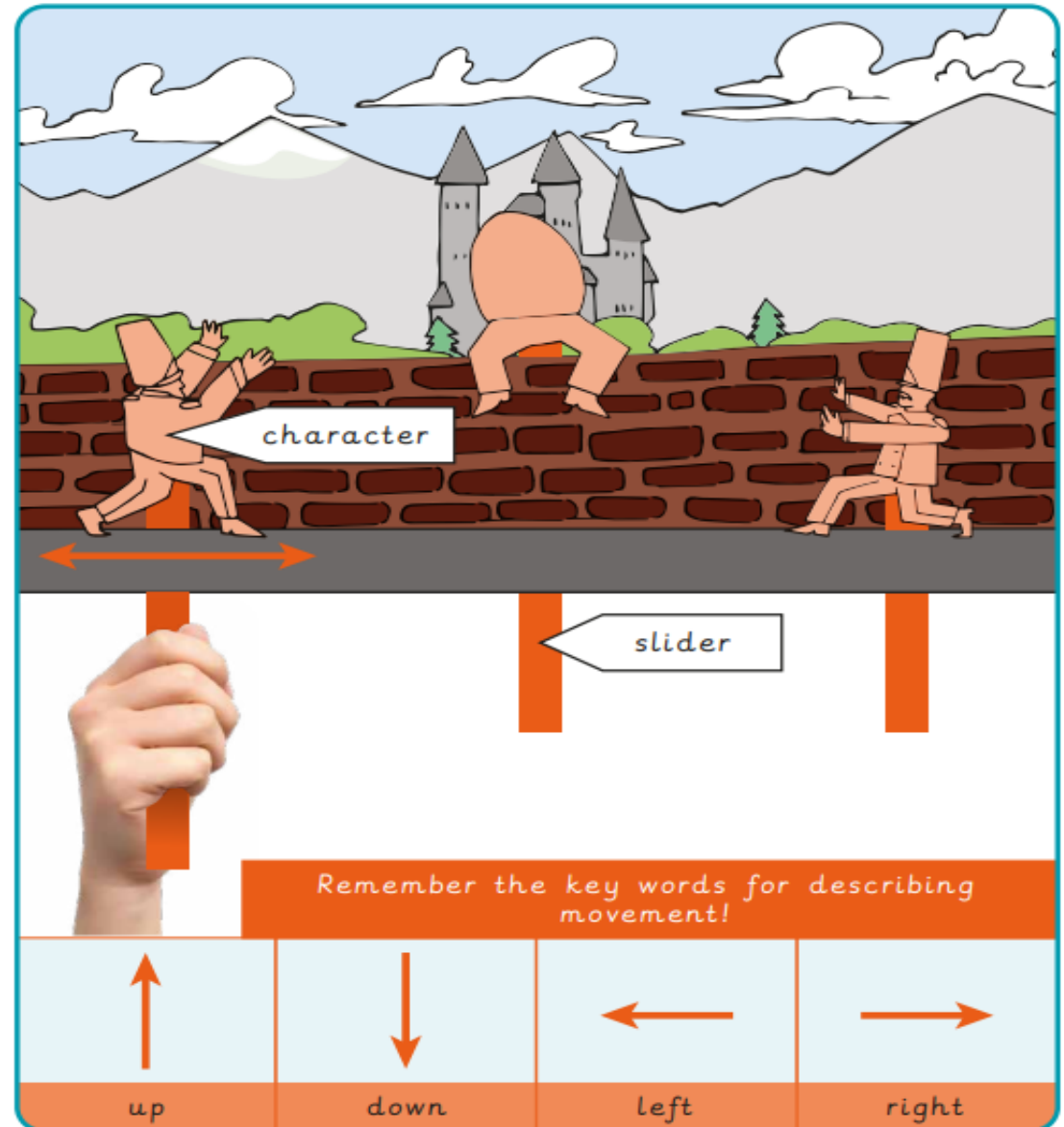
Year 1  
Spring

## D&T - Making a moving storybook



Kapow  
Primary

|                 |   |
|-----------------|---|
| assemble        | To fix all parts together.  |
| design          | To make, draw or write plans for something.   |
| design criteria | A set of instructions for the project.  |
| evaluation      | Looking at what is good and bad about something and thinking about how to make it better. |
| mechanism       | A set of parts of a machine that work together.   |
| model           | A copy of a real object to show how it works or what it looks like.                       |
| sliders         | Something that can move from side to side or up and down.                                 |
| target audience | A person or particular group of people at whom a product is aimed.                        |
| test            | To find out whether something works as it should.   |







Year 1  
Summer

## Food - Fruit and vegetables

|                     |  |
|---------------------|--|
| <b>Blender</b>      | A machine that mixes ingredients together into a smooth liquid.  |
| <b>Carton</b>       | A container made out of card which holds liquid products such as milk and orange juice.  |
| <b>Fruit</b>        | The part of a plant that contains seeds.   |
| <b>Healthy</b>      | When everything in your body and head feels good.  |
| <b>Ingredients</b>  | Items that make up a mixture, for example, foods that make a recipe.   |
| <b>Peel</b>         | The tough skin around certain fruits and vegetables, such as oranges.  |
| <b>Peeler</b>       | A tool which helps you to remove the tough skin off fruits and vegetables.   |
| <b>Recipe</b>       | A set of instructions for making or preparing a food item or dish.   |
| <b>Slice (verb)</b> | To cut pieces off something with a knife.  |
| <b>Smoothie</b>     | A combination of fruits and vegetables blended together to make a smooth drink.  |
| <b>Stencil</b>      | A shape which you can draw around.   |
| <b>Template</b>     | A stencil which you use to help you draw a shape more easily on to different materials.  |
| <b>Vegetable</b>    | Parts of plants that can be eaten by people as food. The parts may be the leaves, roots or stem. Vegetables do not contain any seeds |



You should try to eat five portions of fruit and vegetables every day!

## Key facts

Kapow  
Primary

### Fruits



Apples



Oranges



Strawberries



Bananas

### Vegetables



Potatoes



Broccoli



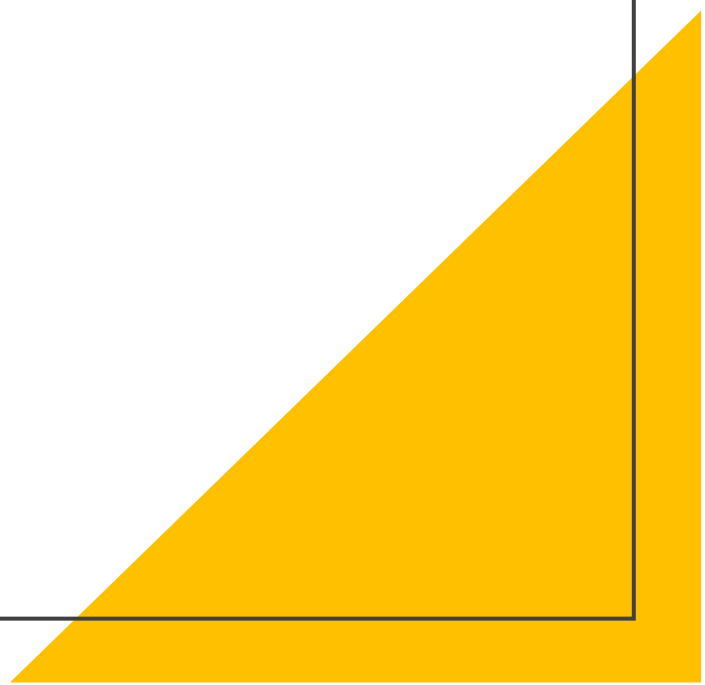
Onions



Carrots



Year 2







Year 2  
Autumn

## Structures - Baby bear's chair

|           |  |
|-----------|--|
| Function  | How something works.   |
| Man-made  | Made by people.  |
| Mould     | To form different shapes out of soft, squishy materials.   |
| Natural   | Found in nature e.g. spider's web, sheep's wool.   |
| Stable    | Object does not easily topple over.  |
| Stiff     | A material or object that does not bend easily (e.g. wood).  |
| Strong    | Something that is not easily broken (e.g. wood, brick, building).  |
| Structure | Something that has been made and put together and can usually stand on its own (e.g. a building, a bridge, a chair). |
| Test      | To find out whether something works as it should.  |
| Weak      | Something that is easily broken (e.g. paper, egg shells).  |

Natural Objects



Man-made Objects



## Key facts

Kapow  
Primary

Often **structures** have a certain **function**, they are made to do something. e.g. Chairs are for sitting on.



They should be **stable**, **strong** and comfortable.  
Was baby bear's chair **stable** and **strong**?





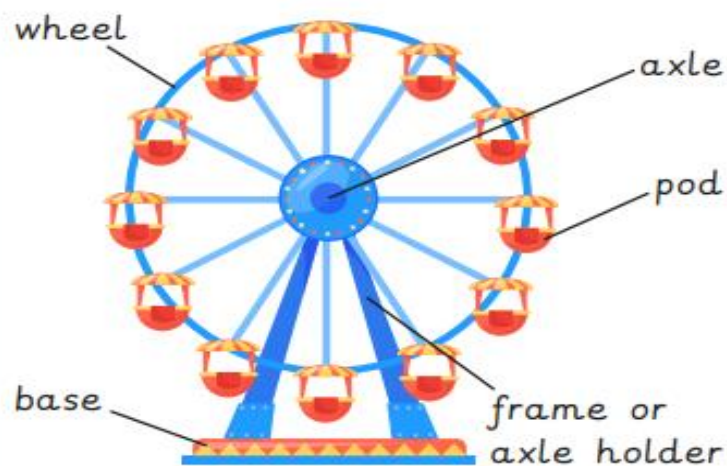


Year 2  
Spring

## D&T - Fairground wheel



|                        |  |
|------------------------|--|
| <b>axle</b>            | A long, straight piece of material which connects to a rotating part (e.g. the wheels of a car). |
| <b>design brief</b>    | A challenge that asks for something to be designed.  |
| <b>design criteria</b> | A set of instructions for the project.   |
| <b>evaluation</b>      | Looking at what is good and bad about something and thinking about how to make it better.        |
| <b>Ferris wheel</b>    | A ride at a fairground which carries passengers around a large, vertical wheel.                  |
| <b>mechanism</b>       | The parts of an object that move together as part of a machine.                                  |
| <b>pod</b>             | The container which carries passengers around the fairground wheel.                              |
| <b>survey</b>          | Questions used to find out what people like.   |



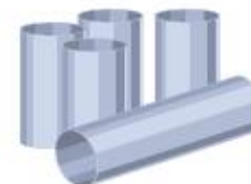
Materials have different properties. A **fairground wheel** design needs to be **stable** and **strong**. Which materials could be used?



Bricks are made from clay. They are stiff and strong.



Wood comes from trees. It is strong and flexible.



Metal comes from mining ore in the ground. It is strong and hard.





Year 2  
Summer

## Cooking and nutrition - A balanced diet

|                 |   |
|-----------------|---|
| <i>balanced</i> | A healthy mixture of different kinds of food.                 |
| <i>diet</i>     | The types of food someone eats.                               |
| <i>evaluate</i> | To study something carefully and decide if it is good or bad. |
| <i>feel</i>     | The way something seems when you touch it.                    |
| <i>grate</i>    | To break food such as cheese into small, thin pieces.         |
| <i>menu</i>     | A list of food and drinks that you can order.                 |
| <i>review</i>   | To give an opinion about something.                           |
| <i>smell</i>    | Information we detect about something using our nose.         |
| <i>snip</i>     | To make small cuts with scissors.                             |
| <i>spread</i>   | To cover something with soft food.                            |
| <i>taste</i>    | The flavour of a food.  |

## Skills



## Key facts



The five different food groups are:

1. Carbohydrates.
2. Fruits and vegetables.
3. Protein.
4. Dairy.
5. Oils and spreads.

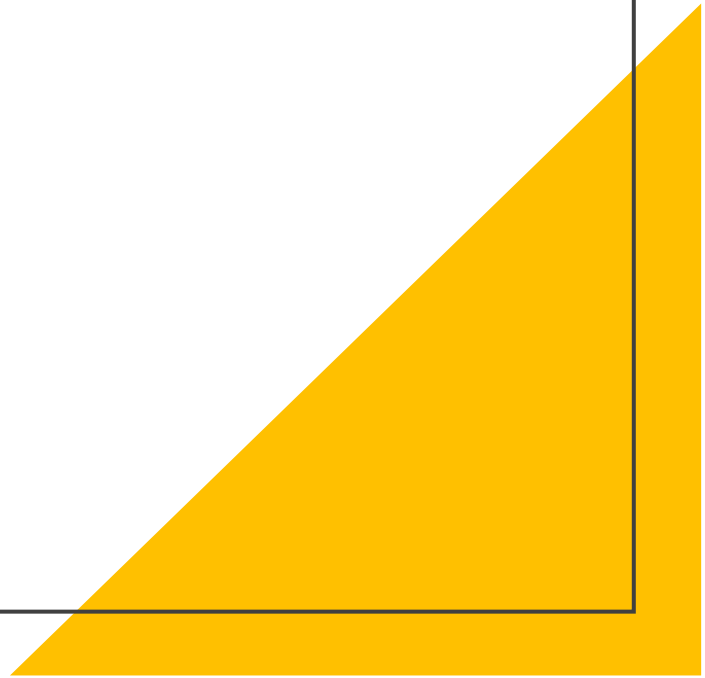


A balanced diet means eating lots of foods from different food groups.





Year 3







Year 3  
Autumn

## D&T - Eating seasonally



### Key facts



Fruits and vegetables are full of vitamins, minerals and fibre. The different colours give a clue to what they contain.



Blue and purple:  
vitamin C and fibre.



Red: vitamin A and  
vitamin C.



Green: vitamin E,  
iron, B vitamins and  
calcium.



Orange and yellow:  
vitamin A, vitamin C  
and fibre.



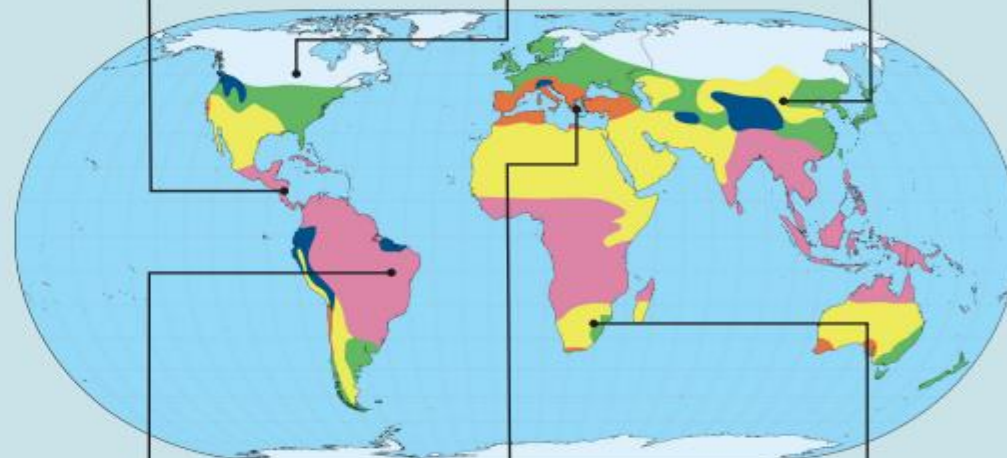
pumpkins from  
Mexico



soya beans  
from Canada



plums from  
China



bananas from  
Brazil



olives from  
Greece



watermelons from  
South Africa





Year 3  
Spring

## D&T - Egyptian collars

Ancient Egypt was a civilisation that existed from 3100 BC to 30 BC.



An Egyptian collar, called usekh or wesekh, was a personal decoration that lay around and over a person's neck and shoulders.

**Cotton** is a fabric made from the soft fibres of the cotton plant.

**Silk** is a fabric made from the threads of silkworm cocoons.

**Polyester** is a fabric made from synthetic plastic fibres.

### Appliqué



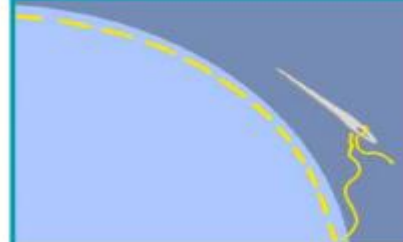
A type of textile art where small pieces of cloth are sewn or glued onto a larger piece to make a design.

### Cross-stitch



A two-stitch style of sewing that forms a cross pattern. Used to add decorative features to fabric.

### Running stitch



A basic sewing stitch made in a straight line with spaces between stitches.

### Embellish



To add decorative details or features to something.

### Pinking



To cut fabric with a zigzag or scalloped edge.

### Template



A tool used to make copies of a shape or to cut a material accurately, such as a biscuit cutter.



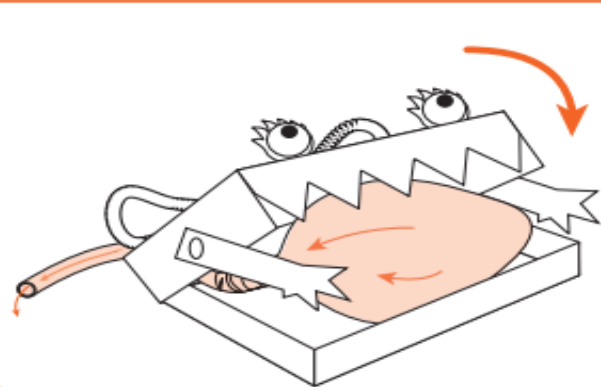


Year 3  
Summer

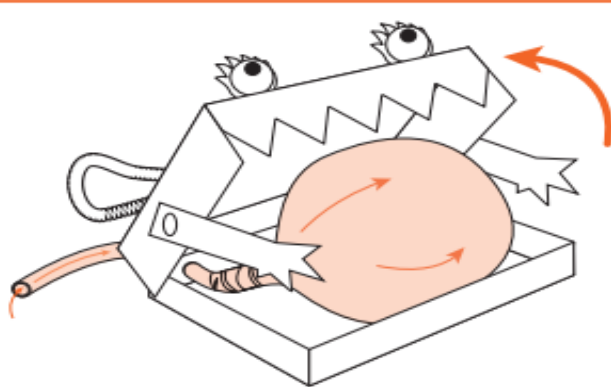
## Mechanical systems - Pneumatic toys

|                         |   |
|-------------------------|---|
| <b>Exploded-diagram</b> | A diagram which shows all of the parts of a product, including the internal and external parts.   |
| <b>Function</b>         | How something works.  |
| <b>Input</b>            | Input is the motion used to start a mechanism.  |
| <b>Linkage</b>          | Lengths of material (for example, metal or card) that are joined together by pivots, so that the links can move as part of a mechanism. |
| <b>Mechanism</b>        | The parts of an object that move together as part of a machine.   |
| <b>Motion</b>           | The movement an object makes when controlled by an input or output (e.g. left, right, up, down).  |
| <b>Net</b>              | A 2D flat shape, that can become a 3D shape once assembled.   |
| <b>Output</b>           | Output is the motion that happens as a result of starting the input.  |
| <b>Pivot</b>            | The central point, pin, or shaft on which a mechanism turns or swings.  |
| <b>Pneumatic system</b> | A mechanism that runs on air or compressed gas.   |
| <b>Thumbnail sketch</b> | Small drawings to get ideas down on paper quickly.  |

When air exits the balloon, the monster's mouth closes.



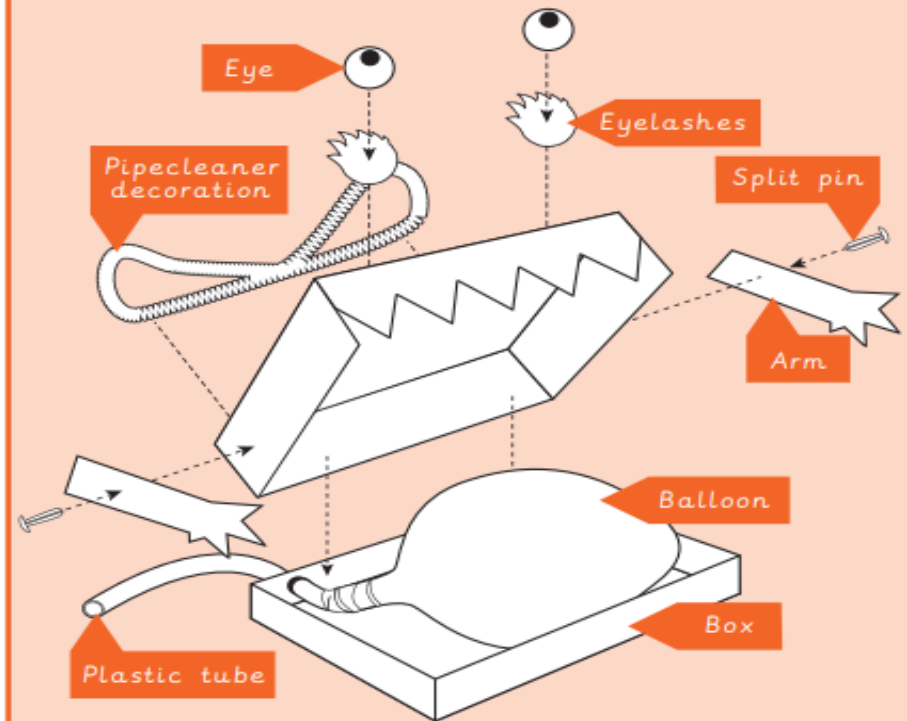
When air enters the balloon, the monster's mouth opens.



## Key facts

Kapow  
Primary

**Exploded-diagrams** allow us to see how a product is put together and the different components inside.



You will need:



Scissors



Sticky tape



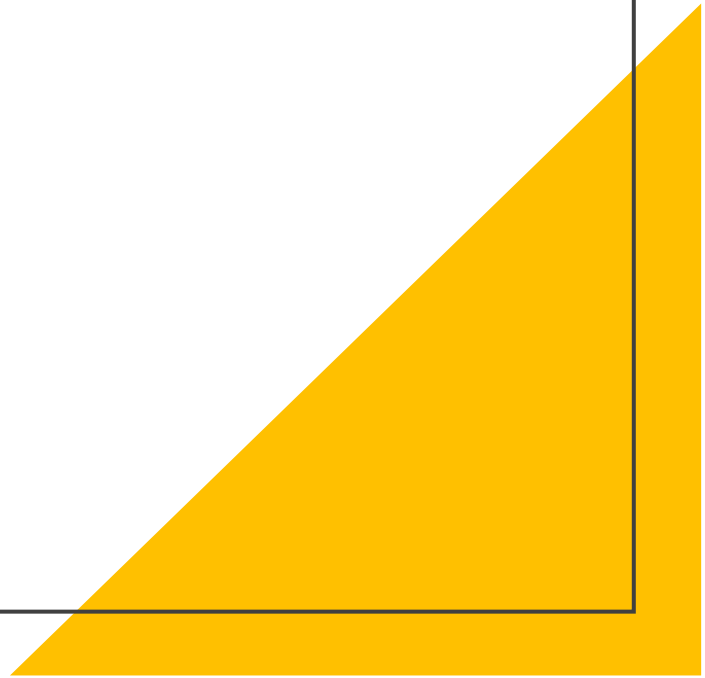
Glue

Tie a pipecleaner into a bow





Year 4







Year 4  
Autumn

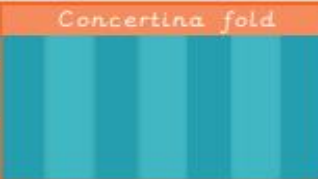
## Structure - Pavilions

|                        |   |
|------------------------|---|
| <b>Aesthetic</b>       | How an object or product looks.   |
| <b>Cladding</b>        | A material put on top of another material or on a structure as protection or to improve appearance.   |
| <b>Design criteria</b> | A set of rules to help designers focus their ideas and test the success of them.  |
| <b>Evaluation</b>      | When you look at the good and bad points about something, then think about how you could improve it.  |
| <b>Frame structure</b> | A way of building something so that the inside supports are built first and the outside covering is added afterwards as cladding.   |
| <b>Function</b>        | The purpose of an object (for example a chair needs to hold a person when sitting down); or how the product works (for example a torch needs to provide light in a dark space). |
| <b>Inspiration</b>     | To gain ideas from different sources such as the internet, magazines and books.   |
| <b>Pavilion</b>        | A decorative building or structure for leisure activities.  |
| <b>Reinforce</b>       | To make a structure or material stronger, especially by adding another material or element to it.   |
| <b>Stable</b>          | Object does not easily topple over.   |
| <b>Structure</b>       | Something that has been made and put together and can usually stand on its own (e.g. a building, a bridge, a chair).  |
| <b>Target audience</b> | A person or particular group of people at whom a product is aimed.  |
| <b>Target customer</b> | A person or particular group of people who you expect to buy the product.   |
| <b>Texture</b>         | The way that something feels when you touch it (e.g. soft, rough, smooth).  |
| <b>Theme</b>           | An idea or specific design that your product or structure is based on (e.g. space-themed).  |

You can create all sorts of **textures** for your **cladding** designs using different materials and techniques.



Weave



Concertina fold



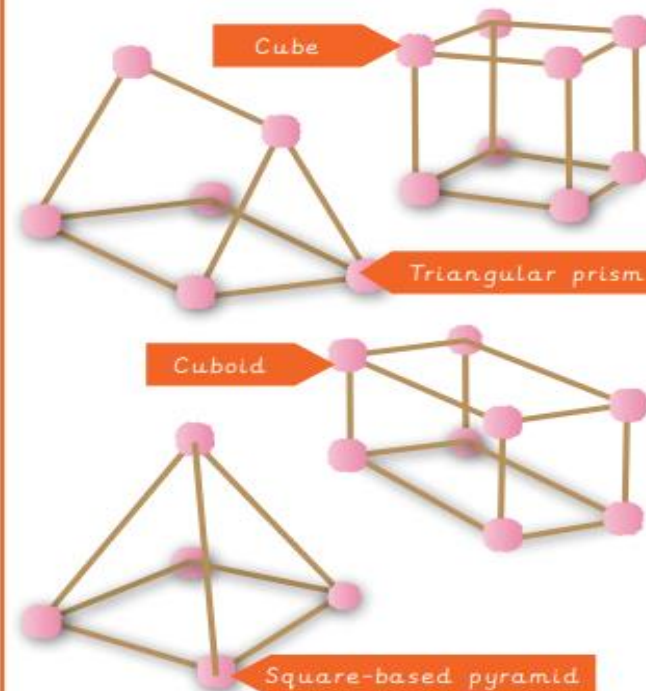
Cut-outs

## Key facts

Kapow  
Primary



There are variety of ways to assemble a **frame structure**.



Cube

Triangular prism

Cuboid

Square-based pyramid

What materials and equipment could you use to make your **structure**?





Year 4  
Spring

## D&T - Cooking and nutrition: Adapting a recipe



|                  |  |                        |  |
|------------------|--|------------------------|--|
| <b>adapt</b>     | To change something to make it suitable for a new purpose. | <b>hygiene</b>         | Keeping things clean.                                    |
| <b>budget</b>    | A plan of how to spend money.                              | <b>ingredients</b>     | The foods used in a recipe.                              |
| <b>combine</b>   | Mixing two or more ingredients together.                   | <b>market research</b> | Gathering information from the target audience.          |
| <b>construct</b> | To build something.  | <b>sieve</b>           | A piece of kitchen equipment often used to remove lumps. |
| <b>cuboid</b>    | A 3D shape with six rectangular sides.                     | <b>sift</b>            | The process of removing lumps and adding air.            |
| <b>design</b>    | A plan for a recipe or product.                            | <b>target audience</b> | Groups of people that a product is made for.             |
| <b>evaluate</b>  | To decide how good something is.                           | <b>taste</b>           | The flavour of a food.                                   |
| <b>fold</b>      | To bend something for a purpose.                           | <b>texture</b>         | The feel of a food when eaten.                           |



Adapting a recipe is making a simple recipe unique by thoughtfully adding or removing ingredients.



Working to a budget is spending a certain amount of money so the final product is affordable for the people who want to buy it.





Year 4  
Summer

## D&T - Torches

|                 |  |
|-----------------|--|
| battery         | Made from two or more cells that provide electrical energy to power a circuit.   |
| bulb            | A part of a circuit made from glass or plastic that gives light when electricity passes through it.  |
| conductor       | A material that allows electricity to flow through it, such as metal.  |
| design criteria | A set of instructions for the project.   |
| electricity     | A type of energy that is usually invisible and can be made or stored to make things work, such as moving or heating objects.                         |
| insulator       | A material that does not let electricity flow through it, such as plastic.   |
| series circuit  | A closed circuit where the current flows in one path.  |
| switch          | A part of a circuit that can open or close to allow electricity to flow or stop it from flowing, such as a light switch that turns lights on or off. |
| test            | To find out whether something works as it should.  |
| torch           | A battery-powered light that can be carried.   |
| wire            | A thin piece of copper that conducts electricity and connects circuit components together.   |



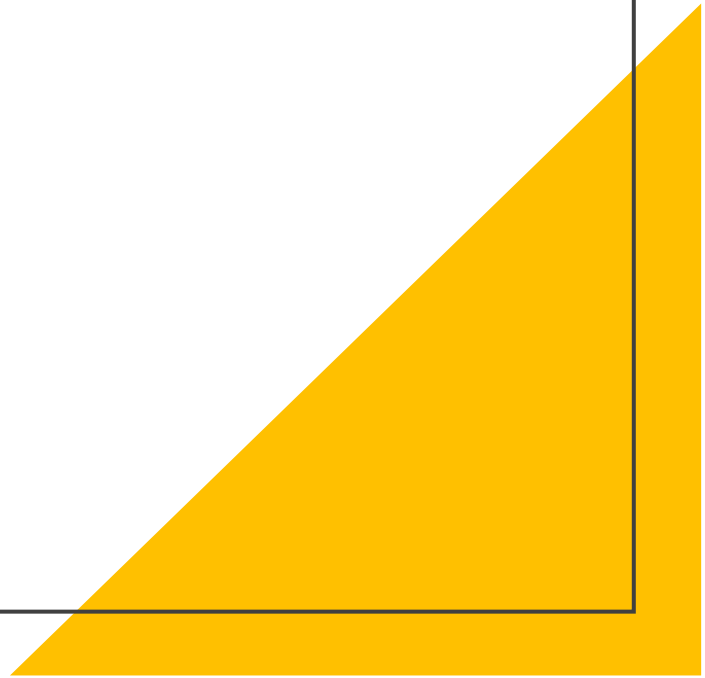
Many products use batteries.



In the past, there were no electrical items because they had not been invented yet.



Year 5



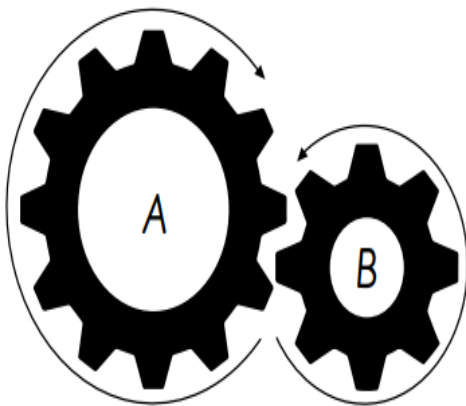


Year 5  
Autumn

## D&T - Gears and pulleys

### Gears

- A **gear** is a wheel with teeth.
- A gear system is multiple gears working together to **transfer** force and motion from one part of a **mechanical system** to another.
- Gears are used to change the speed, direction or force of movement.



An **input** like pedalling a bike causes gear A to rotate.

The teeth of gear A and gear B mesh together. If gear A is turned, it causes gear B to turn.

Gear B causes an **output** like the wheels on a bike spinning.

- **Speed:** larger gears (A) turn more slowly than smaller gears (B).
- **Direction:** gears (A and B) turn in opposite directions.
- **Force:** a larger gear (A) turning a smaller gear (B) requires less force while a smaller gear (B) turning a larger gear (A) increases the force output.



A **problem statement** describes a problem in detail, including who is affected and why it is important to solve it.

The **class** wants to **make smoothies** without using **electricity**, which will **save energy**, promote **physical activity** and increase awareness of **sustainable practices**.



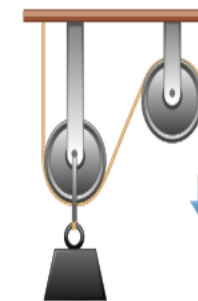
### Pulleys

A **pulley** is a wheel with a groove and a rope or belt that fits into the groove.

A single pulley changes the direction of the input force, making lifting easier.



Multiple pulleys distribute effort over a longer distance, reducing the input force needed.



### Examples

- Escalators.
- Theatre curtain systems.
- Cranes.
- Blinds.
- Treadmills.
- Sailboat rigging.





Year 5  
Spring

## Food - What could be healthier?

|                     |   |
|---------------------|---|
| Beef                | Meat that comes from a cow.   |
| Cross-contamination | Cross-contamination is how bacteria can spread. It happens when liquid from raw meats or germs from unclean objects touch cooked or ready-to-eat foods. |
| Farm                | Land or water used to produce crops or raise animals for food.  |
| Method              | Following a process or list of instructions.  |
| Packaging           | The packet which holds a product safe, ready to be sold and has information on about the product.   |
| Research            | The collecting of information about a subject.  |
| Welfare             | The health and happiness of a person or animal.   |

### Key facts

A balanced diet consists of measured amounts of different foods to keep us healthy. Use the **NHS Eatwell Guide** to see how much you should eat from each food group.

The different food groups are **dairy**, **fruits and vegetables**, **protein**, **carbohydrates**, **fats** and **sugars**.

Eating the right mix of nutrients will help your body grow and develop, many foods have labels which tell you the amount of each nutrient it has.

It is important to know how to avoid cross-contamination to keep safe when preparing and cooking different foods.

In farming, it is important that the animals are cared for properly during their lifetime. There are ethical rules which ensure that the animals receive a good level of welfare.



Always ask an adult's permission before cooking in the kitchen. Remember to wear an apron and wash your hands.

## The Farm to Fork Process

Kapow  
Primary



1. Food production  
(e.g. animals or plants)



2. Processing  
(e.g. factory)



3. Packaging



4. Transport to the shop  
(e.g. lorry)



7. Waste



6. Customers purchase  
and consume



5. Shop shelves





Year 5  
Summer

## Structures - Bridges

|                          |  |
|--------------------------|--|
| Accurate                 | Neat, correct shape, size and pattern with no mistakes.  |
| Arch bridge              | A bridge which is built with a curved arch.  |
| Beam bridge              | A bridge which is built with horizontal beams and vertical pillars.  |
| Bench hook               | A tool which hooks onto the edge of the workbench. It's used to hold woodwork still when sawing.   |
| Compression              | A squashing force caused when parts of a structure are pushed together.  |
| Coping saw               | A saw with a narrow D-shaped metal blade, used for cutting curves in wood.   |
| File                     | A tool used to smooth down rough edges on wood or metal materials.   |
| Mark out                 | To measure and mark where a piece of material needs to be cut or shaped.   |
| Reinforce                | To make a structure or material stronger, especially by adding another material or element to it.  |
| Sand paper               | Strong paper with sand on one side to smooth or polish woodwork.   |
| Set square or Try square | A right-angle triangular plate, wood or metal tool used for drawing lines at 90°, 45°, 60°, or 30°.  |
| Shape                    | The form of an object.   |
| Structure                | Something which stands, usually on its own.  |
| Suspension bridge        | A bridge which is supported by vertical cables and suspended by cables which run between pillars that are connected onto either end of the bridge. |
| Tenon saw                | A saw with a flat blade, used for cutting wood in straight lines or angles.  |
| Tension                  | A stretching force caused by two parts of a structure being pulled apart.  |
| Truss bridge             | A bridge which is built from a series of triangular beams.   |

## Key facts

Kapow  
Primary

**Forces** can change the **shape** of objects, they can also make objects begin to move, speed up or slow down.



Pulls and pushes are both forces.



Truss bridge



Suspension bridge



Beam bridge



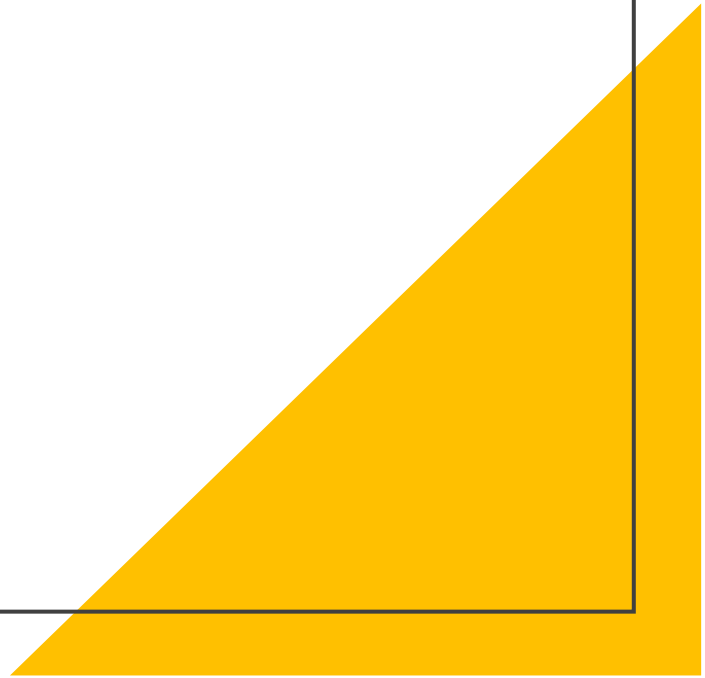
Arch bridge

Gravity is a force which pulls everything towards the centre of the Earth. The weight of something is the force that the Earth's gravity is having on it.





Year 6







Year 6  
Autumn

## Food - Come dine with me

|                     |   |
|---------------------|---|
| Accompaniment       | Something which goes well together with other foods and drinks.   |
| Cookbook            | A book which contains recipes to make various dishes or foods.  |
| Cross-contamination | Cross-contamination is how bacteria can spread. It happens when liquid from raw meats or germs from unclean objects touch cooked or ready-to-eat foods. |
| Equipment           | Items and objects which are needed to complete a task.  |
| Farm                | Land or water used to produce crops or raise animals for food.  |
| Flavour             | How food or drink tastes. (e.g. sour, sweet, bitter, salty)   |
| Imperative verb     | Also known as 'bossy verbs' because they tell you what to do. You put them at the beginning of a command or action. (e.g. bake, grill, add, heat).      |
| Ingredients         | Items that make up a mixture e.g. foods that make a recipe.   |
| Method              | A way of carrying out a certain process, following a list of instructions.  |
| Nationality         | Belonging to a certain group of people in a particular country.   |
| Preparation         | The process of getting ready to make something.   |
| Processed           | When foods are passed through multiple processes in a factory to change or preserve it so it keeps for longer.  |
| Reared              | To breed and raise livestock. e.g. cows.  |
| Recipe              | A set of instructions for making or preparing a food item or dish.  |
| Target audience     | A particular group or person who a product is aimed at.   |
| Unit of measurement | The unit which you use to measure a quantity. (e.g. litres)   |

### Did you know?

Hawaii produces about 1/3 of all pineapples in the world.



You cannot mix raw meat with other ingredients, it is not safe. Remember to also wash your hands after handling raw meat.

### Key facts

Kapow  
Primary

The five different food groups are:

1. Carbohydrates
2. Fruits and vegetables
3. Protein
4. Dairy
5. Foods high in fat and sugar



Many countries have traditional dishes. For example: India is known for hot curries, whilst England is known for the fish'n'chips which were historically served in newspaper.





Year 6  
Spring

## Textiles - Waistcoats

|                 |  |
|-----------------|--|
| Adapt           | To change or alter something to fit a given purpose, or to improve it.   |
| Annotate        | To add notes which explain a plan or design.   |
| Detail          | The small features of an object.   |
| Fabric          | A natural or man-made woven or knitted material that is made from plant fibres, animal fur or synthetic material.                            |
| Fastening       | A closing and opening detail on clothing such as buttons, zips and press-studs.  |
| Knot            | A join made by tying two pieces of string or rope together.  |
| Properties      | The way in which we describe materials for their appearance, strengths and weaknesses. (e.g. absorbent, flexible, transparent).              |
| Running-stitch  | A simple style of sewing in a straight line with no overlapping.   |
| Seam            | A line along the two edges of cloth that are joined or sewn together.  |
| Sew             | To join or fasten by stitches with thread and a needle.  |
| Shape           | The form of an object.   |
| Target audience | A particular group of people who the product is aimed at.  |
| Target customer | A particular type of person who the product is aimed at.   |
| Template        | A stencil made of metal, plastic, or paper, used for making many copies of a shape or to help cut material accurately. (e.g. biscuit cutter) |
| Thread          | A thin string of cotton, wool or silk used when sewing.  |
| Unique          | One of a kind, original.   |
| Waistcoat       | A formal vest-type jacket with no arms, usually worn over a shirt and under a jacket. They sometimes have buttons or pocket detailing.       |
| Waterproof      | Material that does not allow water pass through it.  |

### Did you know?

The first waistcoat was created in Britain in 1630 by King Charles II.



Be careful when sewing your material together. Watch your fingers and ask an adult if you're unsure.

### Key facts

Kapow  
Primary



Think carefully about your **target audience** or **customer**.  
What do they like (colour, texture)?  
What material would be best?  
What type of **fastening** will you use?



It is very important that you are **accurate** in your measurements for the waistcoat, otherwise it will not fit the person it is designed for.





Year 6  
Summer

## Electrical Systems - Steady hand game

|                   |  |
|-------------------|--|
| Backboard         | A background designed for the steady hand game.  |
| Battery           | A cell or connected group of cells which store electrical energy.  |
| Bulb              | A component which gives light when electricity passes through it.  |
| Buzzer            | A component which makes a loud noise as electricity passes through.  |
| Circuit           | A collection of components which make an electrical system.  |
| Conductor         | A material that allows electricity to flow through it. e.g. metal.   |
| Copper            | A metal material that is one of the best conductors of heat and electricity. It is often used to make wires and pipes. |
| Function          | How an object or product operates or works.  |
| Insulator         | A material that does not allow electricity to flow through it. e.g. plastic.   |
| LED               | A light emitting diode which lights up as electricity passes through.  |
| Magnetic field    | The area around a magnet where there is magnetic force.  |
| Net               | A 2D flat shape, that can become a 3D shape once assembled.  |
| Pliers            | A metal tool used for holding, twisting or cutting wire.   |
| Prototype         | A simple model that lets you test out your idea, how it will look and work.  |
| Series circuit    | A closed circuit where the current only follows one path.  |
| Side view drawing | An engineering diagram which shows the dimensions (width, depth, length) of the side (left or right) of a product.     |
| Switch            | A component which opens and closes to turn the circuit on or off.  |
| Side view drawing | An engineering diagram which shows the dimensions (width, depth, length) of the side (left or right) of a product.     |
| Test              | To find out whether something works as it should.  |
| Top view drawing  | An engineering diagram which shows the dimensions (width, depth, length) of the top of a product.                      |

### Check it out!

Check out continuous line drawings, such as Picasso's single-line animals for inspiration!

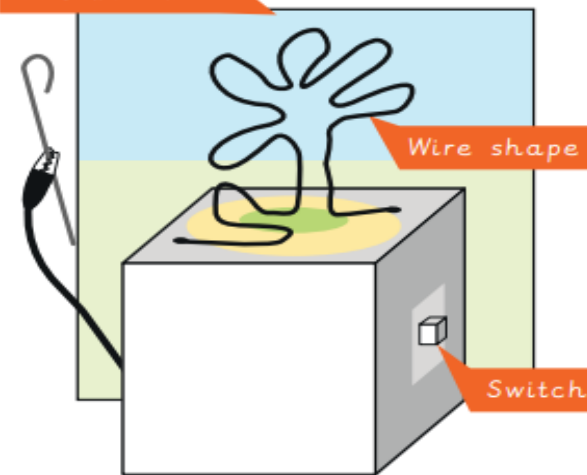


## Key facts

Kapow  
Primary

The more complex your wire shape, the harder your steady hand game will be, especially if the bends are close together.

### Backboard



### Circuit symbols:

wire

switch open

switch closed

battery

buzzer

bulb