



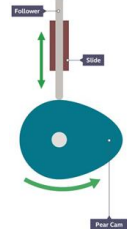
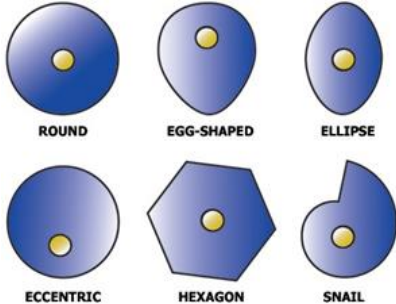
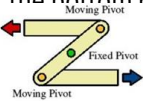
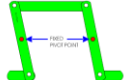
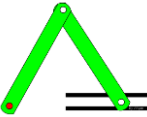
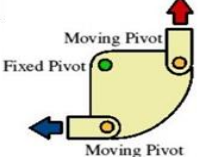


# Year 9 Industry Knowledge Organiser

## MECHANISM

A system of parts working together in a machine

### Core Knowledge

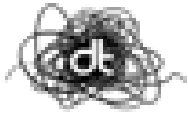
Types of Motions	Cams and Followers	Linkages
<p>There are four basic types of motion in mechanical systems:</p> <p>Linear motion: movement in a straight line, such as a paper trimmer.</p>  <p>Reciprocating motion: movement backwards and forwards, or up and down in a straight line, such as the movement of a needle on a sewing machine.</p>  <p>Rotary motion: movement round in a circle, such as a wheel turning.</p>  <p>Oscillating motion: movement swinging from side to side, such as a swing or the pendulum on a clock.</p> 	<p>Cams and followers A cam mechanism has three parts: a cam, a slide and a follower. When the cam rotates, the follower moves up and down in a reciprocating motion. The pattern the follower moves up and down in, varies depending on the shape of the cam; it can do three things:</p> <p>Cams come in many different shapes to create different combinations of rise, fall and dwell.</p>  	<p>REVERSE MOTION LINKAGE: As the top rod moves to the left the bottom rod moves to the right.</p>  <p>PARALLEL MOTION LINKAGE: As the large rod at the top of the diagram moves to the left the two small rods at the bottom move to the right.</p>  <p>CRANK AND SLIDER LINKAGE: The rods move forwards and backwards in slider. The fixed pivot anchor the linkages to one place.</p>  <p>BELL CRANK LINKAGE: This linkage allows horizontal movement to be converted to vertical movement. It also works the opposite way round. A practical example of this is the brake mechanism on a bicycle.</p> 

### Test yourself

1. Explain what is means by the terms rise, fall and dwell in a cam mechanism.
2. Describe reciprocating motion and give an example of where it can be found.
3. State an example of a second order lever.
4. A pillar drill operates using a belt drive mechanism. The driver wheel has a diameter of 32mm and the driven wheel has a diameter of 128mm. Calculate the velocity ratio.
5. A gear train contains two gears. The driver gear has 10 teeth and the driven gear has 50 teeth. Calculate the gear ratio of this gear train.

### Revision Check List

- I Can describe the four types of movement
- I understand how one type of motion can be converted to another using mechanisms
- I understand what levers and linkages are and what they do
- I understand how diagrams and symbols are used to represent mechanisms
- I know that mechanisms can change the magnitude and direction of forces

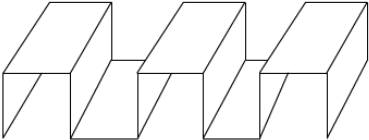



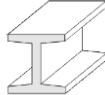
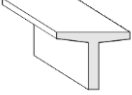








# Year 9 Industry Knowledge Organiser

## STRUCTURES

The way that something is built, arranged, or organized.

### Core knowledge

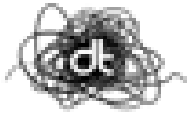
Frame Structure	Sections and beams	Triangulation
<p>Many structures are based on a frame. Some examples are shown below. We use frames every day, for example, a stool is a frame on which we sit. Buildings are based on frames and this is why they can be built very high. Everywhere we look in towns and cities we see examples of structures based on frames.</p> <p>Below are two examples of frames that you can make from card or even paper. When you have made then press down lightly with one hand. You will probably find that they can take some pressure from above.</p> <p>square frame</p>  <p>triangular frame</p> 	<p>If you use metals as part of a practical project a knowledge of the shape or 'section' of lengths of metals is important. The diagrams below show examples of solid lengths and also tubes. When you order metals you need to describe the section you want. The sections shown below are the most common.</p> <div style="display: flex; justify-content: space-around; text-align: center;"> <div data-bbox="617 601 696 615">ROUND SECTION</div> <div data-bbox="721 601 820 615">HEXAGONAL SECTION</div> <div data-bbox="845 601 924 615">SQUARE SECTION</div> <div data-bbox="969 601 1027 615">L-SECTION</div> </div>  <div style="display: flex; justify-content: space-around; text-align: center;"> <div data-bbox="623 679 689 694">ROUND TUBE</div> <div data-bbox="721 679 820 694">HEXAGONAL TUBE</div> <div data-bbox="845 679 924 694">SQUARE TUBE</div> <div data-bbox="969 679 1027 694">L-SECTION TUBE</div> </div>  <p>Beams are used to 'span' distances, such as the distance between two walls. How well the beam works depends the material it is made from and its shape. In some buildings you can easily see the steel girders that hold the roof up. These are made from different 'sections' or shapes and some are named below</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="623 1065 727 1158">  <p>I-SECTION</p> </div> <div data-bbox="897 1065 1027 1158">  <p>T-SECTION</p> </div> </div> <div style="display: flex; justify-content: space-around;"> <div data-bbox="648 1208 727 1300">  <p>L-SECTION</p> </div> <div data-bbox="913 1208 996 1300">  <p>U-SECTION</p> </div> </div>	<p>Examples of triangulation are seen all around us especially in the construction industry (building and civil engineering). Folding a simple art straw into a triangular shape and then attempting to break it gives us some idea of the strength of triangulation.</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div data-bbox="1404 551 1556 701">  <p>TRIANGLE REMAINS VERY STRONG AND RIGID</p> </div> </div> <p>EIFFEL TOWER</p>  <p>A very good example of triangulation can be seen when a house is being built. Most conventional houses (traditional houses) have a triangulated roof.</p> <p>TRIANGULATED ROOF</p> 

#### Test Yourself

1. What is a plain structure?
2. What is a structure frame?
3. What are the advantages of using a steel tube instead of a solid steel?
4. Name two famous structures that rely on triangulation for their strength?

#### Revision check List



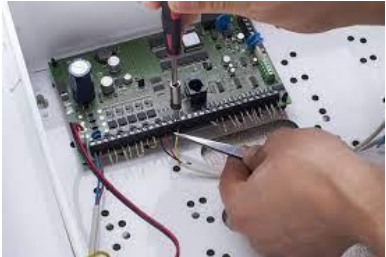









- I now know what a frame structure is
- I can identify different types of section and beams
- I now know the advantages of using triangulation
- I can identify structures where triangulations has been used to strengthen them



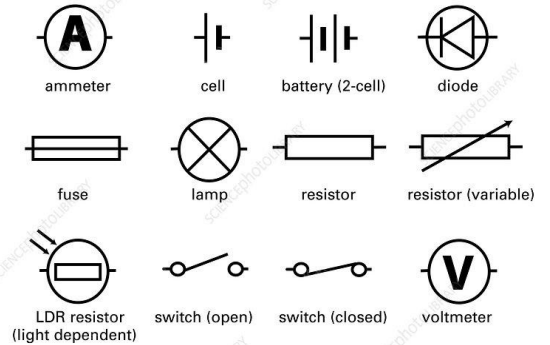
# Year 9 Industry Knowledge Organiser ELECTRONICS

Electronics is the study of electricity (the flow of electrons) and how to use that to build things like computers

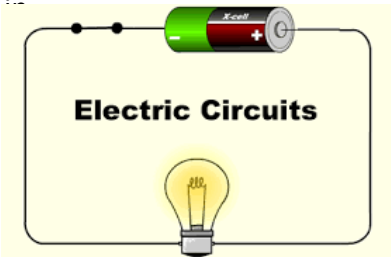
## Core Knowledge

Inputs	Control	Output
<p>Light switch</p> 	<p>A control system is a system, which provides the desired response by controlling the output. Traffic lights control system is an example of control system. Here, a sequence of input signal is applied to this control system and the output is one of the three lights that will be on for some duration of time.</p>  <p>A control is the brain of the circuit</p> 	<p>Any information that is processed by and sent out from a computer or other electronic device is considered output</p> <p>Here are some examples of outputs that we use on daily basis</p>
<p>Motion sensor</p> 		<p>Light bulb</p> 
<p>Light sensor</p> 		<p>Alarm</p> 
<p>Moisture sensor</p> 		<p>Motor</p> 
<p>Heat sensor</p> 		<p>Speaker</p> 
<p>Smoke sensor</p>  <p>An input is an electronic component that controls the control. It turns the output on and off when is required.</p>		

## ELECTRONIC SYMBOLS



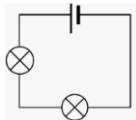
A circuit is a closed loop that electrons can travel :-



## Revision check List

- I can define an input and an output
- I can name some examples of input and outputs
- I can identify and explain some electronic components and their uses.
- I can explain the open and closed circuit.
- I can simulate basic electronic circuits
- I can design and simulate my own circuit
- I am able to identify inputs and outputs on different electronic devices

Series circuit



Parallel Circuit

