Prior Knowledge
Technical Knowledge

What is CAD? CAD stands for Computed Aided Design. Computer software is used to design 3D models and these 3D models can be made into physical objects. Furniture, cars and buildings are just some examples of what can be designed using CAD?

Tinkercad is an online application (software) used for Computer Aided Design. Using specialist tools and techniques, you can design just about anything in CAD software, then using specialist machinery, you can make it. 3D models designed in CAD software can be printed using a 3D printer.

3D printers are used to print physical objects, such as figurines, scientific models (skeleton) and phone holders. A common file format that 3D printers use is .stl.

The 3D printer's nozzle moves up/ down, left/right, as the heatbed moves back/forth to print a 3D model. The nozzle moves along the X, Y and Z axes. 3D printers use filaments to make models. PLA is a filament that is used in the school's 3D printer.

Slicer (slicing software) - Before printing your 3D model, you need to export it (we will export it as a .stl file). This file is imported into a slicer(slicing software). The slicer slices the model into individual layers. In the slicing software, you can add supports to your 3D model (if required). The slicer creates what is known as the g-code, which is a long list of instructions for the 3D printer to follow in order for it to print the 3D model. Essentially, g-code is the language 3D printers understand..

What will I be able to do after I make my Phone Stand?

Design: Turn a paper design into a 3D design model on Tinkercad.

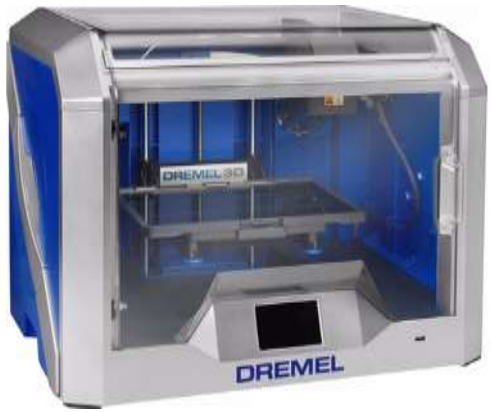
Make: Use a 3D printer to make a useable product. Create suitable packaging for the design of my phone stand.

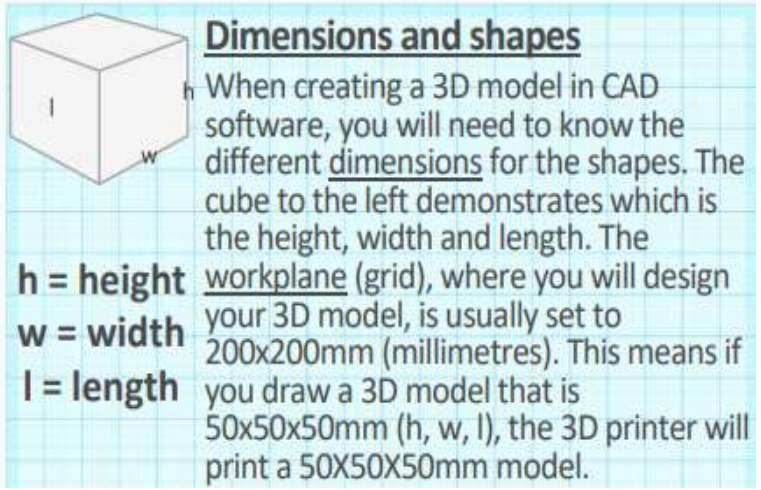
Evaluate: Consider the strengths and weaknesses of my phone stand design and packaging and how it could be improved.

3D Printer Phone Stand
Year 6

Key Vocabulary	Definition
CAD	CAD stands for Computed Aided Design. Computer software is used to design 3D models and these 3D models can be made into physical objects.
Computer software	Software is a set of instructions, data or programs used to operate computers and execute specific tasks.
3D printer	A machine allowing the creation of a physical object from a three-dimensional digital model, typically by laying down many thin layers of a material in succession.
Filament	Are thermoplastics, which are plastics (polymers) that melt rather than burn when heated, can be shaped and moulded, and solidify when cooled.
Nozzle	A short tube that narrows in the middle or toward one end and is often used (as on a hose or pipe) to direct or speed up a flow of fluid.
Heatbed	Holds down the 3D print and regulates the temperature of the 3D print.
Axes	The "x" and "y" lines that cross at right angles to make a graph.
x, y, z co-ordinates	Three coordinates that locate a point by its distance from an origin.
Slicer	Before a design is printed a slicer (program) slices the model into layers before printing.
G-code	3D printing programming language.

Image / diagram





Health and Safety

3D printer - Do not hover or stand close to the 3D printer while it is printing a 3D model. Only an adult should take out the finished product and remove it from the heatbed.

Key Facts

Examples of common minerals include coal, oil, seashells, diamonds, rubies, pyrite (fool's gold), table salt, gold, copper, aluminium, iron, steel, gravel, brick, sand and stone.

Humans rely on oceans for many reasons: transportation, food, climate, weather and jobs.

Marine Protected Oceans (MPAs) protect oceans from threat.

Some energy sources are renewable and some are not.

Prior Knowledge

I know that there are threats to the health of our planet.

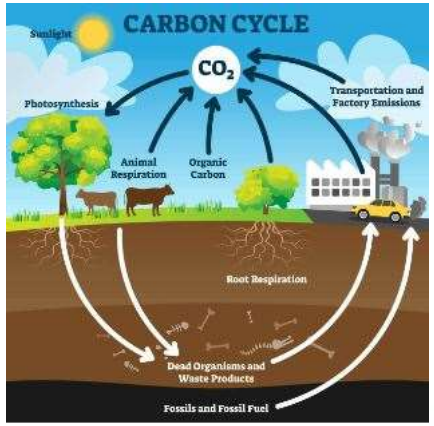
I know that planting lots of trees is important for our planet.

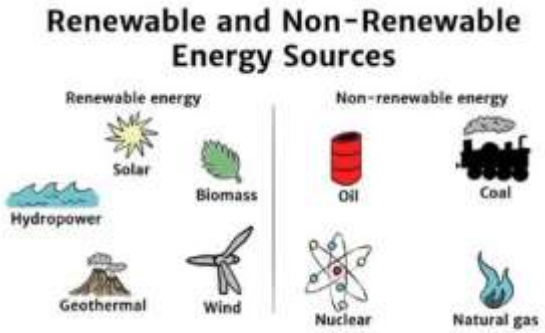
I know that recycling is important for our planet.

Global Warming and Climate Change

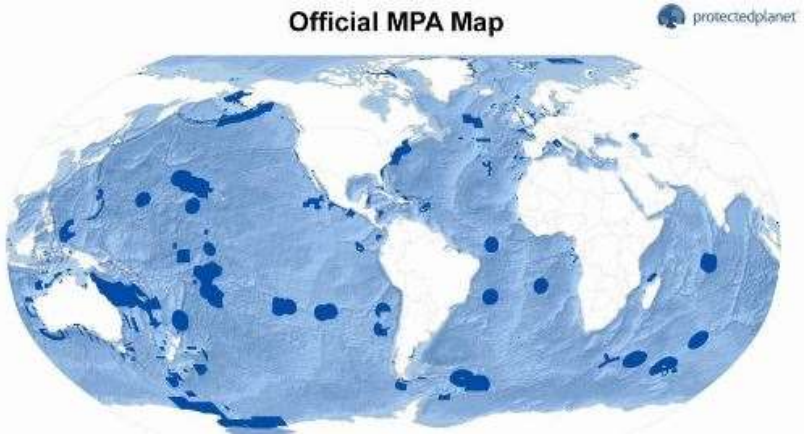
Vocabulary	Definition
sustainability	To be able to be kept up and continue to improve over time
Renewable sources	A resource that can replenish itself at the rate it is used
Non renewable sources	A resource which has a limited supply
Carbon cycle	The process that moves carbon between plants, animal and the atmosphere.
endangered	At risk of extinction
campaign	An organised course of action to achieve a goal.

Image / diagram





Important People / Places



Crime and Punishment

Key Facts

- *In the middle ages justice was almost entirely community based, and the only hope of keeping your house safe was if the village you lived in worked together against law breakers*
- *The justice system in the middle ages was loaded in favour of the rich and powerful*
- *In the middle ages God was seen as the ultimate judge, so crimes against the church were very serious*
- *The justice system is a group of peers judging 'beyond reasonable doubt' that you are guilty. You are innocent until proven guilty.*
- *Public humiliation was seen as a good form of punishment and would deter people from committing crimes again – the stocks, pillory, whipping, beheading, hanging etc*
- *There was no formal police force until 1829 which was started by Sir Robert Peel*
- *From 1654 convicts were sent to America and then later Australia as a punishment to work instead of being executed. It became more common after the Transportation Act of 1717.*
- *The death penalty in the UK was abolished in 1965*
- *The Tower of London was reserved for very important prisoners and more often traitors – 3 Queens of England were beheaded there in the 16th century*
- *There were up to 12 hangings a year at Tyburn – each one being a public holiday for people to come and watch! One of the most famous hangings is of Oliver Cromwell – despite the fact that he had died and been buried, his body was exhumed from Westminster Abbey and hung following the restoration of the monarchy in 1660*

Prior Knowledge

In Y2 children studied the Gunpowder Plot and know crimes long ago carried the death penalty

Useful websites:
https://www.historic-uk.com/HistoryMagazine/DestinationsUK/ExecutionSitesinLondon/

Image / diagram

Key Vocabulary	Definition
branding	Marked with a burn that will never go away to show you were a criminal
Cyber crime	Online crime - normally involving taking money from accounts
Corporal punishment	Physical punishment eg caning or whipping
Ducking Stool	Women were tied to the stool and then submerged under water. If they floated they were a witch and then killed. If not, they drowned
heretic	Unbelievers in God
highwayman	A man, usually on horseback, who held travellers up at gunpoint to rob them on their travels
poaching	Stealing animals from land not belonging to you
smuggling	Illegally bringing good in from abroad
stocks	Public humiliation device to hold criminals in one place by their head and hands whilst things were thrown at them
transportation	Being made to leave the country instead of being executed as a punishment
vagrancy	Not having anywhere to live
witchcraft	The practice of magic and spells

Important People / Places

Robin Hood – robbed the rich to feed the poor
Dick Whittington – highwayman and later Mayor of London
Tower of London – royal prison
Tyburn – most over worked hanging spot in London
Newgate – most notorious London prison from the 12th - 20th century
The Old Bailey – the central criminal court in the country

Key Facts

- Evolution is change over time and it occurs when there is competition to survive(natural selection).
- I understand that living things have changed over time and that fossil provide information about living things that inhabited the Earth millions of years ago.
- I can recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
- I can identify how animals and planted are adapted to suit their environment in different ways and that adaptation may lead to evolution.
- I understand that variation in offspring over time can make animals more or less able to survive in particular environments e.g. how a giraffe's neck got longer, the development of insulating fur on the arctic fox.

Prior Knowledge?

I know most living things live in a habitat.

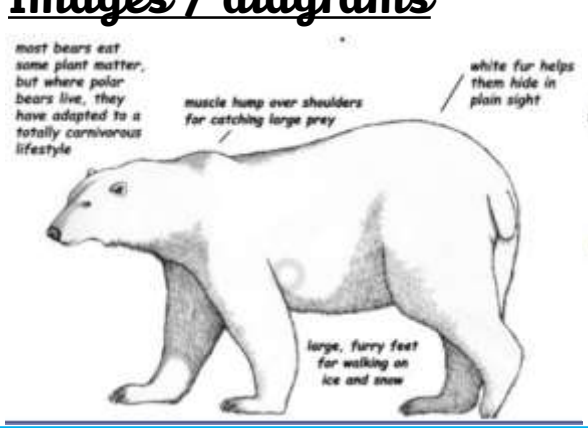
I can describe how different habitats provide the basic needs of animals/plants and how they depend on each other.

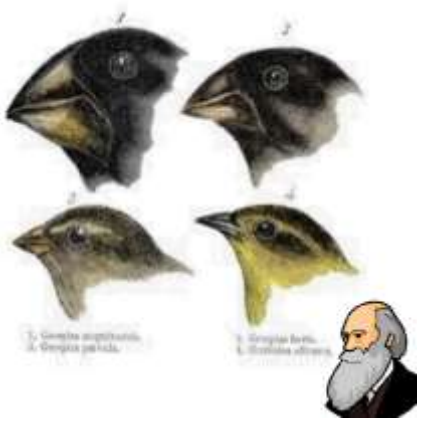
I can describe how fossils are formed when things that have lived are trapped within rocks.

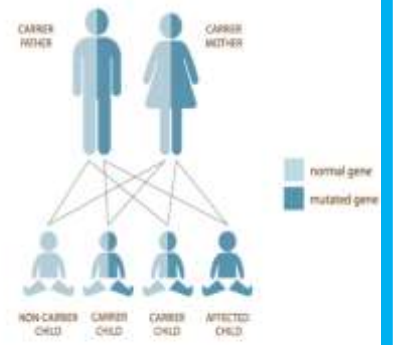
I know that environments can change and that this can sometimes pose dangers.

EVOLUTION and INHERITANCE

Images / diagrams







Some characteristics that are passed on genetically negatively affect the offspring.

Key Vocabulary	Definition
adaptation	A trait (characteristic) changing to increase a living thing's chances of surviving and reproducing.
characteristics	The distinguishing features or qualities that are specific to a species.
environment	An environment contain many habitats and includes areas where there are both living and non-living things.
evolution	Adaptation over a very long time.
fossil	The remains or imprint of a prehistoric plant or animal, embedded in rock nd preserved.
habitat	A specific area or place in which particular animals and plant can live.
inheritance	This is when characteristics are passed on to offspring from their parents.
natural selection	The process where organisms that are better adapted to their environment tend to survive and produce more offspring.
offspring	The young animal or plant that is produced by the reproduction of that species.
variations	The differences between individuals within a species.

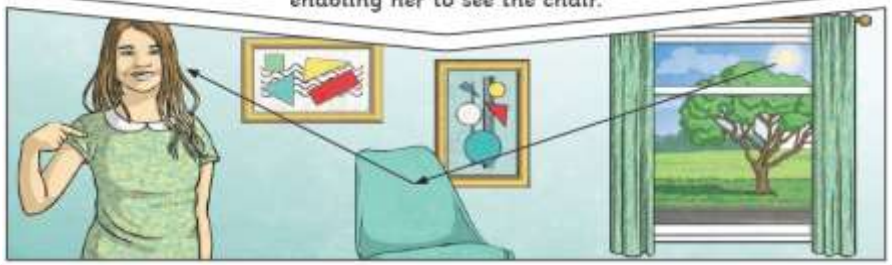
Important People / Places / Events

Charles Darwin (1809-1882)/Alfred Wallace (1823-1913)–work on evolution.
Mary Anning (1799-1847) - palaeontologist

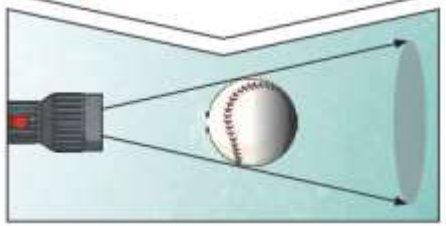
Key Facts

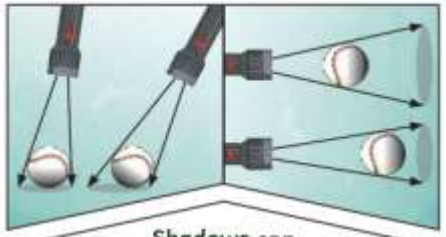
- We need light to be able to see things.
- Light travels in straight lines which are calls rays / beams.

Light from the sun travels in a straight line and hits the chair. The light ray is then reflected off the chair and travels in a straight line to the girl's eye, enabling her to see the chair.



A **shadow** is always the same shape as the object that casts it. This is because when an opaque object is in the path of light travelling from a light source, it will block the light rays that hit it, while the rest of the light can continue travelling.

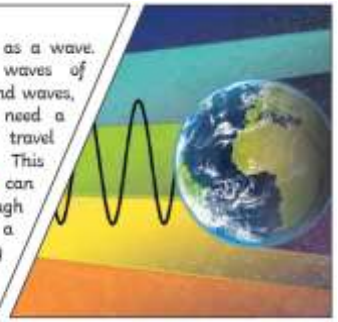




Shadows can also be elongated or shortened depending on the angle of the light source. A **shadow** is also larger when the object is closer to the light source. This is because it blocks more of the light.

The spoon in this water looks as if it is bent. This is because light bends when it moves from air to water. When light bends in this way, it is called refraction.

Light travels as a wave. But unlike waves of water or sound waves, it does not need a medium to travel through. This means light can travel through a vacuum - a completely airless space.



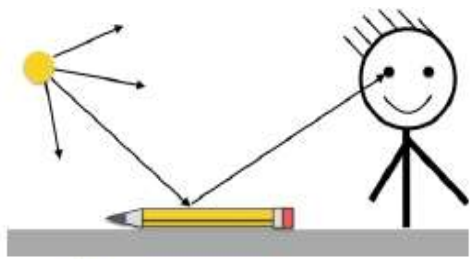
Prior Knowledge?

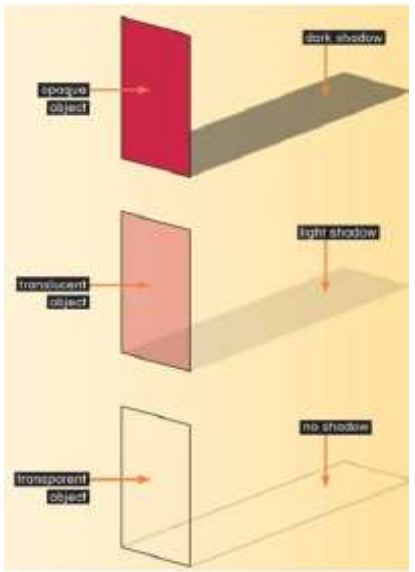
I know you need light to see things, that dark is the absence of light and that light is reflected from some surfaces.
I know that light from the sun can be dangerous but there are ways to protect my eyes.
I know that shadows are formed when light from a source is blocked by an opaque object.

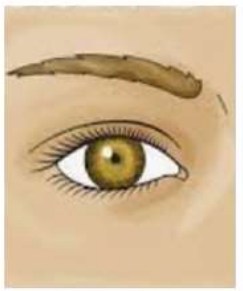
LIGHT

Key Vocabulary	Definition
light source	An object which makes its own light.
orbit	To move in a regular, repeating curved path around another object.
reflection	Reflection is when rays of light bounce off a surface, changing their direction.
refraction	This is when light bends as it passes from one medium to another.
transparent	Objects that let light travel through them easily.
translucent	Objects that let some light through but scatters the light so we can't see through them properly.
opaque	Objects which don't let any light pass through them.

Images / diagrams







Our eyes have a small window at the front called a pupil, through which light can enter. The pupil looks as though it is black because it is dark inside our eyes.

When it is dark, our pupils get larger, in order to let more light in so that we can see better. In bright lights, our pupils get smaller.

At the back of our eye is a sensitive sheet of nerves called a retina. They can detect light when it comes in through the pupil, and send messages to the brain about what we can see.

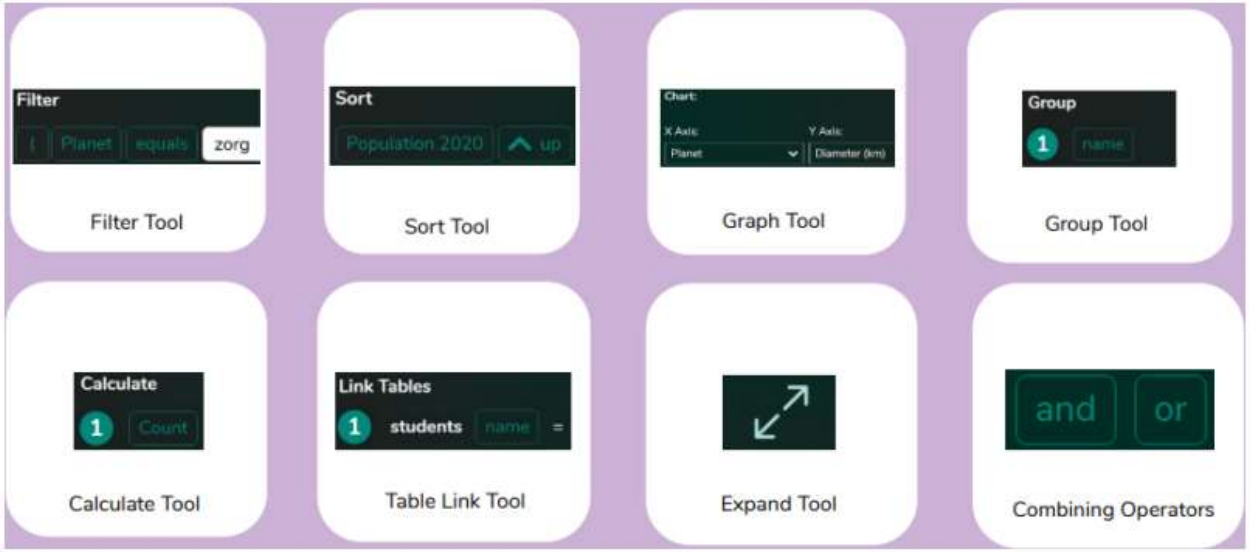
Year 6
Data Detectives

Key Learning

- To find information in databases by filtering and sorting.
- To create graphs from data within a database.
- To be able to find information in linked table databases.
- To be able to find requested information using databases.

Key Resources

Data Detectives



Bar Chart
A type of graph that uses categorical data, which means the data is grouped into categories e.g. colours, types of pet.

Calculate
In databases, calculations on data can be performed e.g. calculate the number of records.

Condition
A condition is a rule you give to a database to help it find the right information. A condition might contain an operator.

Data
A collection of information, especially facts or numbers, to be analysed and used to help decision-making.

Database
A set of data that can be held in a computer in a format that can be searched and sorted for information.

Filter
Filtering what information is shown according to any filter rules applied.

Field
A heading in a database record against which data is entered.

Group
Putting similar pieces of information together in a database so it is easy to read, understand and interpret.

Line Graph
A type of graph used to display information which can change over time. For example, temperature at different times of the day.

Linked Tables
A database can contain more than one table which can be linked together so a query can include information from the linked tables.

Query
A way for a user to find specific information in a database by using tools such as filtering and grouping.

Record
A collection of related data or information that is stored together as a single unit.

Sort
Organising data by a rule such as alphabetical or numerical.

Purple Mash Computing Scheme: Knowledge Organiser

Year 6

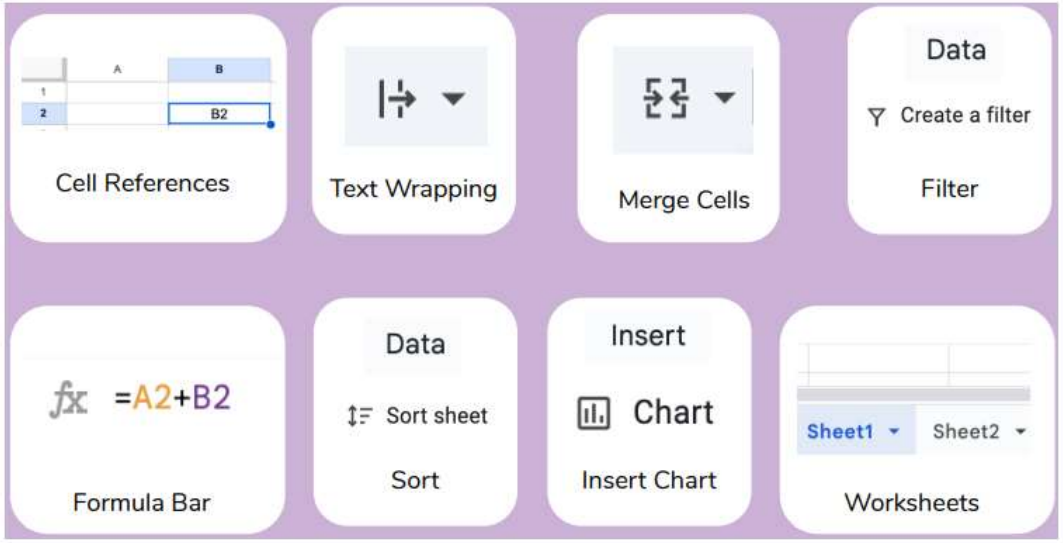
Spreadsheets - Google Sheets

Key Learning

- To understand and use basic formatting in a spreadsheet.
- To develop skills in using basic functions in a spreadsheet.
- To create and format charts in a spreadsheet.
- To sort and filter data within a spreadsheet.
- To understand and use advanced functions in a spreadsheet.
- To combine Excel skills to create an effective spreadsheet for a given purpose.

Key Resources

Google Sheets



Cell
A single box in a spreadsheet where data is entered.

Chart
A visual representation of data.

Chart Labels
Labels to tell you what the information on a chart is showing.

Column
Vertical lines of cells. (Lettered)

Filter
To show data that meets a specified criteria by temporarily hiding rows that do not.

Formatting
Changing the appearance of text or numbers.

Formula
A set of instructions that tells a spreadsheet what to calculate.

Function
A built-in formula that performs a specific job automatically.

Row
A horizontal line of cells. (numbered)

Sort
Organising data by a rule such as alphabetical or numerical.

Sum
A function that adds a range of numbers.

Workbook
A spreadsheet file containing one or more worksheets.

Worksheet
A single sheet in a workbook.