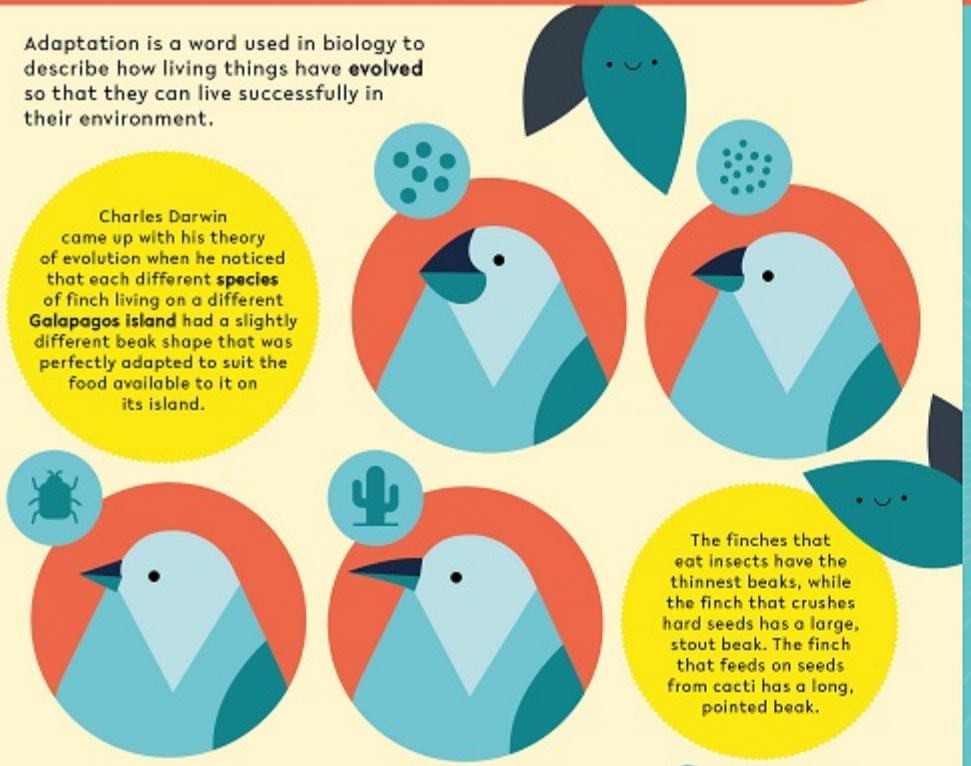
ADAPTATION

Adaptation is a word used in biology to describe how living things have **evolved** so that they can live successfully in their environment.

Charles Darwin came up with his theory of evolution when he noticed that each different **species** of finch living on a different **Galapagos island** had a slightly different beak shape that was perfectly adapted to suit the food available to it on its island.



The finches that eat insects have the thinnest beaks, while the finch that crushes hard seeds has a large, stout beak. The finch that feeds on seeds from cacti has a long, pointed beak.

Too well adapted?

The **dodo** was a bird that lived on Mauritius. It adapted to its environment by losing the ability to fly – it didn't need to fly because there was plenty of good food for it to eat and no **predators** to threaten it. That was until European sailors turned up on the island – and hunted the dodo to **extinction** as it was so easy to capture.



AI

AI stands for 'artificial intelligence' and it is a technology that tries to make computers learn and think like humans.



Computers are great at doing what they are instructed to do but with AI, computers can think for themselves.

They do this by taking in information (**input**) and making a decision on how to react. The input could be **data** provided by humans or other computers, or readings from the outside world, such as **temperature**, the number of cars on the road or pollution levels.

AI is so useful because computers can process a lot more information than humans alone can. AI can find patterns that a human might not have noticed, and suggest issues for humans to think about, such as looking at weather patterns to predict a storm coming.



What AI can't do

There are some things AI cannot do, such as imagining new ideas, or transferring the lessons learned in one subject to another one. Making these sorts of inventive connections is left to humans – that's the fun part!

ALGORITHM

An algorithm is an idea taken from mathematics and it means a step-by-step way of solving a problem. The steps need to be very clear and they must be followed exactly. At some point, the steps end and give a final result.



Computer **programs** need algorithms to do certain tasks but an algorithm can also describe something **analogue**, which means not computer-based, such as tidying your room. The algorithm needs to have an **input**, a **process** and an **output**. The steps are different for each problem.

Ancient algorithms!

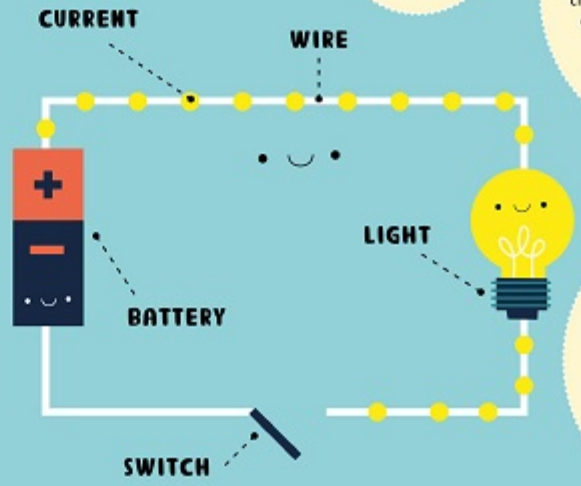
Algorithms are famous for being part of very successful online search engines or online shopping platforms. But over 2,000 years ago, in the year 300 BCE, the ancient Greek mathematician Euclid wrote one to solve a mathematical problem. The term 'algorithm' was first used by a Muslim mathematician in the ninth century.

ALTERNATING CURRENT

Alternating current is the way electricity powers our household electrical items.

Electricity flows around a **circuit** in a 'current'.

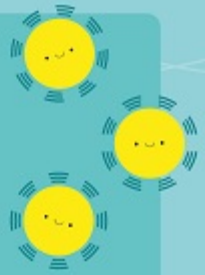
Electricity works because the **electrons** (tiny parts of an **atom**) in the metal wires flow from the negative side of the battery to the positive side. This is called **direct current**, because the electricity flows in one direction, and is used in small battery-powered items.



Household items that are plugged into the mains supply use alternating current. This is because alternating current is more efficient for sending high **voltage** electricity across the country from power stations to homes.

Good vibrations

Alternating current is when the electrons don't flow around the circuit in one direction but repeatedly switch directions so that they vibrate. This means the power very quickly changes from on to off and back again – this happens so quickly that we don't notice.





ANATOMY

Anatomy is the part of biology to do with studying the body – how it looks and how all the pieces fit and work together.



To study the internal anatomy of an animal or plant, a scientist carefully cuts it open and examines the parts found inside. This is called **dissection**. They might photograph or draw what they see, and compare its size, looks and condition to other examples.

Today, we can use machines to look inside people's bodies safely and painlessly while they are alive, using an **MRI scanner**.

We can even see the anatomy of unborn babies using **ultrasound** scanners to check that their bodies are growing well. (See page 89.)



Ancient anatomy

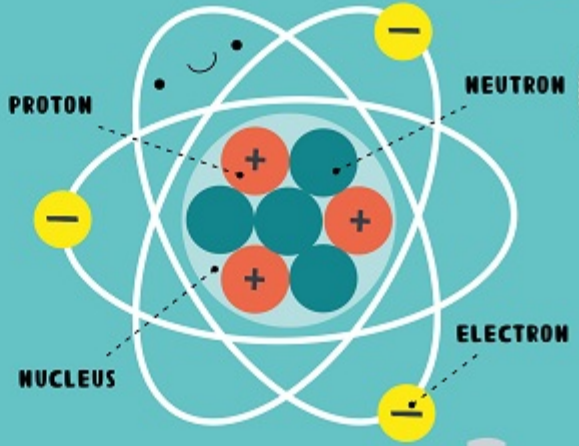
Five hundred years ago, **Leonardo da Vinci** studied anatomy by looking at bodies in hospitals and carefully observing and drawing them. By learning about anatomy, he understood how muscles work, and this understanding helped inspire some of his inventions.

ATOMS

Atoms are the building blocks of our entire universe. They combine in different ways to make everything, from solid objects to liquids and gases, but on their own they are very small and scientists need a special type of microscope to see them.

There are three main parts of an atom: **protons**, **neutrons** and **electrons**.





The protons and the neutrons make up the centre of the atom and together they are called the **nucleus**. The electrons surround the nucleus.

An atom of the gas called neon contains ten protons, ten neutrons and ten electrons. Every atom with ten protons is a neon atom since it is the number of protons that defines an atom.



Super-powered machinery!

Atoms are very small! It would take roughly fifty million atoms to measure one centimetre. Scientists use a transmission electron microscope (TEM) to see them. The TEM fires a beam of electrons to create an image that the human eye can see.

