



IMAGE: iStock/ Rach27

# MAP MAKER

## All roads lead to a cartography challenge

THERE are many types of maps. But generally when you think about maps, you probably think of geographic maps.

These are drawings of the Earth, or areas of the Earth on a flat surface. The people who produce maps are called cartographers.

Today's cartographers have all sorts of technology available to them.

But when you think about how long maps have been around - quite impressive maps were produced by ancient civilisations - computers, aerial and satellite images are a new phenomenon.

Most early maps depicted the night sky rather than the Earth, but rock carvings and cave paintings have been found of hills and mountains and other landscapes.

Ancient Greeks drew papers maps using simple instruments, the observations of travellers and mathematical equations.

Famous astronomer, mathematician and cartographer Claudius Ptolemaeus (better known as Ptolemy), made a large contribution to geographic knowledge.

Way back in Second Century, Ptolemy produced a series of guides to drawing the Earth, known as the *Geography*.

He talked about the problems of representing a spherical earth on a flat sheet of paper, and is believed to have been the first to have placed a grid system on a map and used the same grid system for the entire planet.

In other words, Ptolemy invented the lines of longitude and latitude, along with a few other ideas about

geography, that we still use today.

He also showed north at the top of the map.

Unfortunately for Ptolemy his work was not appreciated until about 1000 years later.

Of course his maps contained lots of mistakes, because he was relying on the inaccurate observations of travellers.

For example, his maps showed the Indian Ocean as a large inland sea.

He also had Asia extending much further east, which historians believe may have led explorer Christopher Columbus to believe he could reach Asia by sailing west from Europe.

This did lead to Columbus discovering North and South America, but he always argued that the lands he visited were part of the Asian continent.

This might explain why the Americas were named after fellow Italian explorer Amerigo Vespucci, who recognised the continents as the "New World".

Anyway, maps show areas of the Earth from the air, as if you were flying above in an aeroplane.

Maps of the world show oceans and land, and sometimes use different colours to show countries.

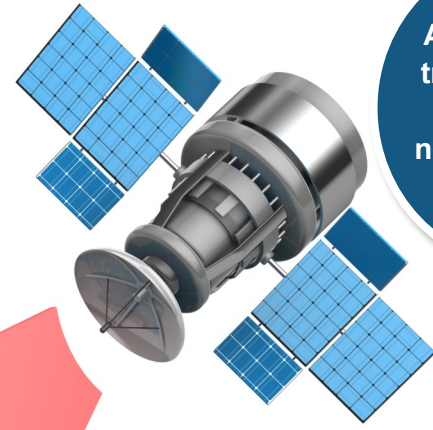
Maps of countries show information such as state borders, cities, rivers and lakes, and perhaps major highways.

Street maps help people find their way from one destination to another by displaying all the roads of a particular area and other important information for people, such as schools, parks, police stations and airports.

**Continued Page 2**



# The GPS has changed our direction



A GPS satellite travels through the sky at nearly 14,000km per hour.

Satellite signals can travel through most plastics and glass.

Sextants use the angle between the sun (or a star) and the horizon to calculate latitude.

THE Global Positioning System (GPS) has made a massive change to the way people navigate.

All you need now to drive somewhere unfamiliar, or find a certain location is a modern mobile phone.

Phones operate as a receiver in this process, but there are two other parts to this system - satellites and ground stations.

There are more than 30 satellites high above the Earth in what is known as medium Earth orbit - between 2000 and 35,786 kilometres above sea level.

In this orbit it takes a satellite 24 hours to circle the Earth, the same period as the Earth's own rotation.

GPS satellites have atomic clocks that provide very accurate time.

A receiver listens for radio signals from the satellites.

The signal contains data that a receiver uses to work out the locations of the satellites and



make other adjustments needed for accurate positioning. It does this using a mathematical process called "trilateration". Once it has calculated your distance from four or more satellites it can compute latitude, longitude, altitude and time, and knows almost exactly where you are. The standard GPS service

provides to the public is accurate to about seven metres, 95% of the time. The ground stations use radar to determine the location of the satellites, and make sure they are where they should be. The GPS has been fully operational and available to the public since 1994. It is interesting to think that

humans still look to the skies to know where we are. Ancient sailors did not have reliable maps and sailed within sight of land as much as they could. But when that became impossible they used celestial navigation - the position of the stars, moon, sun and horizon. Sailors were familiar with the

constellations. In the Southern Hemisphere the Southern Cross can be used to locate due south. Over time tools were developed to assist celestial navigation, including sextants, more accurate devices for keeping time and almanacs of data. Space agencies still use celestial navigation for missions outside the Earth's atmosphere.

Image: iStock/ Madmaxer

## Turn your hand to creating a street map of your own

### From Page 1

Thicker lines or bolder colours are used to distinguish major highways from smaller streets.

If a friend asked how to get to your house from school do you think you could draw them a map?

You might like to challenge yourself by giving it a go.

You will need to think about directions - north, south, east and west.

You will also need to consider scale.

For example, a scale of 1:5000 would mean 1cm on the map represents 50m on the ground.

You might also like to use map points, symbols and words to show important locations or landmarks (e.g. your school and your house).

Your map can be as simple or as complex as you like.

You will need some paper (graph paper will help if you have some), a pencil, a ruler and an eraser.

You could use colour pencils or textas to show geographic features - dark green for a park, or blue for waterways.

In fact, you can draw anything on your map that is important to you.

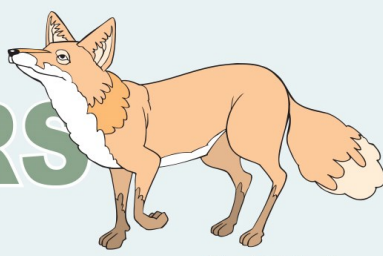

Your friend might like an ice cream on the way perhaps.

Then draw a line to show the quickest safe route from your school to your house.

There is no issue with using a street atlas, or Google Maps if you have access to technology, to assist you with this challenge.

Children's University Tasmania members can earn stamps in their passports for this challenge, at the discretion of their school coordinator.

## Word CHANGERS

Change one letter and arrange them on the next line to make a new word. Use the clues to help you change an owl into a fox and a magpie into a badger. The answers are at the right.

**O W L**

The front of a boat \_\_\_\_\_

Square container \_\_\_\_\_

**M A G P I E**

Pictures \_\_\_\_\_

Shines \_\_\_\_\_

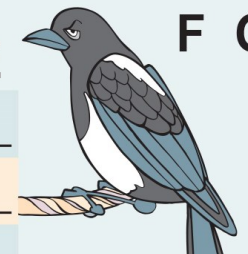

Ruin, spoil \_\_\_\_\_

Fisherman \_\_\_\_\_

Peril, risk \_\_\_\_\_

**F O X**

**B A D G E R**

**SOLUTIONS:** OWL, bow, box, FOX. MAGPIE, images, gleams, mangle, angler, danger, BADGER

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