

Second last day Class 11,

At the start of August, we began our Main Lesson exploring ancient world maps that depicted a pretty limited view of the world. Since then, through human exploration, an actual depiction of the Earth's surface has gradually emerged. The Mercator Projection was first created in 1569 and assisted marine navigation and further explorations. Antarctica was not discovered until 1820 and humans first reached the North Pole in 1909. GPS was first used by the US military in the 1960s, with the satellite data and images becoming publicly accessible a decade or so later. More recently, topographic maps are no longer being mass published due to their lack of demand and necessity. What an incredible way to ponder human's relationship to planet Earth! Excitingly, the recent creation of the AuthaGraph world map provides a totally fresh perspective on the spatial relationships of the world's countries and seas, which may encourage and support our global interconnectedness conscience.

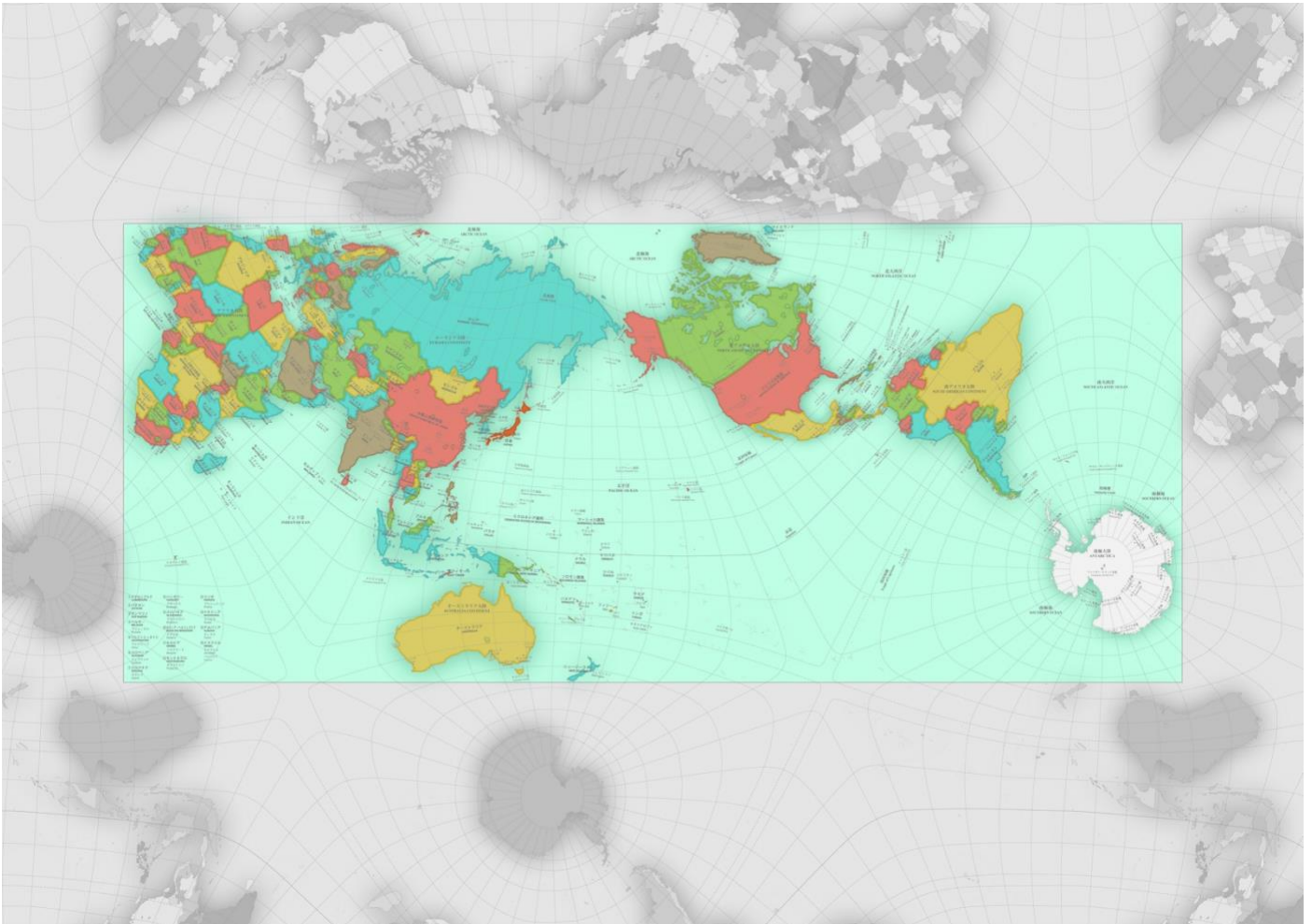
After our investigation into different mapping projections, are you ever going to look at a world map the same again? Now you know that all two-dimensional maps are distorted either in their projection of size, area, direction or distance between places. The most well-known world map, the Mercator Map has Greenland depicted 14 times larger than it is in reality, and most people are unaware!

Today I ask you to contemplate the world view offered by the AuthaGraph projection and then draw an image of how GPS works, while listening to a story on satellite navigation.

Stay warm, it feels like winter has finally arrived! Lou

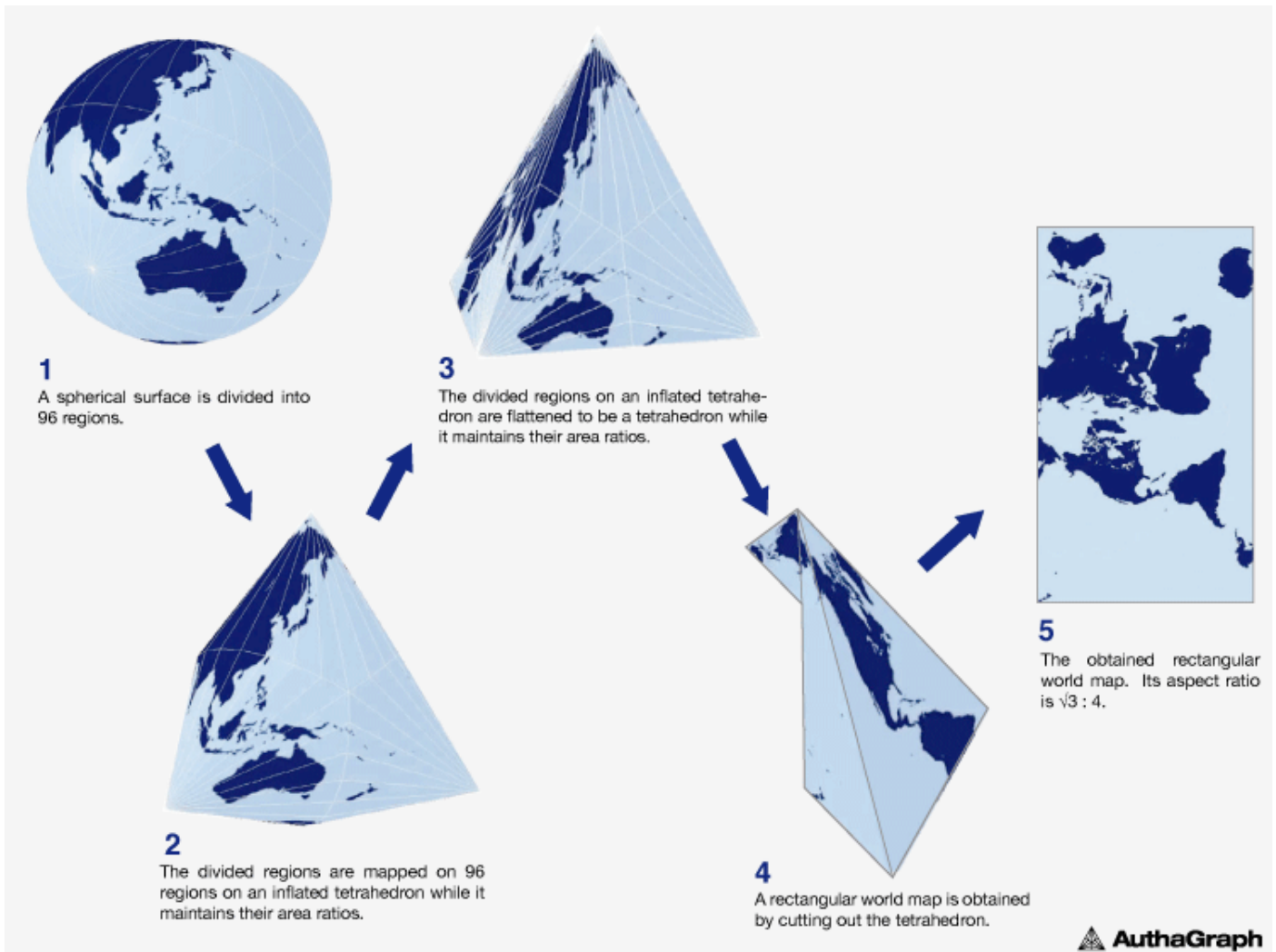
1. One last quiz! This quiz is from 3rd August and contains hurricanes, heatwaves, floods, landslides, earthquakes and fires in different parts of the globe. The answers to the map of Australia at the end are challenging, see how you go!
2. Now work your way through the following information on The AuthaGraph Map. At the end of the information, there are some questions to answer in your ML book.

The AuthaGraph Map, designed by Hajime Narukawa in 1999, is deemed the most accurate world map. It won Japan's prestigious Good Design Award in 2016.



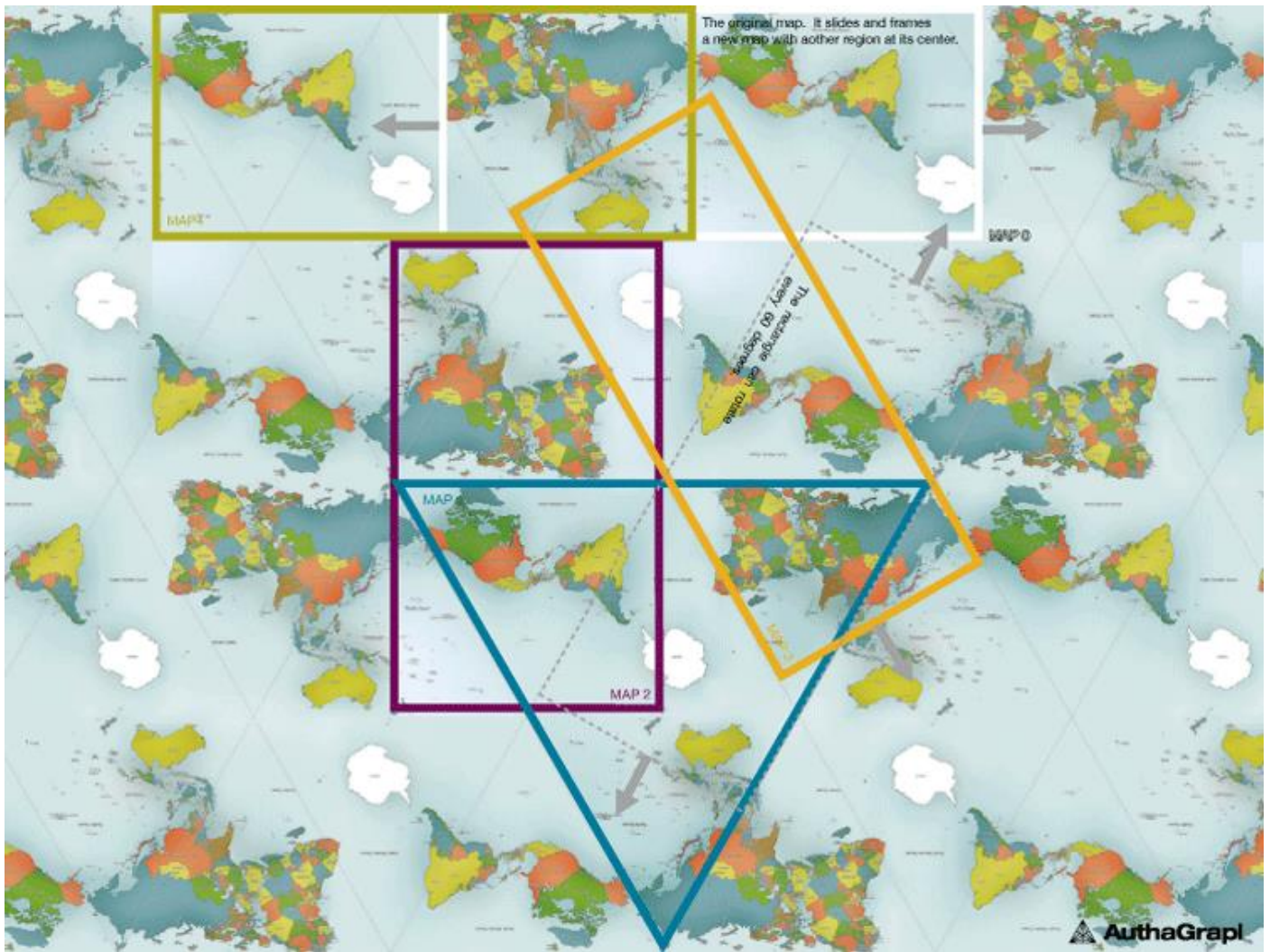
Source: <https://taylor.raack.info/wp-content/uploads/map.jpg>

It was created by dividing the globe into 96 triangles. The triangles were then flattened and transferred onto a tetrahedron and then unfolded into a highly accurate 2D map. Since the projection began as a globe, it can be folded back into one, like doing origami.

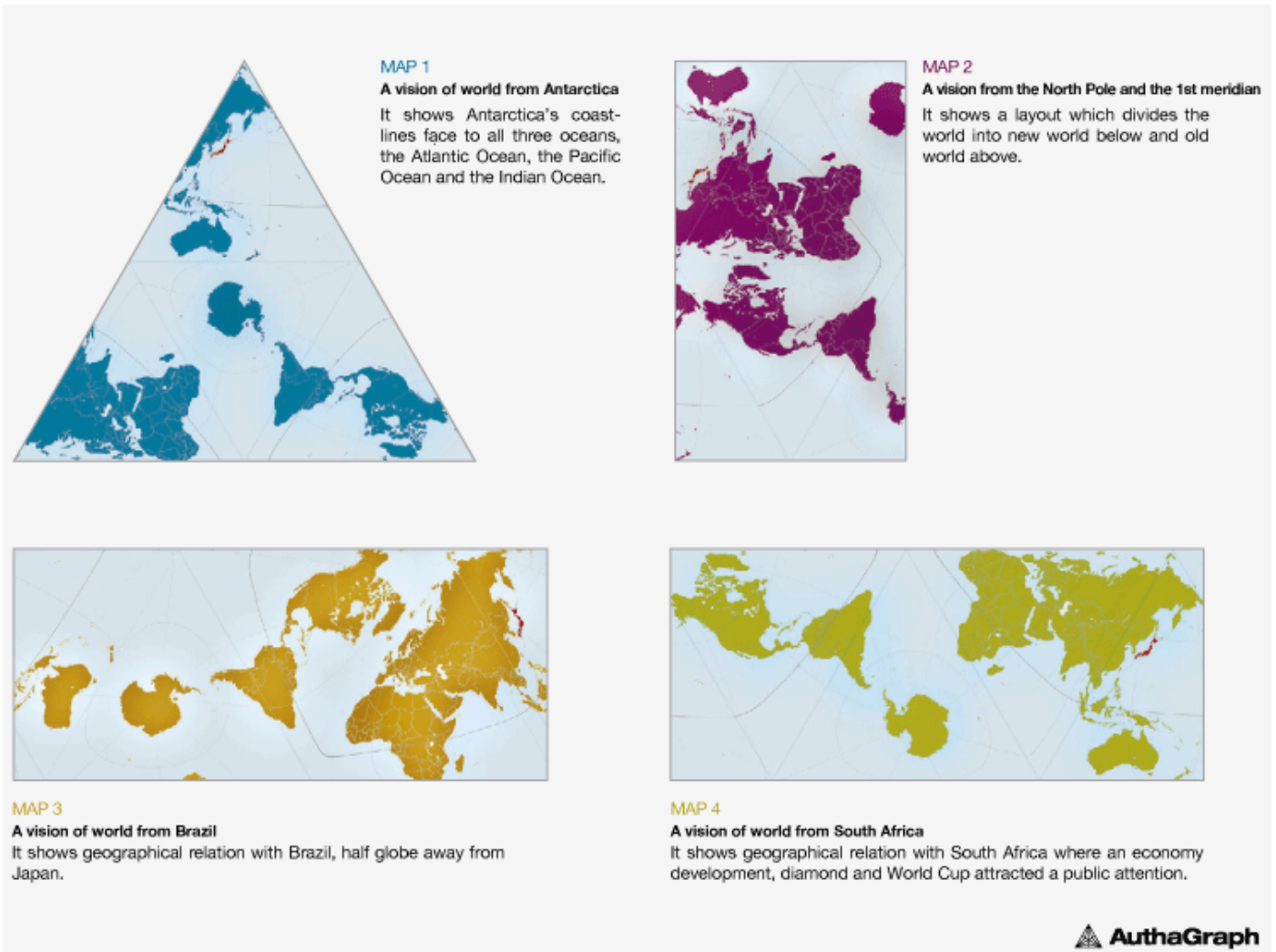


Source: <https://allthatsinteresting.com/wordpress/wp-content/uploads/2016/11/authagraph-map-process.png>

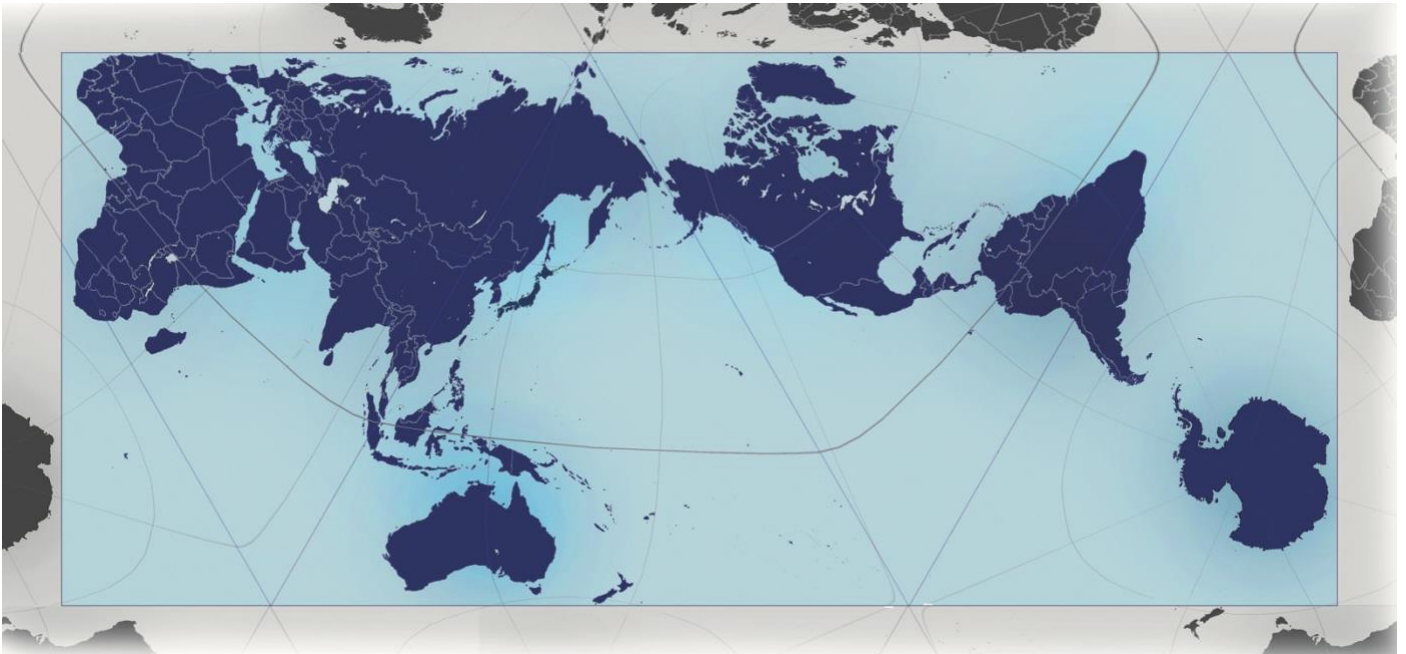
This projection maintains the landmass and sea proportions better than any other map. Furthermore, the continents do not become fragmented and the oceans keep their continuous networks. This continuous reality reflects the spherical nature of the Earth, in that there are no dead ends and we could keep traveling around its infinite plane.



The AuthaGraph Map can be tiled in any directions without visible seams and can be seen through the lens of a triangle, rectangle or parallelogram. Any place in the world can be in the centre and the Earth's surface can be viewed like it never really has before.



“The AuthaGraph world map aims to provide a new view point to perceive the world by equally showing the issues spread over the globe.” This idea is especially relevant as humanity are realising our connectedness through environmental issues like Climate Change and the recent COVID-19 pandemic.



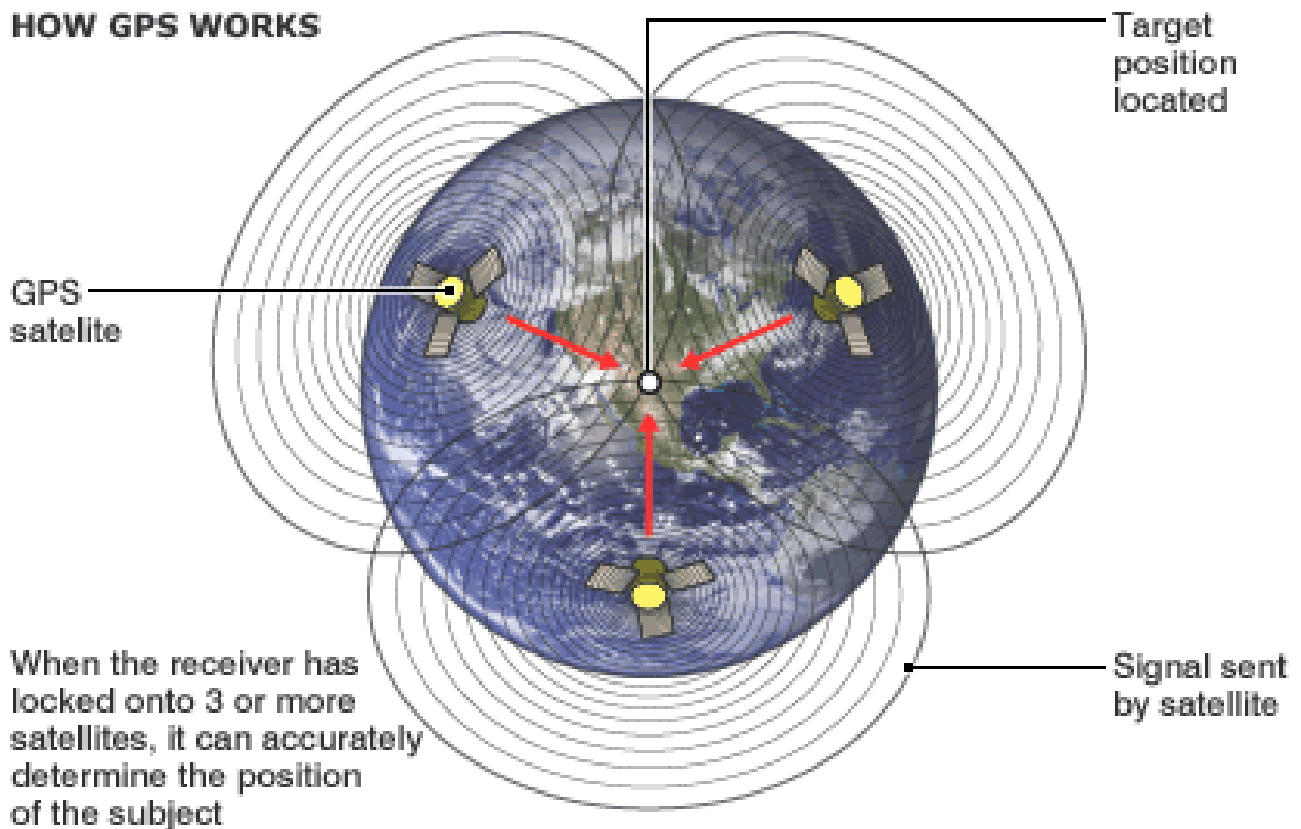
Source: <http://jto.s3.amazonaws.com/wp-content/uploads/2013/01/fl20110717x1a.jpg>

Unlike cylindrical projections, like the Mercator Map, the AuthaGraph no longer has a tidy grid system of latitude and longitude. The parallel and meridian lines bend and twist, with the Equator forming a slightly rigid arc. This where we confront the map's downfall, it cannot be used to navigate and it is hard to orient north.

Under the title **The AuthaGraph Map**, answer the following questions in your ML book:

- How is the AuthaGraph Map different from other maps?
- Observing the map, what stands out as looking different to how you are used to perceiving countries and oceans?
- Do you think this map can change how we think about our relationship and connectedness within the world?
- What role do/can maps play in this current stage of human development?

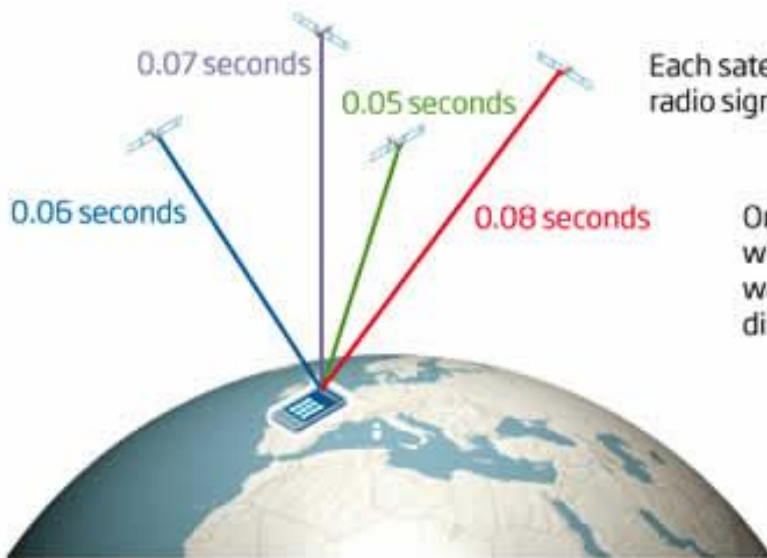
3. I would now like you to listen to the audio recording on satellite navigation. As you listen to this story, put the title ***Where would we be without the Global Positioning System?*** Into your ML book, and sketch a combination of the following diagrams (to explain how GPS triangulation works) below the title.



Source: http://newsimg.bbc.co.uk/media/images/42738000/gif/_42738925_gps_416x266.gif

How GPS works

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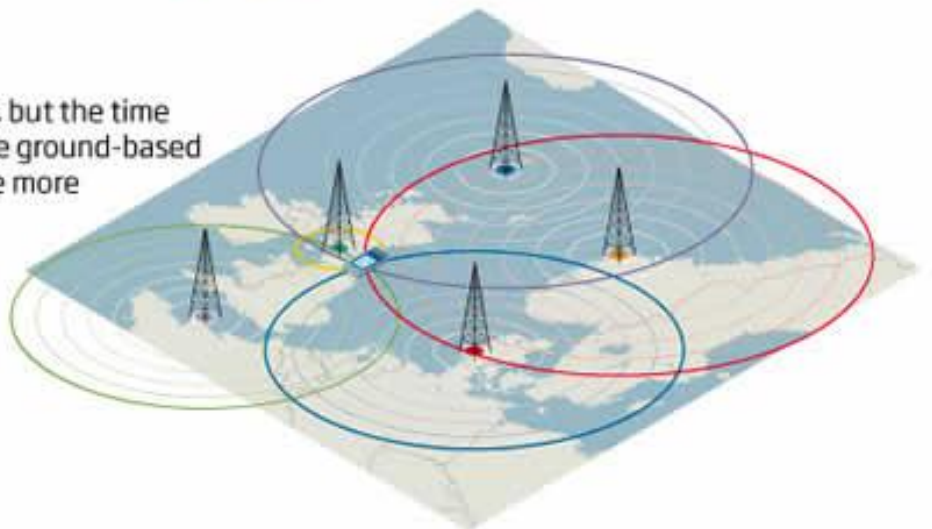


Each satellite is continually sending out weak radio signals with its position and the exact time

On Earth, a receiver will compare the time when the signal was sent with the time it was received. This is used to calculate distance from the satellite

After correcting for errors, the receiver uses the signals from four or more satellites to calculate its position in 3D. This is called trilateration

eLORAN uses a similar principle, but the time signal is broadcast from multiple ground-based stations. These radio signals are more powerful and harder to jam



Source: http://www.braddye.com/images/how_gps_works.jpg