TEACHER RESOURCE

STARDOME OBSERVATORY & PLANETARIUM
FACTS, RESOURCES AND ACTIVITIES ON...

UP VS. DOWN (PART 1)

Early in our history Earth was thought to be flat, and the maps created at the time reflected this notion. Landmarks were used to help orient which way was the top of the map. With larger maps required for further world exploring, a more universal method was required– and we turned to the skies. Because we can see the arc of the Sun across the sky, the sky wasn't considered flat. It was thought to be a celestial sphere that spun around the flat earth.

The location of sunrise and sunset gave two of the cardinal points to our maps, east and west respectively. A third point was given to us at night by observing how the stars appear to rise and set in a similar manner to the Sun, all except for one part of the sky where the stars appear to pivot around a singular point. This is the part of the sky above a pole, and these stars are called circumpolar.

Using these navigational tools, the top of many maps became known as the direction towards a pole / the circumpolar stars. Many of the first world maps were created in the Northern Hemisphere, so north is generally depicted at the top of these maps. If the first world maps were created from a Southern Hemisphere point of view, the tops of our world maps would have south at the top.

The flat model of our world did not explain many of the observable changes noticed by travelling great distances, one of which is that as we travel to different latitudes, a range of different stars are revealed. If we lived on a flat surface, the stars would be the same from any perspective, but on a sphere the objects you can see in the sky change as you move along the curved surface.

Once the spherical nature of our world was accepted, the first globes were made. These were created by people in the Middle East, then Asia and then Europe, all Northern Hemisphere nations so they depicted the 'top' of the globe as the Northern Hemisphere.

Gravity pulls towards the centre of the Earth, so up is always towards the sky and down is towards the ground – regardless of which way is north or south.

Science Content / Curriculum Link

PHYSICAL WORLD – PHYSICAL INQUIRY AND PHYSICS CONCEPTS. EXPLORE EVERYDAY EXAMPLES OF PHYSICAL PHENOMENA. SEEK AND DESCRIBE SIMPLE PATTERNS IN PHYSICAL PHENOMENA.

SOCIAL SCIENCES – UNDERSTAND HOW PEOPLE REMEMBER AND RECORD THE PAST IN DIFFERENT WAYS. UNDERSTAND HOW THE IDEAS AND ACTIONS OF PEOPLE IN THE PAST HAVE HAD A SIGNIFICANT IMPACT ON PEOPLES LIVES.

check out these other resources...

en.wikipedia.org/wiki/Spherical_Earth

en.wikipedia.org/wiki/Globe

en.wikipedia.org/wiki/South-up_map_orientation

DISCUSSION POINTS

By observing the sky, how can we figure out that it is the Earth that is actually turning and not a celestial sphere spinning around us?

What would maps look like if the first world maps were made in the southern hemisphere?

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ACTIVITY

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CREATE YOUR OWN STARRY SKY!

Objective...

With an umbrella from home your students can create their own star field and see how the world view changed from flat to spherical using the stars seen from different perspectives.

You'll need...

- Umbrella (one large one for the whole class, or an umbrella from each student)
- Glow in the dark or regular star stickers

Instructions...

- Create a star field on the inside of your umbrella. Students could make up their own constellation or use some well known constellations like the Southern Cross. You will find images of constellations at en.wikipedia.org/wiki/88_modern_constellations
- To make a Northern Hemisphere sky place the stars in the Little Dipper pattern at the central point of the umbrella. To make a Southern Hemisphere sky, place the Southern Cross near the central point of the umbrella.
- Get the students to twirl the umbrella slowly above their head. Looking up from this point is what the sky would look like from the North or South Pole. Stars viewed from the North or South Pole never rise or set.
- Now place the umbrella on a desk, allowing half of the umbrella to hang of the edge. When the umbrella is turned at this angle, you'll see that most of the stars rise and set. This is the perspective seen at the Equator. Stars viewed from the Equator rise and set.
- Now prop the umbrella on the desk, this angle represents looking at the sky from New Zealand (or anywhere in the Southern Hemisphere if using the Southern Cross). By twirling the umbrella here you'll see that the stars on the umbrella will never rise or set (circumpolar stars). Now imagine the entire celestial sphere, and you can see that those stars further out from the tips of the umbrella will rise and set.

Take a photo of your star umbrella and send it to us. We'd love to see your starry sky! education@stardome.org.nz

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