

## Activity I: What Planet Earth looks like from Space

From space planet Earth looks like a blue and white disc against a starry background. The colour comes from the world's oceans which reflect the blue colour back into space. The white colour comes from the clouds. The clouds are just huge amounts of water vapour existing as very tiny droplets in the atmosphere, Also visible is the brown and green of the world's continents,

Because the Earth is a planet and not a star only one half of the world is lit up at anyone time. This is because planets do not produce their own light and the Earth is relying on the Sun for its light. The planet therefore is reflecting the light into space. The Earth spins (rotates) on its axis (an imaginary line joining the north and south Poles) once every 24 hours. It is because of the Earth's spin that we experience day and night. The part of the Earth receiving light directly from the Sun is experiencing day, while the other side, not receiving direct sunlight experiences night. The direction of this spin is from west to east. This is why the east of Australia (e.g. people in Melbourne and Sydney) start each day before those in the west (e.g. Perth). The Earth is slightly tilted at an angle of approximately  $23^\circ$ ,

The Earth takes one day to rotate about its axis and one 365  $\frac{1}{4}$  days to orbit the Sun. This is why we have a leap year, We don't have 114 of a day so we catch up the day every 4 years, Generally, a leap year occurs every 4 years and is divisible by 4, but years ending in 00 (1900, 2100, 2200, etc.) are not leap years unless they are divisible by 400, Not counting some years as leap years, despite them being divisible by 4, compensates for the fact that a year is a little less than 365 y.! days. It is the Earth's orbiting of the sun that causes stars to appear in different positions throughout a year and the length of day and night to change as the Earth orbits the Sun.

The orbital path around the Sun is elliptical in shape, The tilt of the Earth is responsible for the seasons. In summer, the Sun's rays are concentrated over a smaller area, and therefore produce a greater heating effect and higher temperatures. In winter, the rays are more spread out, and the Earth does not heat up as much. As the Earth orbits the sun, the tilt causes different parts of the Earth to experience different heating effects-in other words, different seasons. The Earth may be thought of in terms of two hemispheres, or half spheres, When it is summer in the southern hemisphere (which contains Australia), it is winter in the northern hemisphere, At the summer solstice, days are longest and at the winter solstice, days are shortest. Between these two times, at the two equinoxes, day and night are of equal length.

The Earth is the only place in our solar system that we know has life, It's unique position in terms of the distance from the Sun means water can exist as a liquid. This is essential for life to exist.

### Questions

- How long does it take the Earth to: a travel once around the sun? b spin once on its axis?
- What is the angle of the Earth's tilt?
- Where on Earth are day and night always the same length?
- True or false:
  - A leap year is one that 4 divides into without any remainder,
  - The year 2000 was a leap year.
  - The year 2100 will be a leap year.
- In which direction do the stars appear to move compared to the Earth?  
**Hint:** Think about the direction of the Earth's rotation.
- If the Earth's axis was not tilted, would there be:
  - seasons?
  - day and night?
- What is:
  - a hemisphere?
  - a line of latitude?
- What would be the effect on the seasons if the Earth were tilted more?
- What is the difference between an equinox and a solstice?
- Why is it hot at the equator all year?
- Where on Earth could it be dark for an extended period of time (more than 24 hours)? Why?