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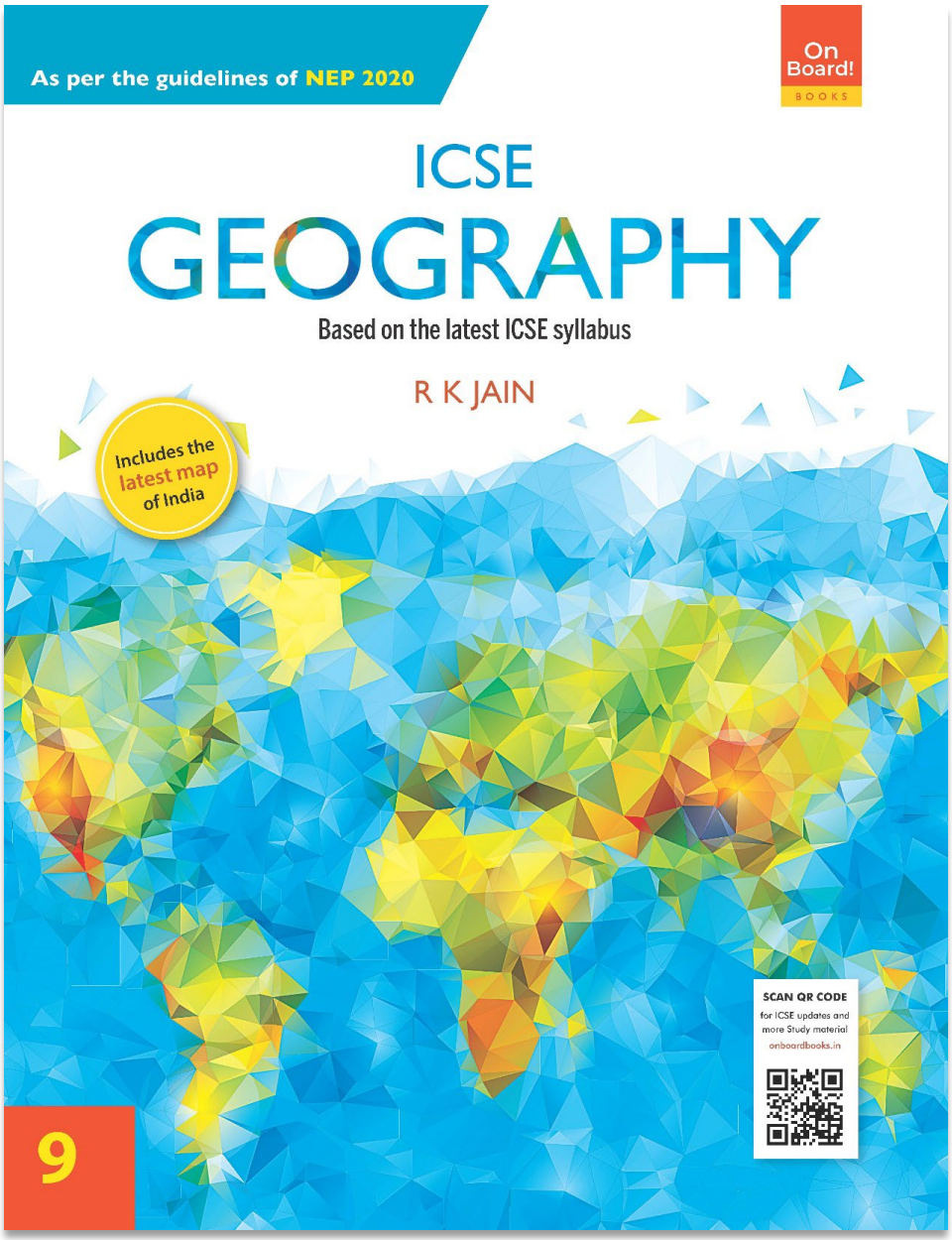
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CONTENTS

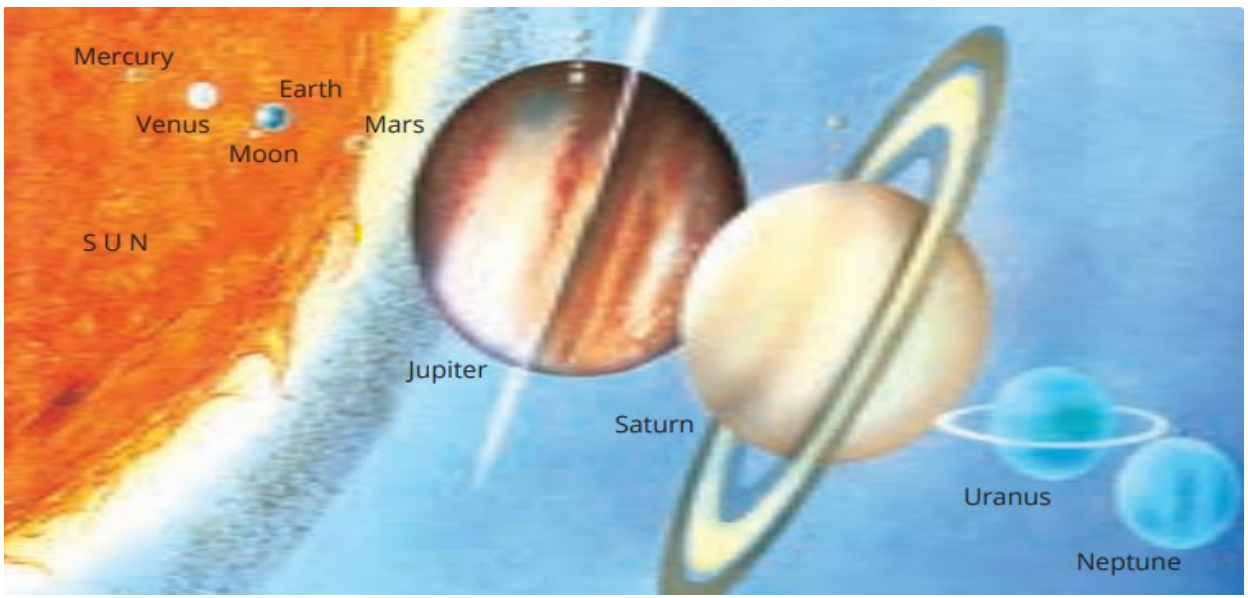
ICSE GEOGRAPHY

Class 9

Chapter 1: The Earth as a Planet

THE SOLAR SYSTEM

The Sun has a family, which is called the **Solar System**. The main members of the Solar family are the planets, satellites, asteroids, comets and meteors.



THE SUN AS A STAR

The Sun is the largest member of the Solar System and is a huge ball of very hot gases. The diameter of the Sun is about 1,392,000 km, which is 109 times greater than that of the Earth. The Sun is about 1.3 million times bigger than the Earth. It is located at an average distance of about 148 million km from the Earth. It is the main source of heat and light for all forms of life on the Earth.

The light from the Sun, travelling at a speed of about 300,000 km per second, takes about 8 minutes and 20 seconds to reach the surface of the Earth.

THE PLANETS

There are eight planets in the Solar System these are – Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

The Inner Planets include Mercury, Venus, Earth and Mars. These are also called the terrestrial planets, as their structure is similar to that of the Earth.

The Outer Planets include Jupiter, Saturn, Uranus and Neptune. These are also called the Jovian planets, as their structure is similar to that of the Jupiter. They are of gaseous origin.

EARTH – A UNIQUE PLANET

1. The Earth lies between Venus and Mars. The Earth is located at an average distance of about 148 million km from the Sun.

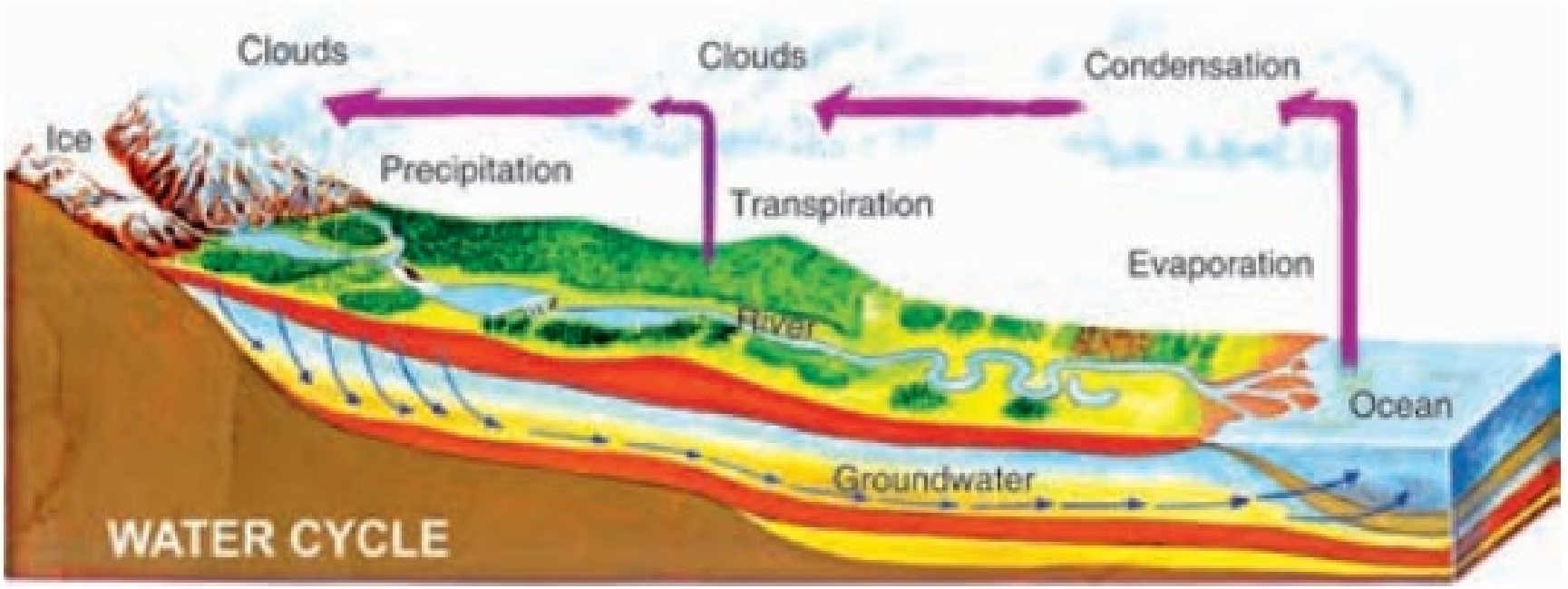
2. The average temperature on the side which is facing the Sun is about 17 °C.

3. Life exists on the Earth due to the presence of land, water and air. These three domains represent the three states in which matter can exist–solid, liquid and gas.

4. The Earth has a favourable environment, which is due to the favourable living conditions.

5. Due to the rotation of the Earth around its axis, the part of the Earth facing the Sun constantly gains heat due to insolation and the part of the Earth away from the Sun constantly loses heat due to terrestrial radiation towards the outer atmosphere.

6. The presence of water is a unique feature of our planet. The area under land and water on the surface of the Earth is about 29 per cent and 71 per cent respectively. The water is continuously moving from the Earth's surface into the atmosphere and back again to the Earth's surface through the **hydrological cycle**. This maintains the continuous flow of water on the Earth.

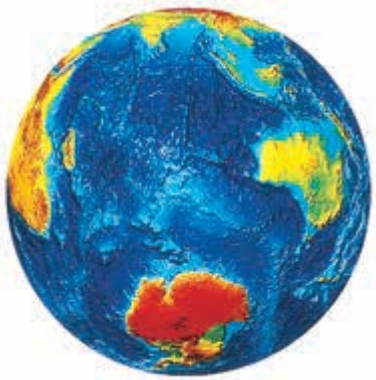


7. The presence of atmosphere around the Earth has made it a unique planet. The main gases present in the atmosphere are nitrogen (78 per cent) and oxygen (21 per cent).

8. The atmosphere also acts as a shield and protects the planet from harmful **ultraviolet rays** coming from the Sun. These rays are not able to reach the Earth's surface due to the presence of **ozone layer** in the atmosphere. The atmosphere also absorbs the radiations from the Earth's surface. This helps in keeping the Earth comparatively warmer during the night time and also during the winter season.

Blue Planet

When astronauts from the Earth, for the first time, landed on the surface of Moon, they watched the Earth from there, as no one had ever seen it before. It looked blue in colour due to the presence of water all over it. Thus the Earth is popularly known as the **blue planet** or the **watery plan**



Earth – The Blue Planet

THE SHAPE OF THE EARTH

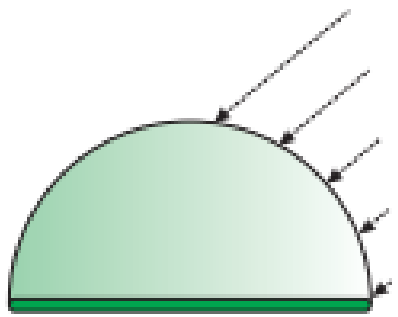
Today we know that the Earth is spherical in shape. But it is not a perfect sphere, as it is bulging at the Equator and flattened at the Poles.

The famous Greek philosopher Pythagoras, in the sixth century BC, said that the Earth was spherical in shape. But people did not believe him. Later on, Aristotle, Varahamihira, Aryabhata and Copernicus also said that the Earth is spherical in shape.

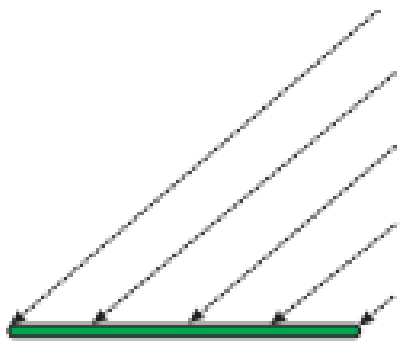
Earth as seen from the Moon's surface

We have several convincing proofs to support the spherical shape of the Earth. Some of them are:

1. **The Sun and other planets:** In the Solar System all the heavenly bodies are spherical in shape. Thus, the Earth should also be spherical in shape.
2. **The Sunrise and the Sunset:** As the Earth rotates around its axis from west to east, people living in the eastern areas see the sunrise earlier than those living in the west. Had the Earth been flat in shape, then all places on the flat Earth would have sunrise and sunset exactly at the same time.



On a spherical Earth the rising Sun will be first seen in the east and then in the west.



On a flat Earth the rising Sun can be seen at all places at the same time.

3. **The Circular Horizon:** The extent of this circular horizon increases with the increase in altitude of the observer. This is possible only in the case of a spherical body. Had the shape of the Earth been flat, the extent of visible area and its horizon would remain the same.

The extent of visible sea increases with height.

4. **The Sighting of a Ship:** As the ship comes up over the horizon, we can see the chimney, then deck and finally the entire ship. This is due to the curved surface of the Earth.

5. **The Circular Shadow**: The basis of Aristotle's belief about the spherical shape of the Earth, was its circular shadow (as an arc of a circle) observed during the lunar eclipse. A circular shadow can only be cast by a spherical body.

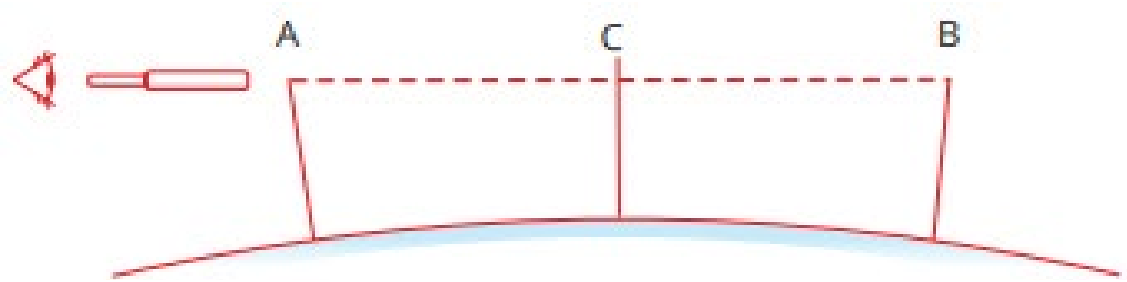
6. **The Pole Star:** The position of the Pole Star is always vertically above the North Pole. The angle of elevation of the Pole Star is different at different places. This angle decreases towards the Equator, where it is 0°. This is possible only if the Earth is spherical in shape.

7. **The Circumnavigation:** sailors have been travelling around the world in different directions and almost all of them came back to the starting point. In the early years of the sixteenth century, Ferdinand Magellan, a Portuguese navigator and explorer, went on a voyage and discovered the Strait of Magellan. He sailed across the Pacific Ocean. Though he was killed in the Philippines, but his ship Victoria continued westwards and finally completed the voyage around the world and proved that the Earth is spherical in shape.

Route of Magellan for round-the-world voyage

8. **The Bedford Canal Experiment:** The most convincing proof about the shape of the Earth was given by **Dr Wallace**, a Britisher, who carried out an experiment in the **Bedford canal** area in England. He fixed three poles of equal length on the level bed of the Bedford canal at a distance of one mile or 1.6 km apart from the other. Dr Wallace observed the top parts of these poles with the help of a telescope. He found that the middle pole was higher by about eight inches or 20 cm.

This experiment was repeated in several other directions and at different places. It proved beyond doubt that the surface of the Earth is curved and the Earth is spherical in shape.

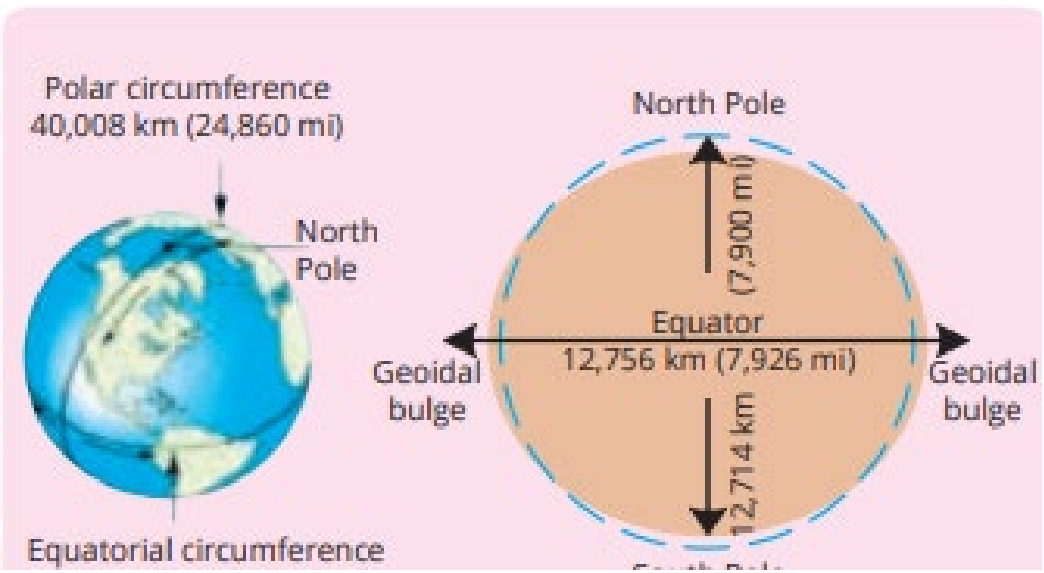


The Bedford level canal experiment proved the curvature of the Earth.

9. Recent Photographs of the Earth: the orbiting satellites have taken photographs. We can see the Earth in the true perspective in these photographs taken from outer space. This is a confirmed proof about the spherical shape of the Earth.

Oblate Spheroid

The Earth is slightly bulging at the Equator and slightly flattened at the Poles. This shape of the Earth is called Oblate Spheroid. The difference between the Polar and the Equatorial diameters is only about 42 km. In comparison to the size of the Earth, this difference of about 42 km between the Polar and the Equatorial diameters is insignificant. Thus the Earth is taken as spherical in shape for all practical purposes.



Earth is an Oblate Spheroid.

THE EARTH AS THE HOME OF HUMANKIND

- Earth is the only planet in the Solar System which is known to have life and this is due to the presence of land, water and air on it.
- Three domains of the Earth are called the lithosphere, the hydrosphere and the atmosphere.
- The narrow zone of contact between land, water and air, where all forms of life exist, is called the Biosphere.
- Biosphere is the home for the entire living organisms on our Earth.
- It is estimated that about 1.5 million different species of organisms are living in the biosphere.
- The biosphere provides all the nutrients and resources which the living organisms need to survive.

Life in the biosphere is found in plant kingdom and animal kingdom. Human beings are also part of a biosphere. Many human activities have a negative impact on the biosphere.

THANK YOU