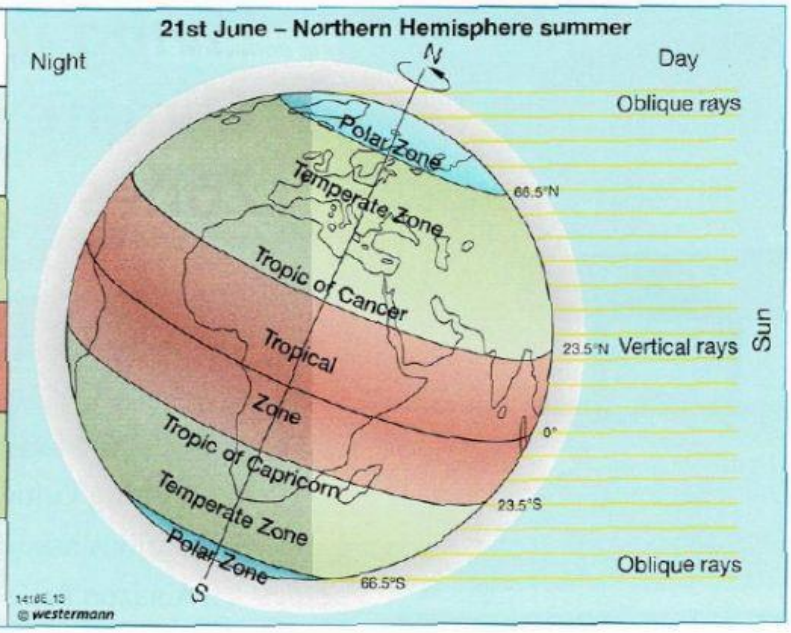
Hot Places – Cold Places

Per cent of Earth's surface	Sun rays hit the Earth ...	Length of days
5	not at all or at flat angle.	At the North Pole 6 months day, 6 months night.
25	at moderate to steep angle.	Long days in summer, short days in winter.
40	at steep to 90° angle.	Always almost 12 hours day and 12 hours night.
25	at moderate to steep angle.	Long days in summer, short days in winter.
5	not at all or at flat angle.	At the South Pole 6 months night, 6 months day.



Hot Places – Cold Places

More heat – less heat

Because of the Earth's shape, vertical or oblique rays heat the surface differently near the Equator and the Poles (M4). This is why the Earth can be divided into three different illumination zones (M1, M2). There is a Polar Zone and a Temperate Zone on the Northern and the Southern Hemisphere. Also, there is a Tropical Zone around the Equator. These illumination zones are an important basis to characterise climate zones of the same name. In between these climate zones, there are transition regions: the Subpolar Zone, and the Subtropical Zone (› pp. 68-69).

The **Polar Zones** north and south of the Temperate Zones get so little heat from the Sun that ice and snow cover large areas all year round.

As the Sun's rays hit the Earth at a lower angle north and south of the Tropics, these areas called the **Temperate Zones**. They get less energy and have a wider range of temperature during the year. There are four seasons.

Between the Tropics the Earth's surface gets the most energy. This is the hot or **Tropical Zone** of the Earth. There are almost no differences in temperature throughout the year.

M2 Illumination zones

Tilted axis

The Earth does not only spin on its own axis, it also orbits the Sun within one year. The Earth's axis is tilted at an angle of 23.5 ° (M3). This means that different parts of the Earth face the Sun in the course of the orbit. Therefore, the Northern and the Southern Hemisphere of the Earth are getting more or less vertical rays from the Sun throughout a year. This is why we get seasons.

From June to September, vertical rays reach the Northern Hemisphere, because the North Pole is tilted towards the Sun. During this time, the Sun is at its zenith (vertical rays) between the Equator and the Tropic of Cancer (23.5° N, › p. 34: M1). The days are longer and the temperatures are higher. It is summer.

Between December and March the Sun is at its zenith (vertical rays) between the Equator and the Tropic of Capricorn (23.5° S, › p. 34: M1). Then the North Pole is tilted away from the Sun and the Northern hemisphere gets oblique rays only. The days are shorter and the temperatures are lower. It is winter there.

Q1: Why are there different temperatures near the Equator and the Poles?

Because ...

Q2: What zones can be found in between The Polar, Temperate and Tropical Zones?

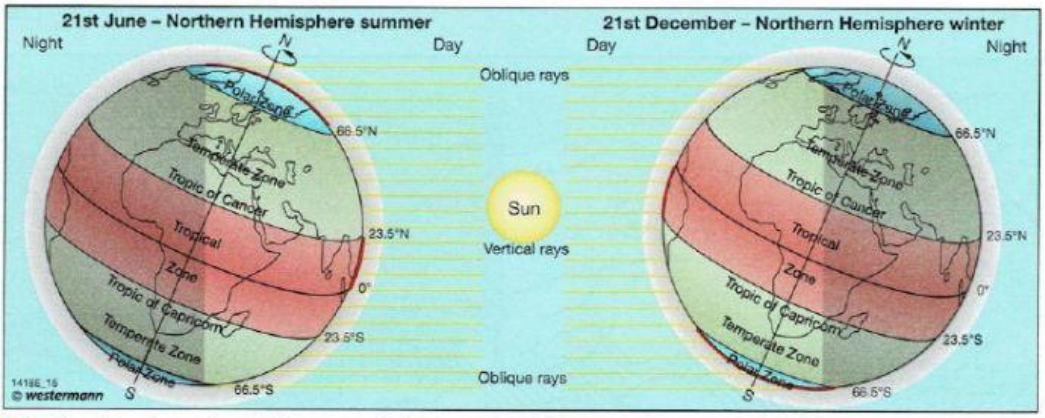
There are ...

Q3: Where is the Sun at its Zenith from June to September?

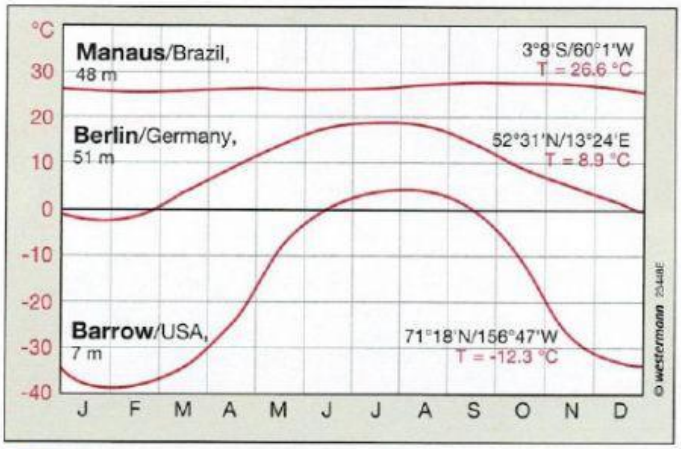
The Sun is at its Zenith ...

Q4: What does it (the fact that the Sun is at Zenith) mean for the everyday life?

Hot Places – Cold Places



M1 The Earth on its orbit around the Sun on 21st June and on 21st December



M2 Average temperatures of Manaus, Berlin, and Barrow

Q5: Explain why Berlin's temperature changes from month to month.

Q6: Explain why the temperature in Manaus stays constant throughout the year.