

# How Climate Works

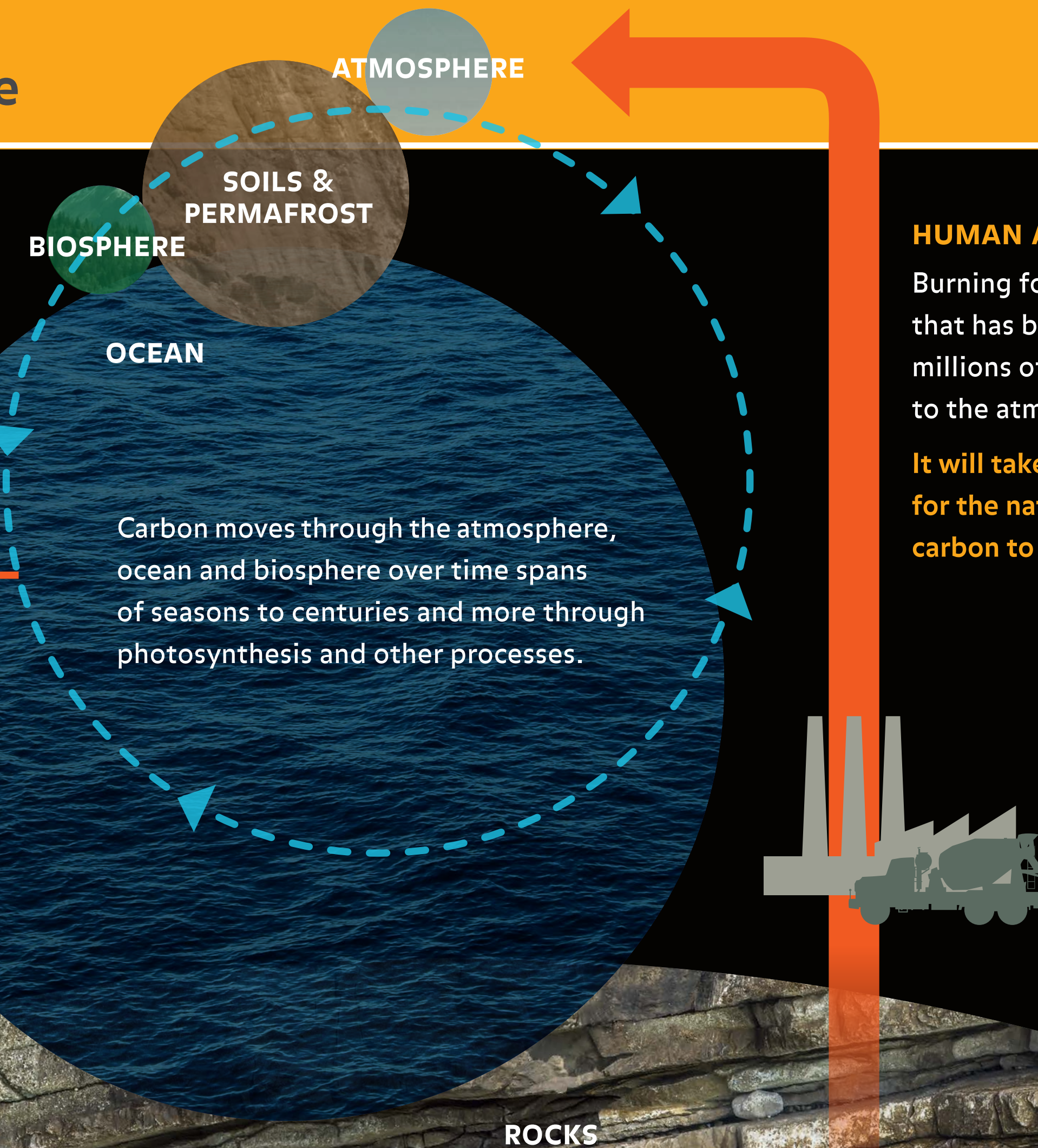
Energy from the Sun drives climate by heating Earth's surface unevenly. Solar energy is concentrated near the equator, delivering more heat to the tropics and less to the poles. Ice also reflects incoming sunlight, cooling the poles even more. The temperature difference sets the ocean and atmosphere in motion as they work together to distribute heat around the planet.

**Movement of heat by the atmosphere and ocean gives rise to climate and weather.**

## Changing the Carbon Cycle

The carbon cycle has regulated CO<sub>2</sub> levels in Earth's atmosphere for billions of years. How is human activity changing the cycle?

Carbon naturally moves into the rock reservoir slowly, over thousands to millions of years.



Carbon moves through the atmosphere, ocean and biosphere over time spans of seasons to centuries and more through photosynthesis and other processes.

### HUMAN ACTIVITY

Burning fossil fuels releases carbon that has been stored underground for millions of years, instantly adding it to the atmosphere as CO<sub>2</sub>.

**It will take tens of thousands of years for the natural cycle to return this carbon to the rock reservoir.**

## Carbon Imbalance

Carbon constantly moves between the ocean, atmosphere, biosphere and other components of the climate system. The natural exchange of carbon between these components, called reservoirs, regulates CO<sub>2</sub> in the atmosphere, thereby stabilizing Earth's temperature. Burning fossil fuels releases carbon into the atmosphere more rapidly than natural processes can remove it, disrupting the balance of the carbon cycle.

**CO<sub>2</sub> = Carbon dioxide**    **O=C=O**