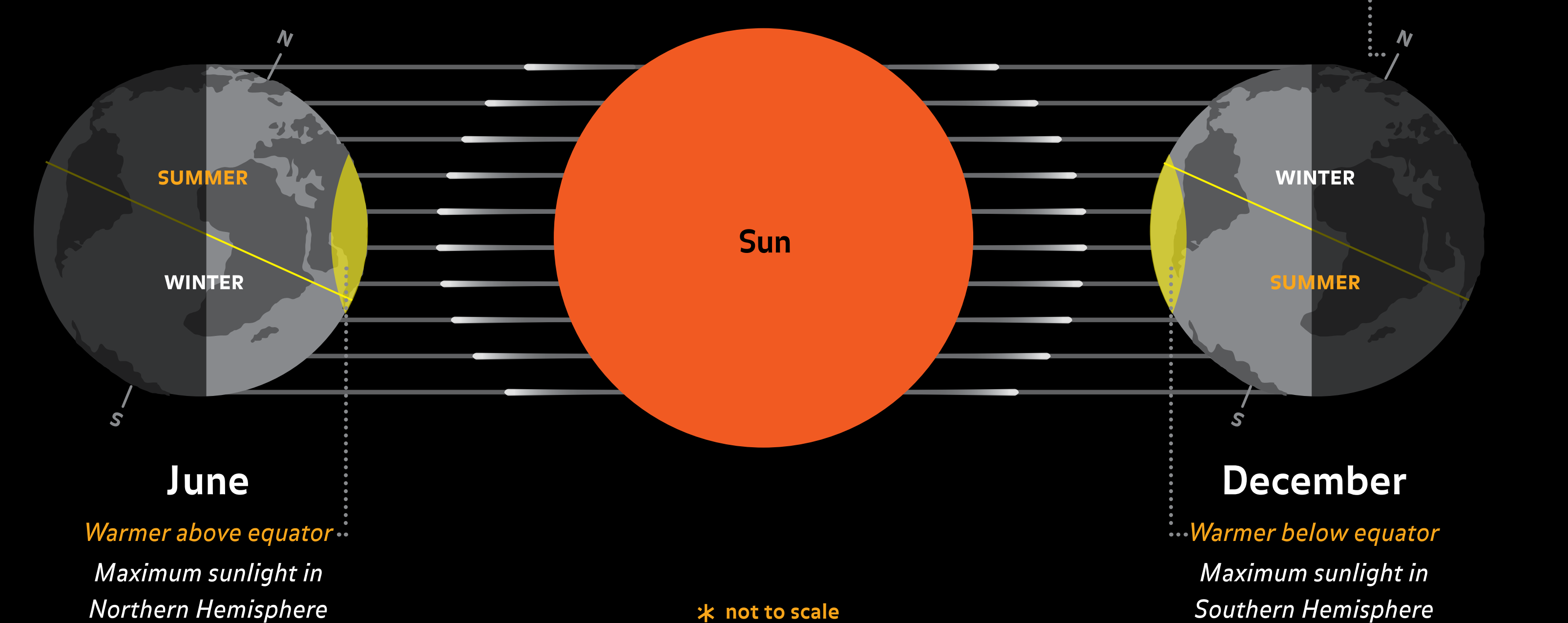


## The Reason for the Seasons

Earth has seasons because its axis of spin is tilted (see *diagram*). This causes the amount of solar energy warming each hemisphere to shift based on where the planet is in its yearly orbit.



## TAKE THE CLIMATE QUIZ

PRESS A BUTTON to answer the questions above

## Weather or Climate?

We experience **weather** every day and even moment-to-moment. It's why you choose to wear a T-shirt, sweater or raincoat. **Climate** is the average weather over decades or longer. How people build their homes and what crops they grow are usually determined by climate.

A rainy day may inspire you to bring an umbrella—and if you live in a climate where storms and flooding are frequent, you may build your home on stilts.



## Components of the Climate System

Earth's climate system is like a body: it relies on many interrelated pieces working together to function.

**ATMOSPHERE (AIR)**  
Insulates Earth by trapping heat and transporting heat and water vapor

**CRYOSPHERE (SNOW AND ICE)**  
Cools Earth by reflecting incoming sunlight, limiting how much heat is absorbed by the surface

**LITHOSPHERE (SOLID EARTH)**  
Absorbs solar energy, radiates heat and stores carbon; continents and landforms help direct ocean and wind currents

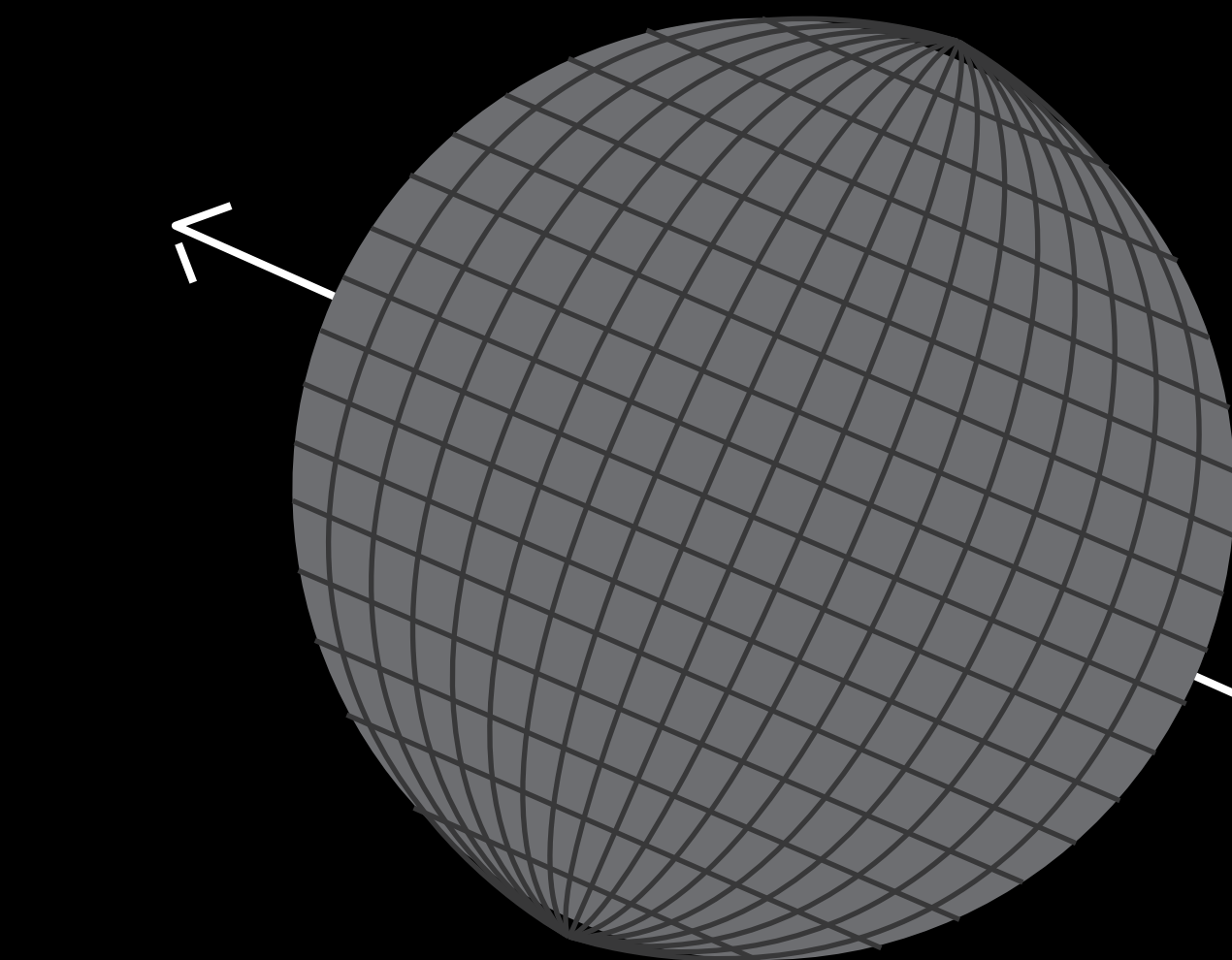
**BIOSPHERE (LIVING THINGS)**  
Organisms take up carbon and exchange it with the atmosphere and ocean

**HYDROSPHERE (WATER)**  
The ocean absorbs heat and carbon, transports them around the planet and naturally controls atmospheric CO<sub>2</sub>

## AIR AND OCEAN CURRENTS

SLIDE to explore north and south

SLIDE to explore east and west



## How Does the Ocean Control Climate?

The ocean holds **50 times** more CO<sub>2</sub> and **1,000 times** more heat than the atmosphere.

The atmosphere moderates Earth's temperature through heat-trapping greenhouse gases, mainly carbon dioxide (CO<sub>2</sub>). But the ocean is also crucial to climate. It acts as a control knob, absorbing or releasing carbon and heat in response to changes in the atmosphere. It will take thousands of years for the ocean to absorb the excess CO<sub>2</sub> in today's atmosphere.

