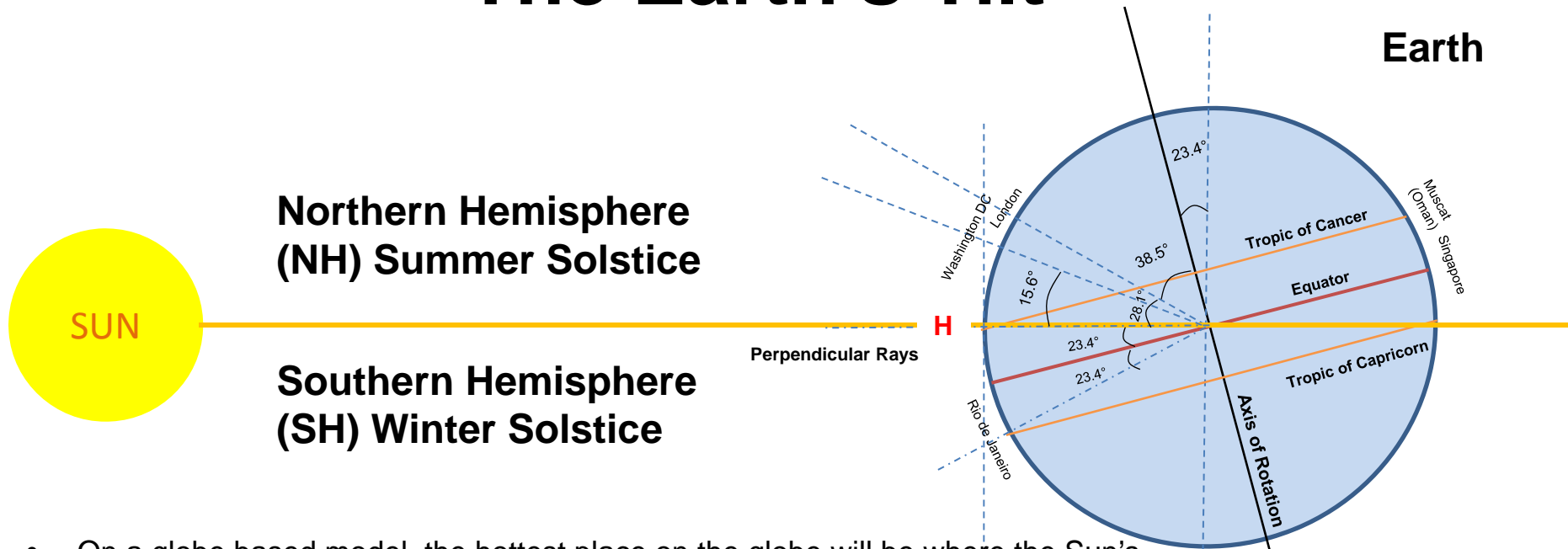


The Earth's Tilt



**Northern Hemisphere
(NH) Summer Solstice**

**Southern Hemisphere
(SH) Winter Solstice**

- On a globe based model, the hottest place on the globe will be where the Sun's light strikes the Earth perpendicularly (at right angles).
 - This is where the Sun's rays should be most intensely spread
- With the Earth tilting towards the Sun at 23.4° (NH Summer Solstice), the hottest place will be the Tropic of Cancer, which lies on a latitude 23.4° North of the Equator
- The distance of any location in terms of latitude from point H, should be directly related to the temperature
- We can use known latitude of cities to check that this is correct
 - e.g. The Equator is 23.4° below point H in NH mid-summer, but Washington DC is only 15.6° above it, so Washington DC (39° North Latitude) should be hotter than places on the Equator, e.g. Singapore.
 - London (51.5° North Latitude) is only 28.1° north of point H, which is only 4.7° more than the Equator is South!!!
 - Rio de Janeiro (23° South Latitude) is 46.4° below point H, so should be much cooler
 - Reykjavik in Iceland (64° North Latitude) is only 40.6° above point H
 - The Arctic Circle is 66.5° North Latitude, which 43.1° from the perpendicular Sun Rays (closer than Tropic of Capricorn, which is 46.8° away)

See next slide for typical temperatures

Cities Latitudes and Temperatures NH Summer Solstice

City	Latitude	Angle from Point H	Hours of Sun light (Solstice)	Average July Temperatures
Reykjavik	64° North	40.6°	21 hours	9°C
London	51.5° North	28.1°	16.5 hours	19°C
Washington DC	39° North	15.6°	12.5 hours	27°C
Muscat (Oman)	23.6° North	0.2°	12.25 hours	35°C
Singapore	1° North	22.4°	12 hours	27°C
Rio de Janeiro	23° South	46.4°	12 hours	22°C

1. How can London and Reykjavik be so much colder than Rio de Janeiro in July, when they are closer to the perpendicular rays of the Sun and receive longer hours of Sun Shine?
2. Why aren't London's summer temperatures comparable to Singapore's temperatures, when there is only 4.7° difference from the perpendicular Rays of the Sun?
3. Why isn't Washington DC hotter than Singapore?