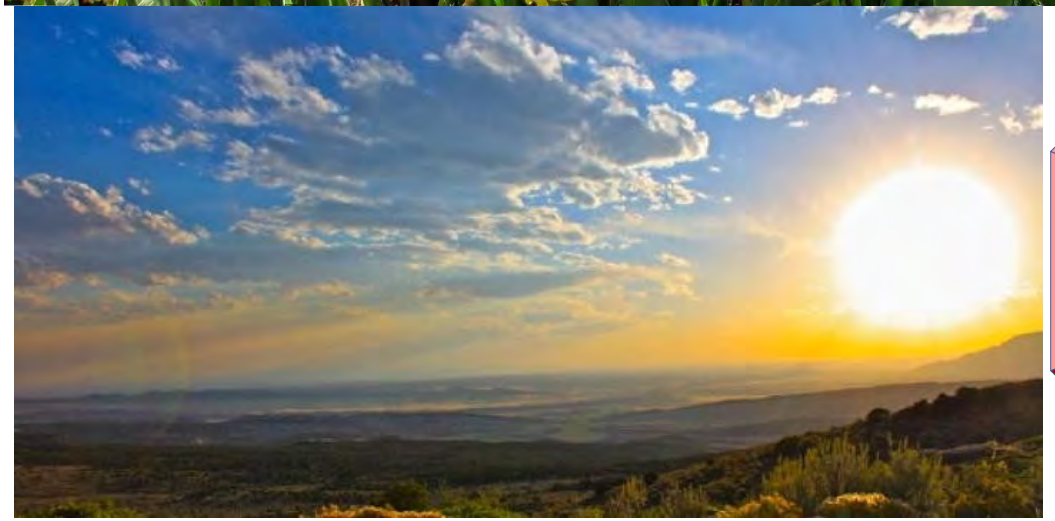
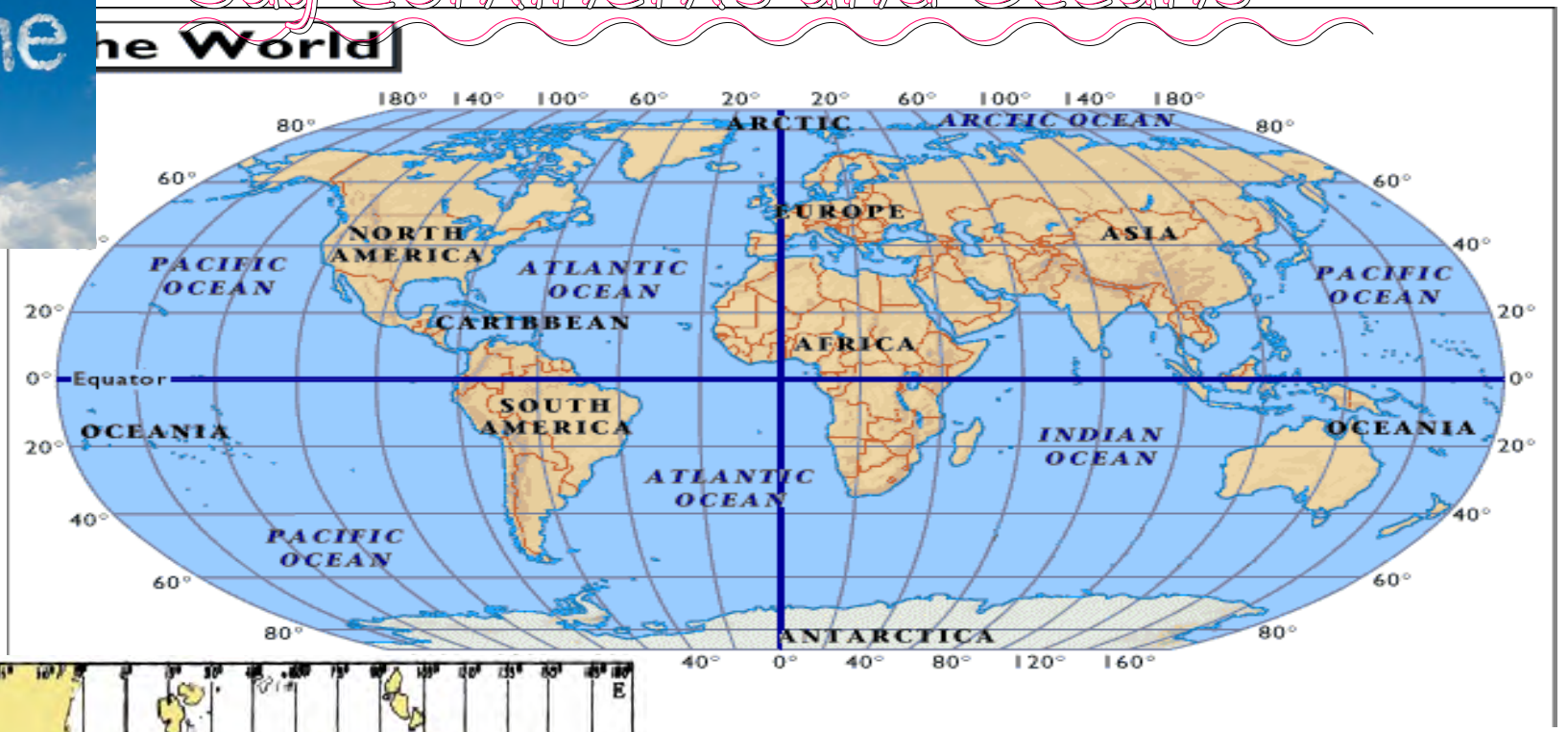
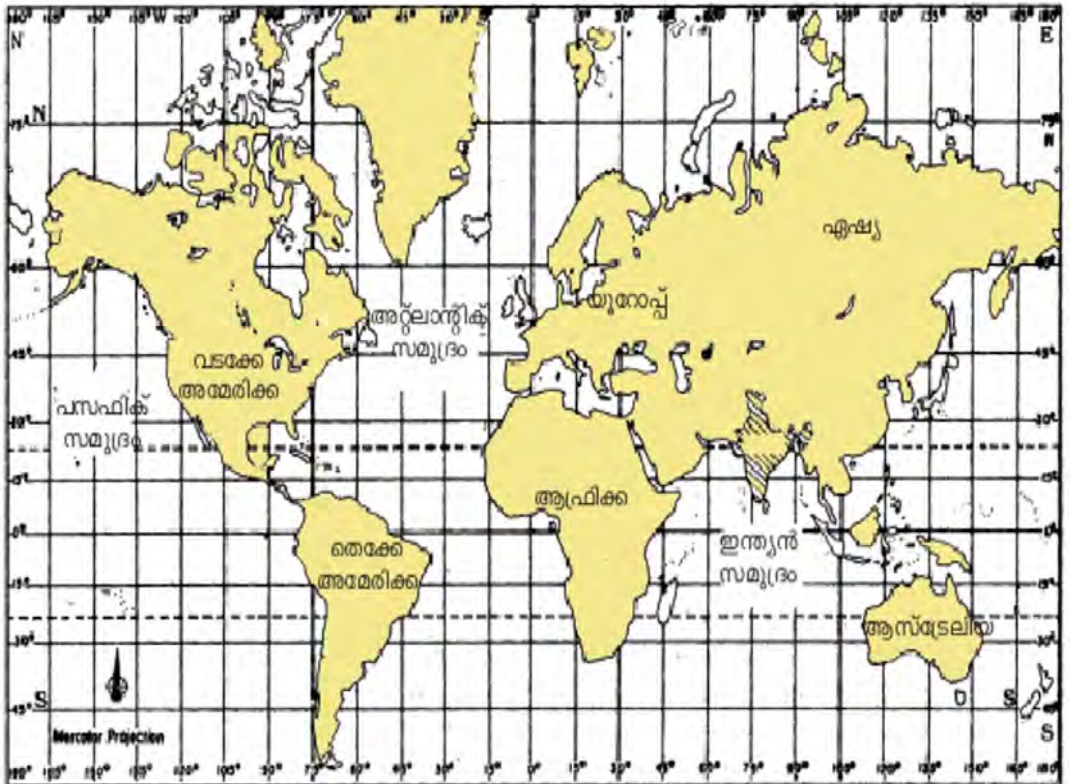
Season And Time

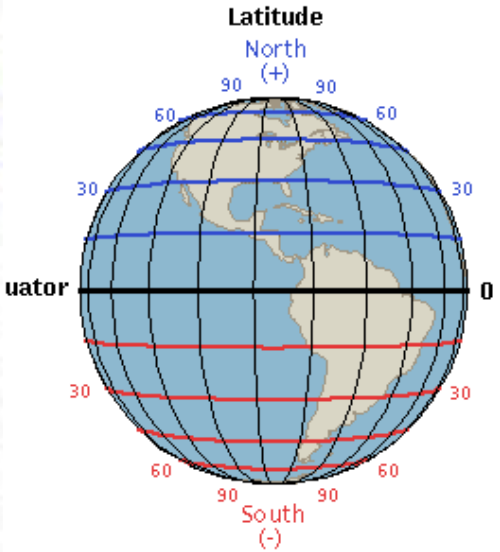


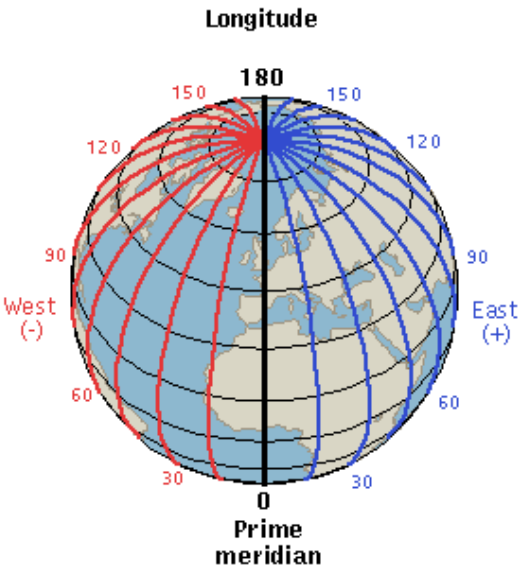
U C Abdul Vahid
SIHSS UMMATHUR
9447820303

Say Continents and Oceans





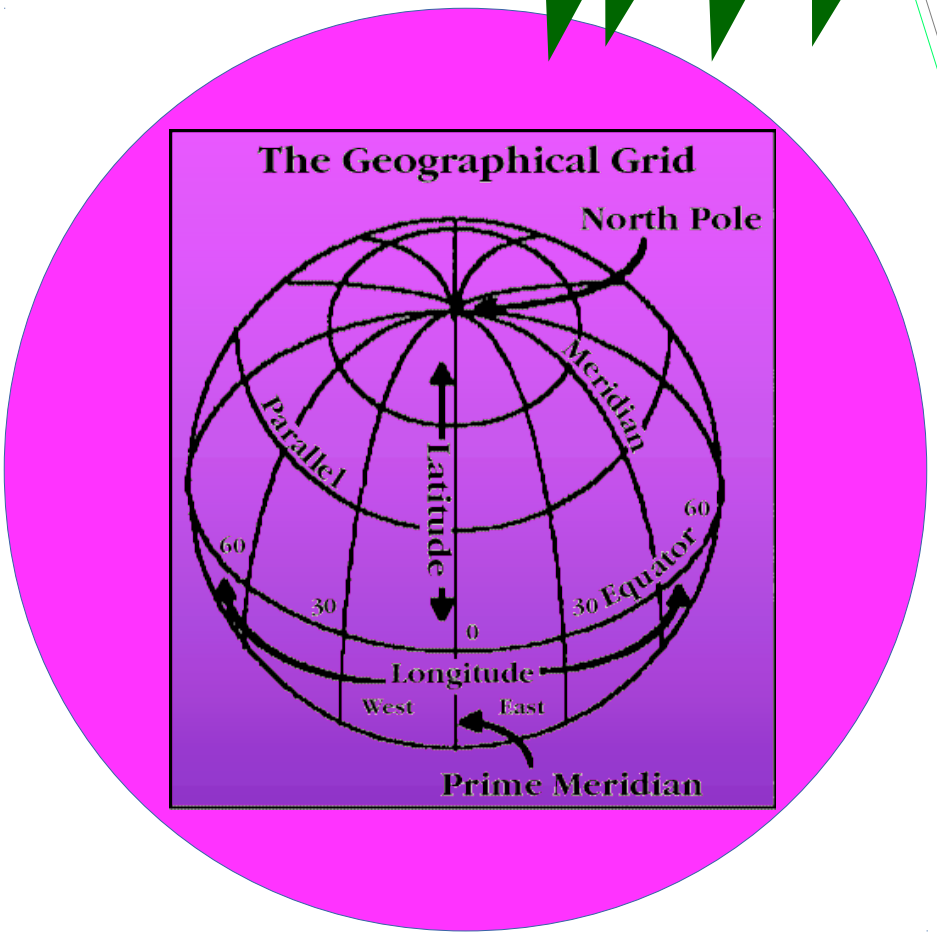


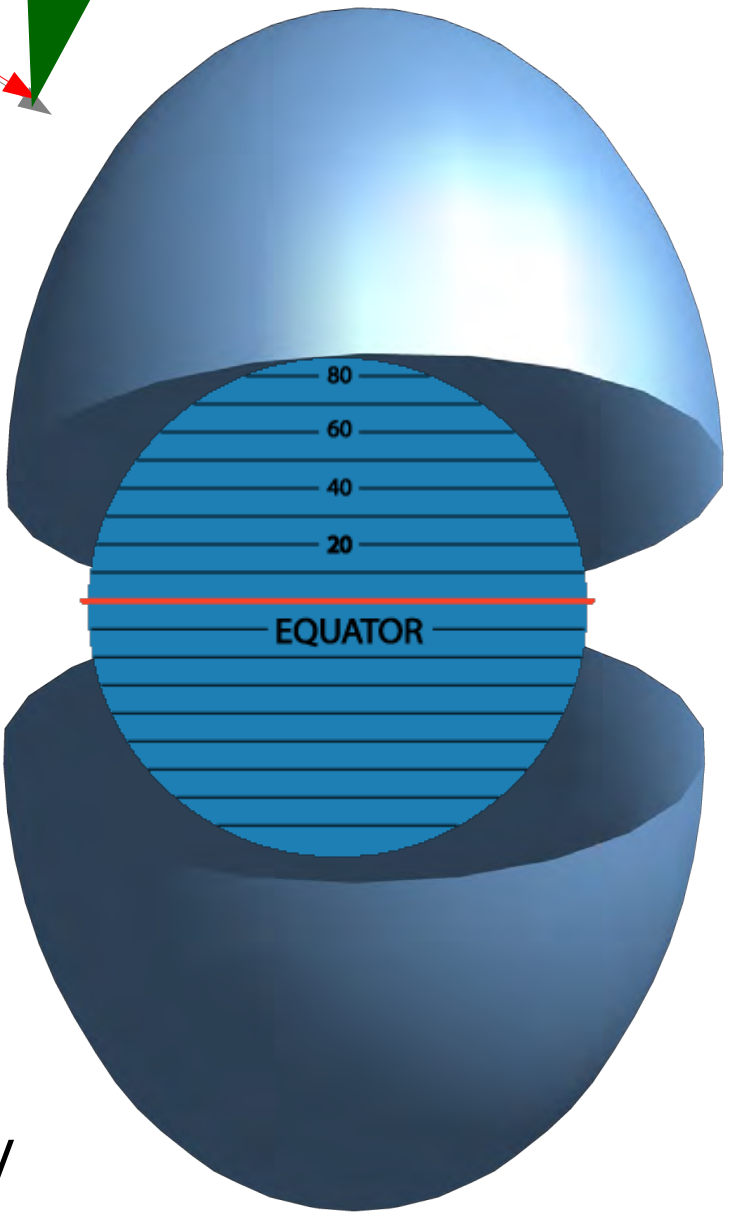


UCV

Draw a circle & mark the important latitudes

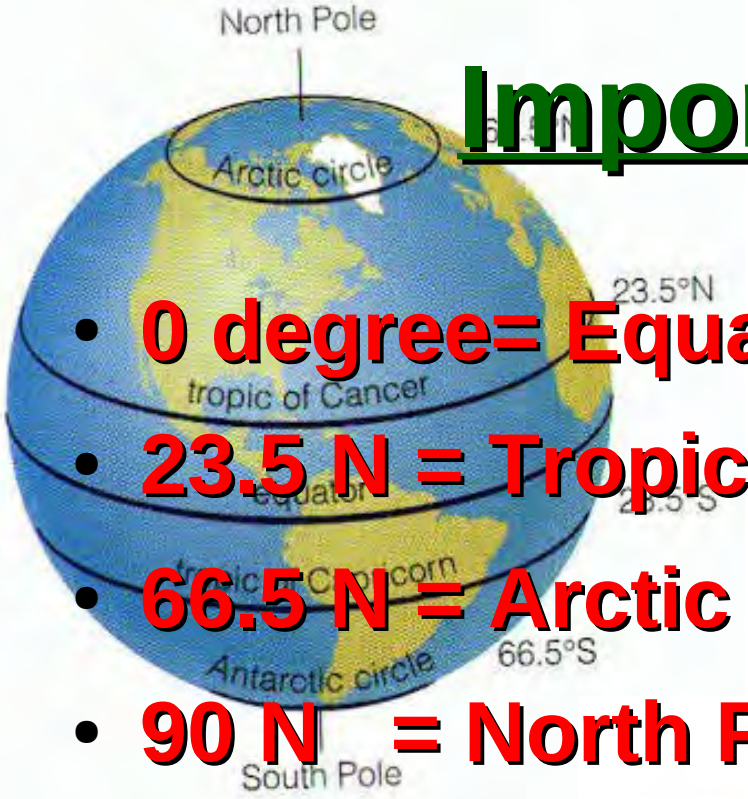
[redacted]?



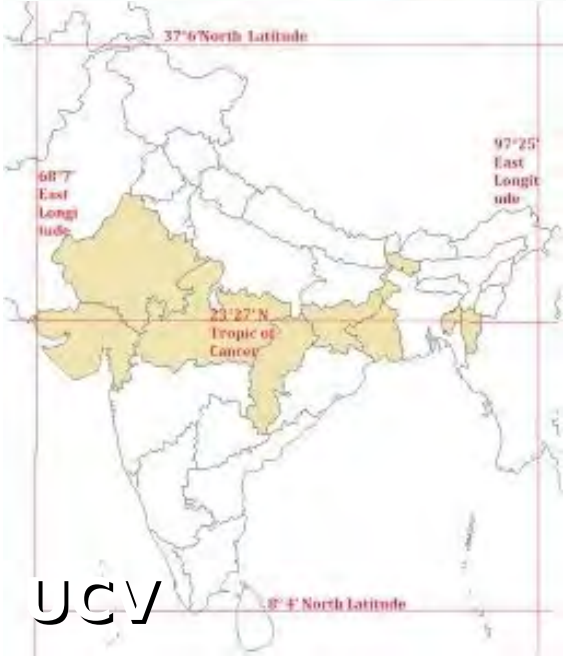


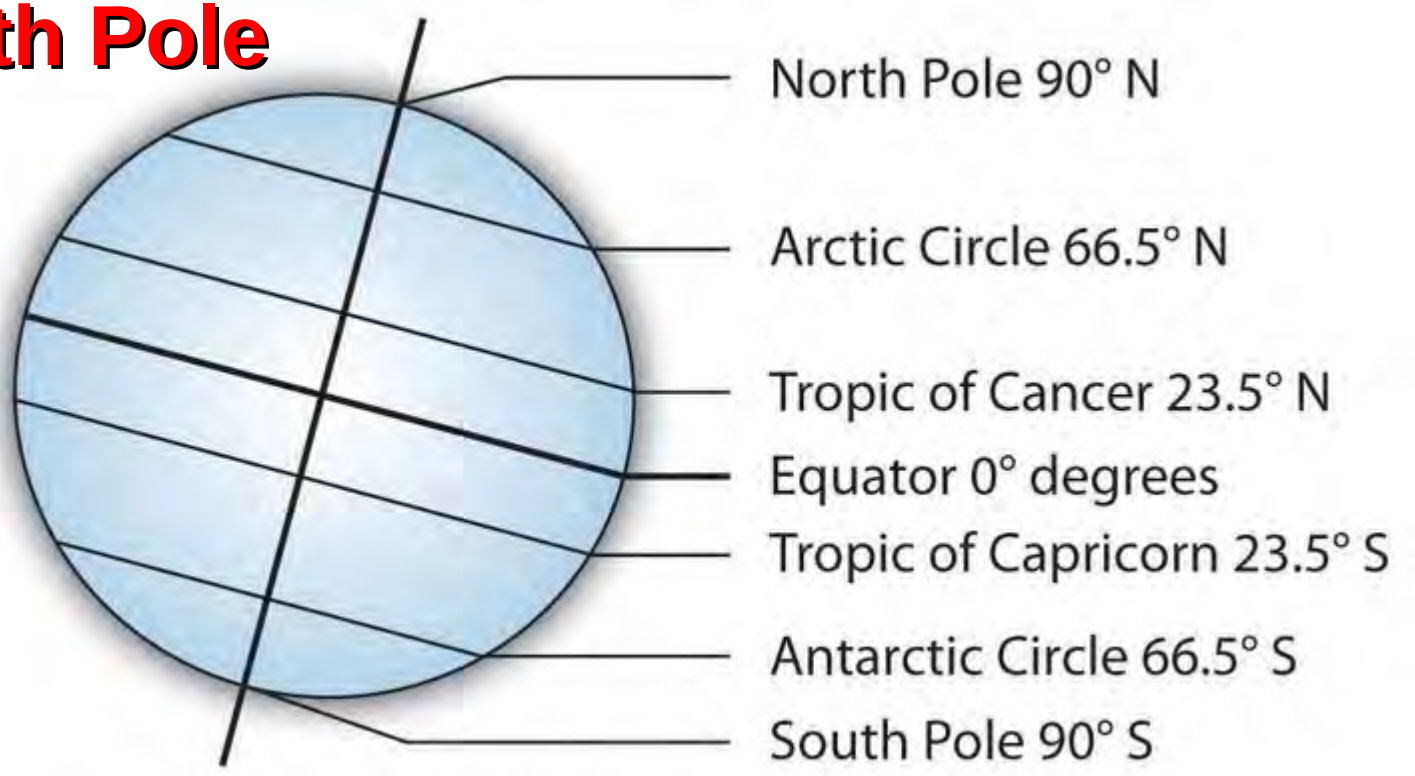
UCV

Important latitudes

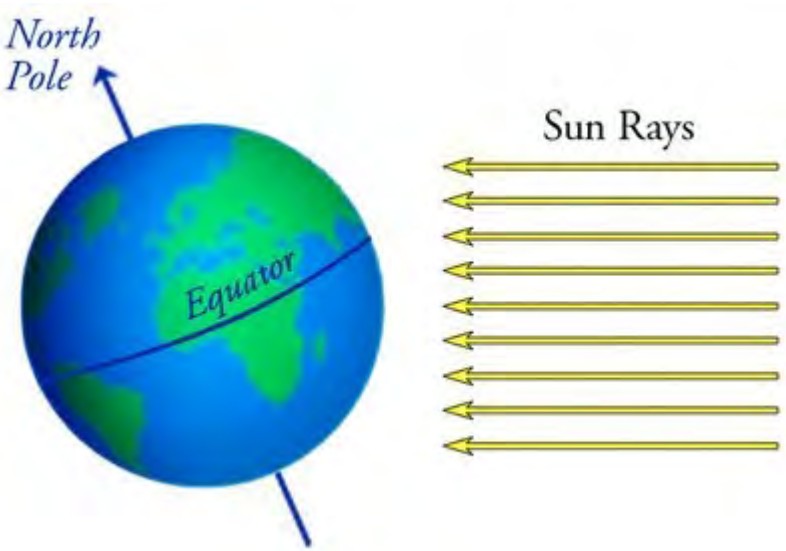


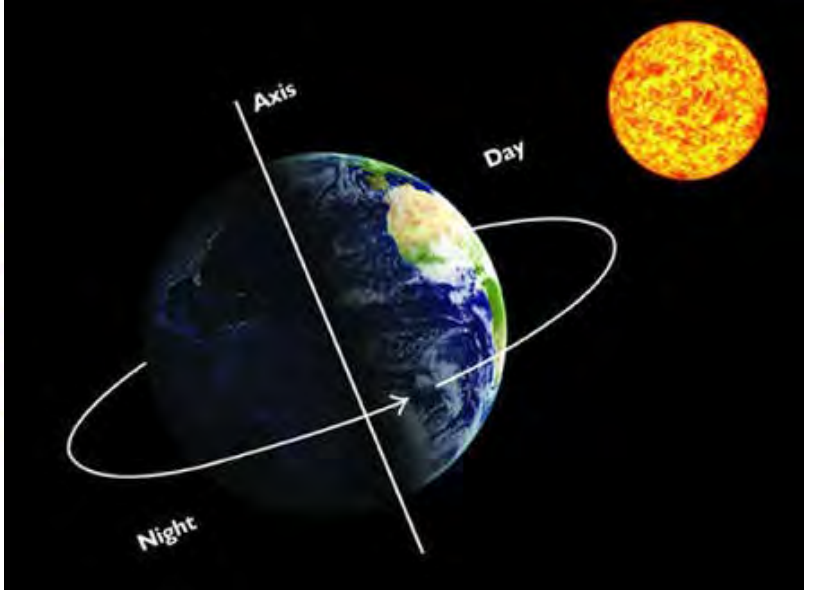
- 0 degree= Equator
- 23.5 N = Tropic of Cancer
- 66.5 N = Arctic Circle
- 90 N = North Pole



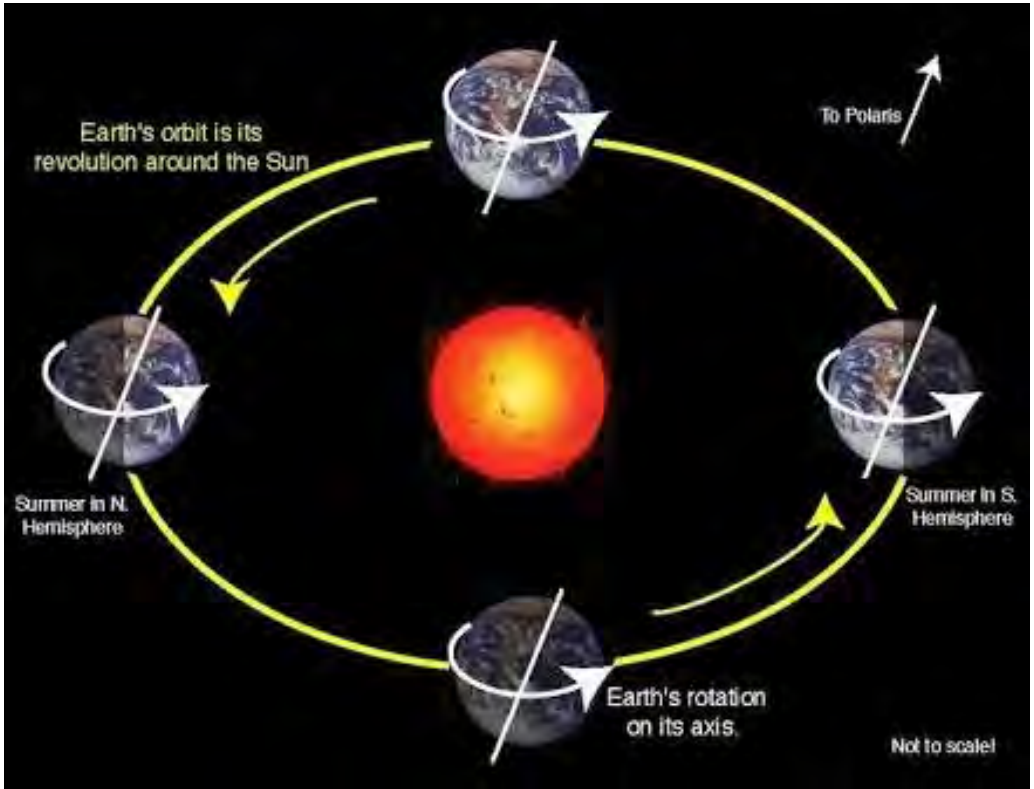


UCV





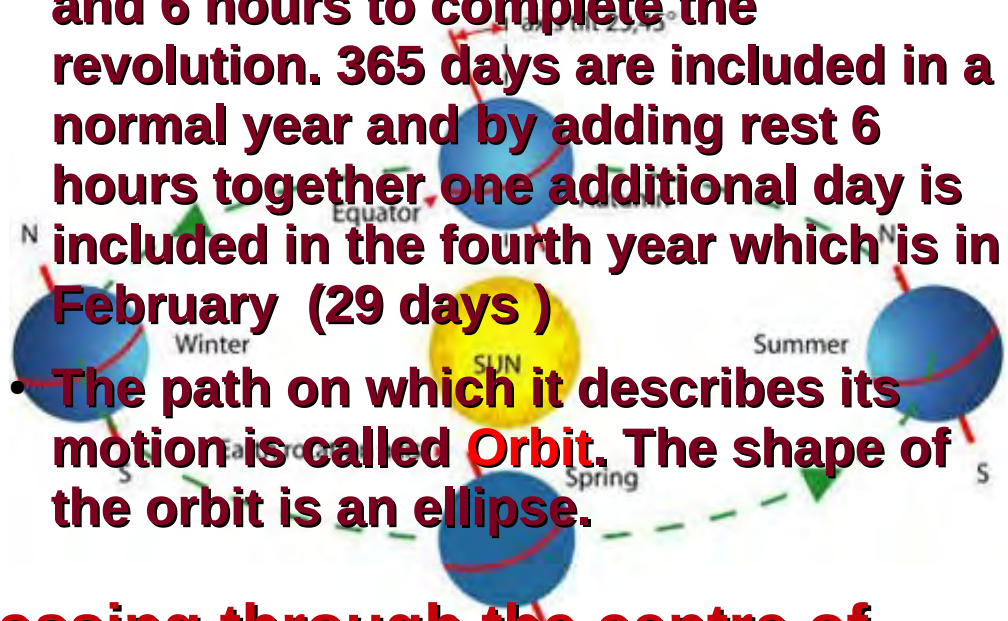
Identify pictures & motion of earth?



Motion of the Earth

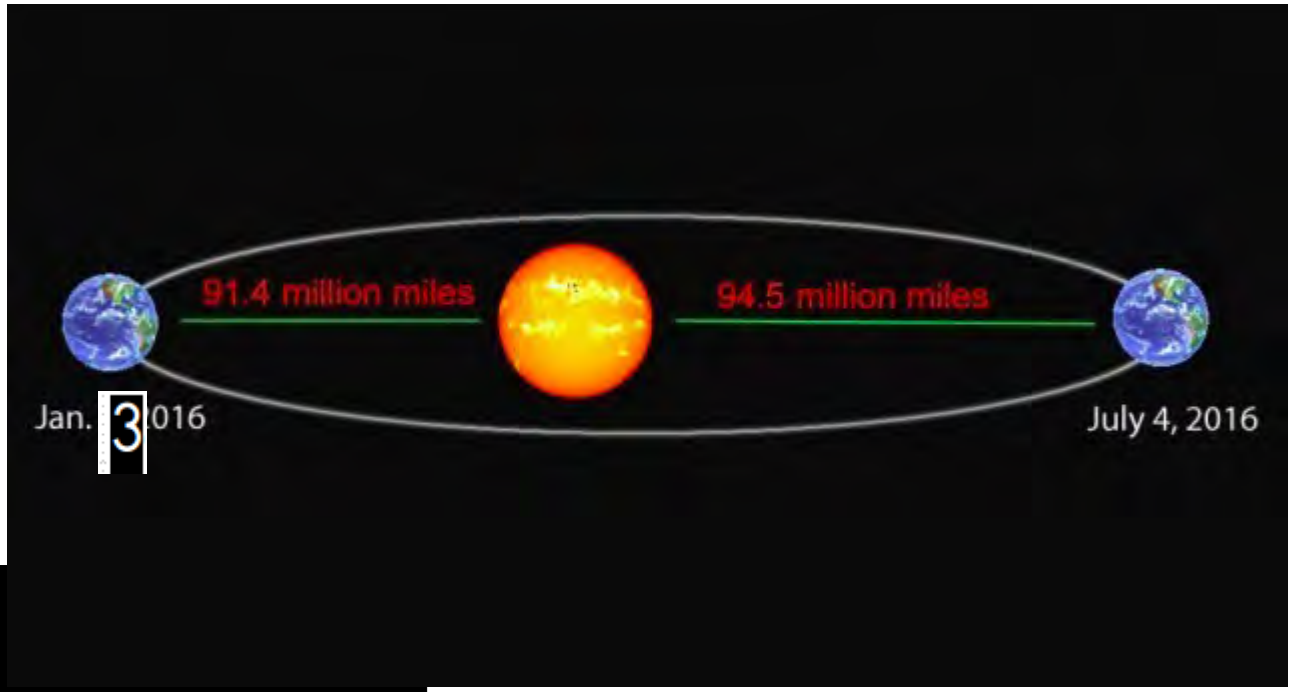
- **The rotation – the Earth rotates(spins) around its axis. The Earth completes one rotation in 24 hours (23 hours 56 minutes 4.09 seconds). If we look down upon earth from outside, the earth is found to rotate in anticlockwise direction, i.e.,from west to east**

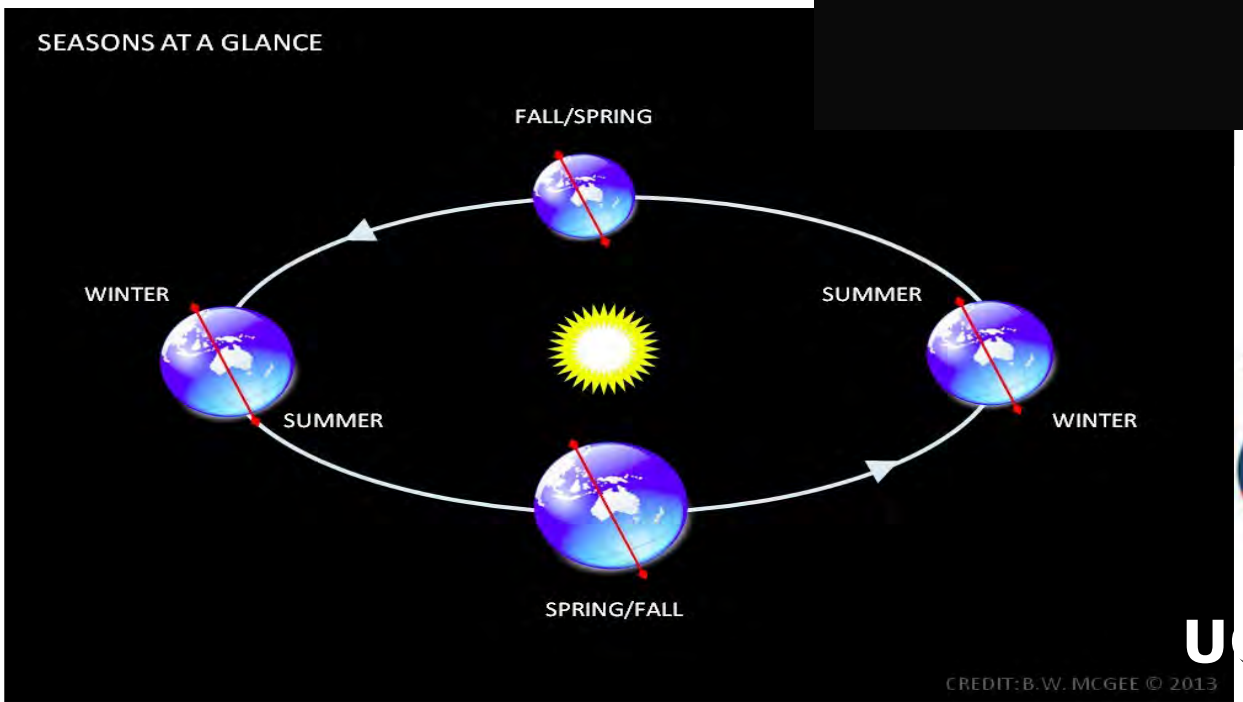
- **Revolution - The Earth revolves around the sun in an elliptical orbit. This motion is called Revolution. To complete one revolution Earth takes 365 days 5 hours 48 minutes &45 seconds. (365.25 days)**
- **Leap year- the earth takes 365 days and 6 hours to complete the revolution. 365 days are included in a normal year and by adding rest 6 hours together one additional day is included in the fourth year which is in February (29 days)**
- **The path on which it describes its motion is called Orbit. The shape of the orbit is an ellipse.**

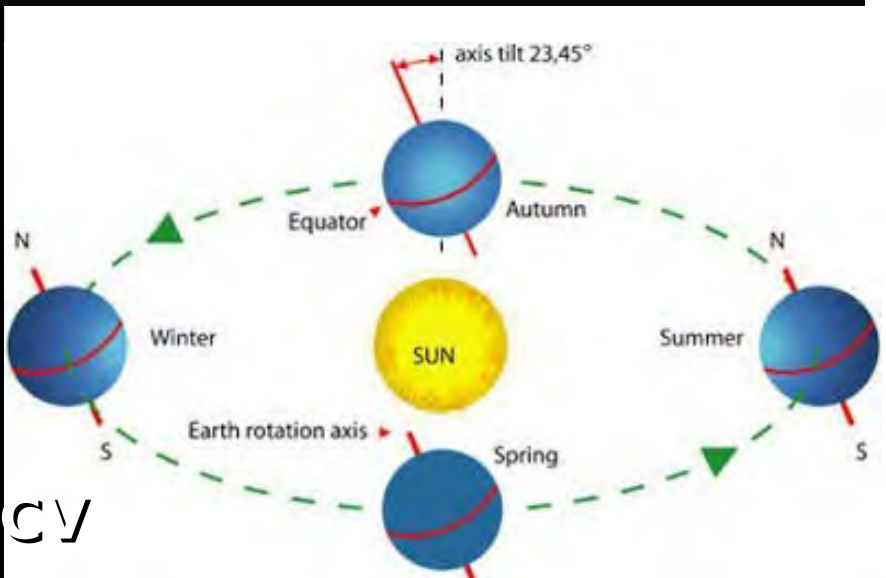


- **The axis is an imaginary line passing through the centre of earth. Its two ends surface are called North & South poles**

When does the sun far away from earth?



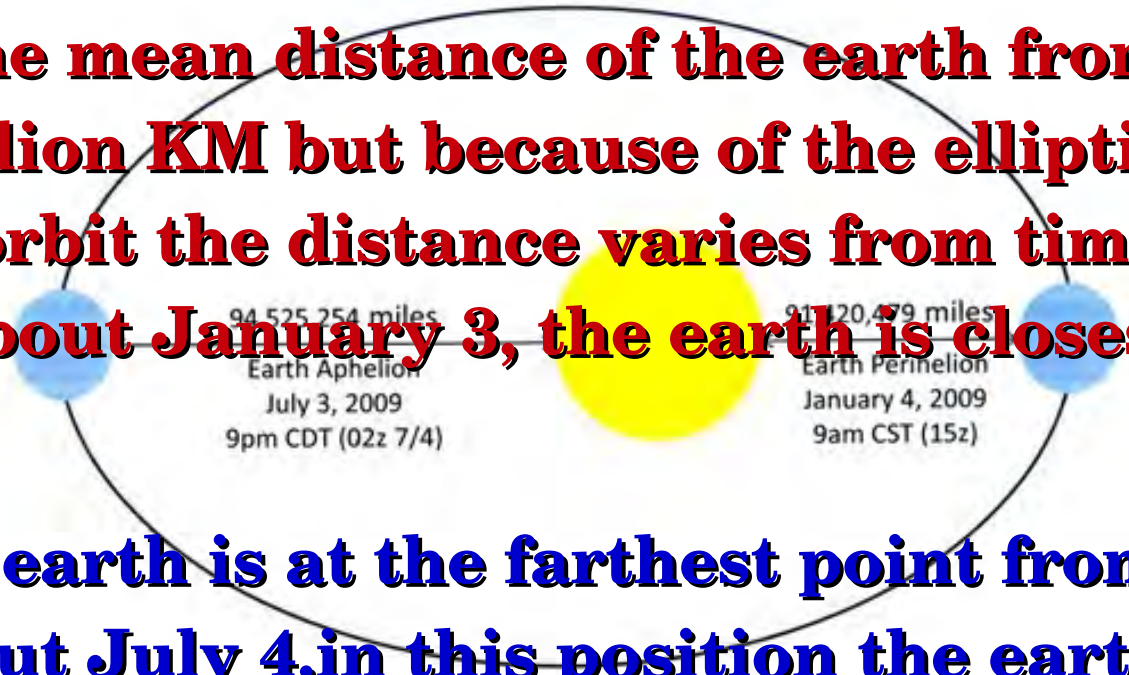




UCV

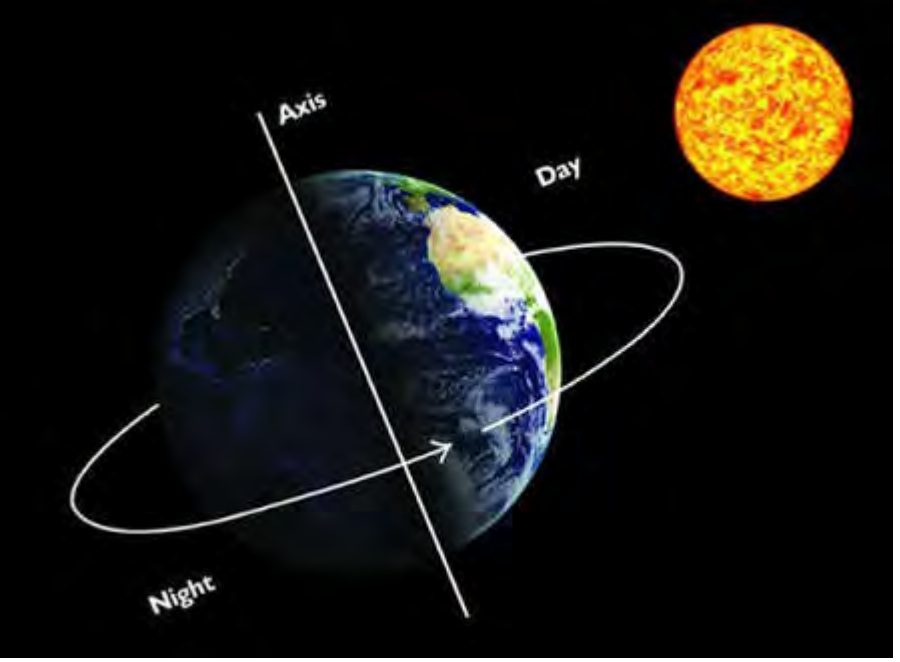
Perihelion (near)& Aphelion (far)

- Perihelion- **The mean distance of the earth from the sun is 150 million KM but because of the elliptical shape of the orbit the distance varies from time to time. On or about January 3, the earth is closest to the sun.**



- Aphelion- **the earth is at the farthest point from the sun on or about July 4.in this position the earth is at a distance of 152 million km**
- **Speed the mean speed on the earth in its orbit is 107,000km per hour. The speed comes to 29.72km per second**

UCV

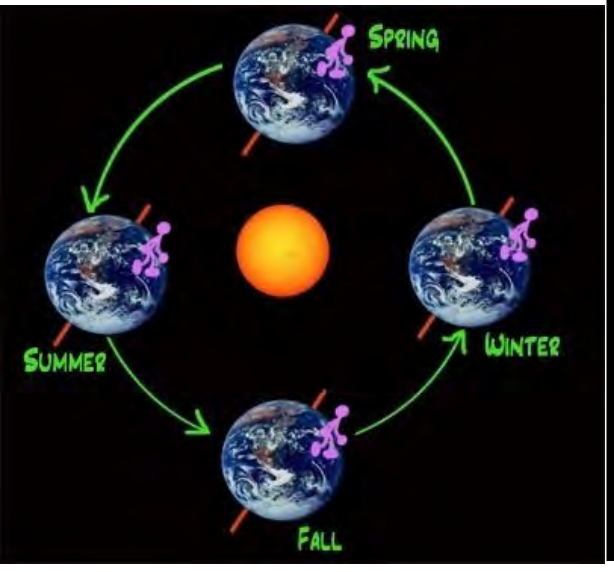


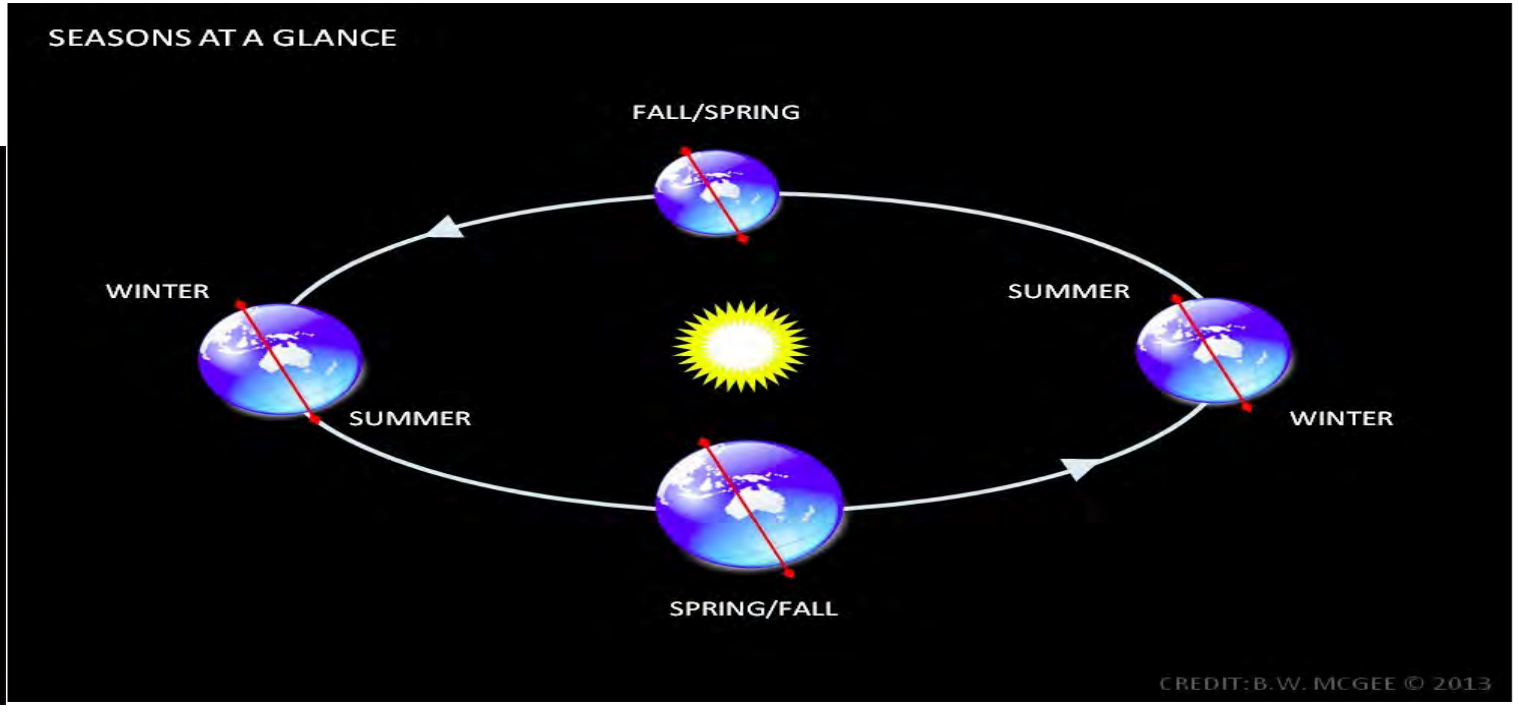
Do you know axis tilt ?

66.5+23.5= 90

let's see Parallelism of axis

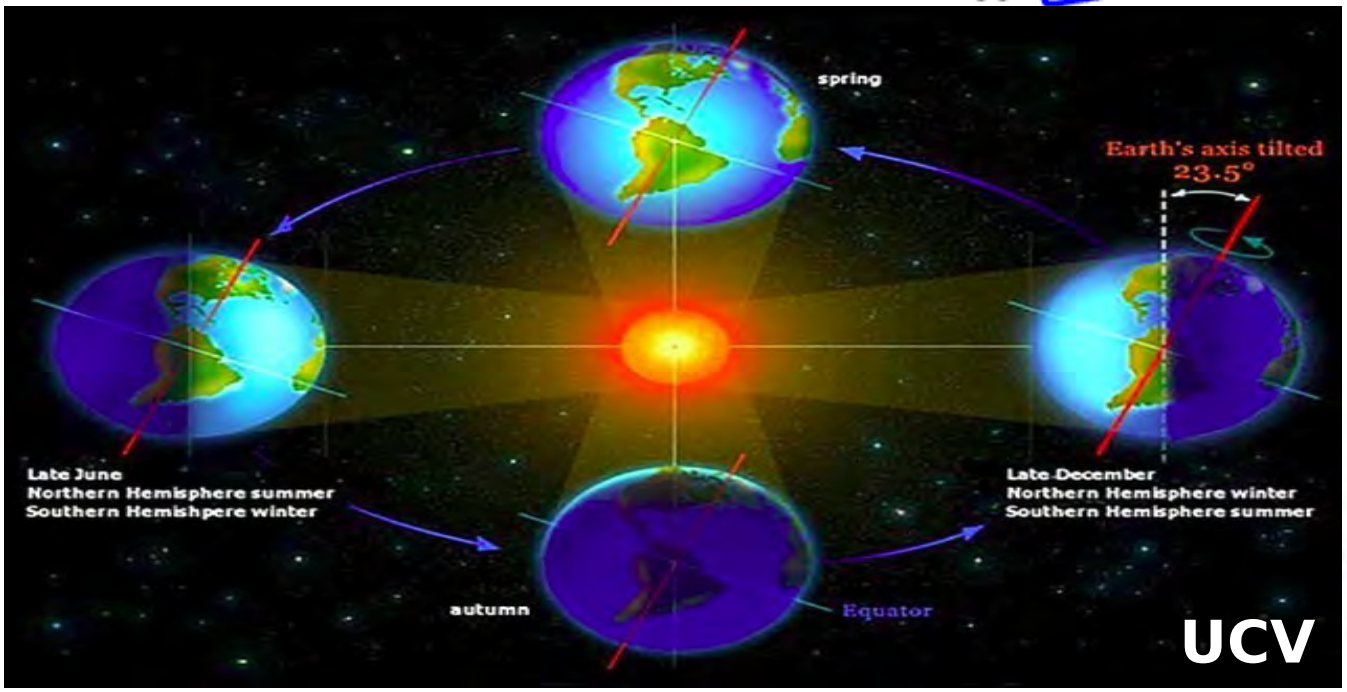
UCV

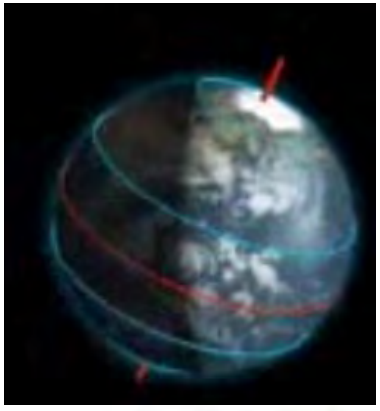


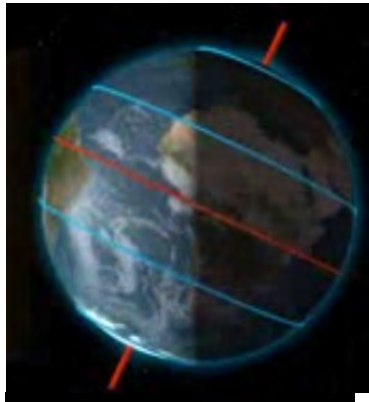


Effect of the revolution of the Earth

- **Change of seasons**
- **Length of the days and night**
- **Shifting of the wind belt**
- **Determination of latitudes**







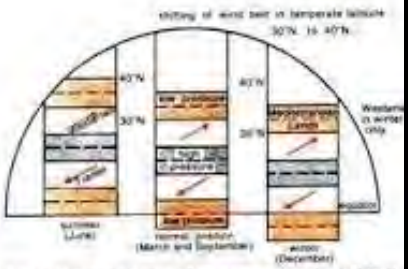
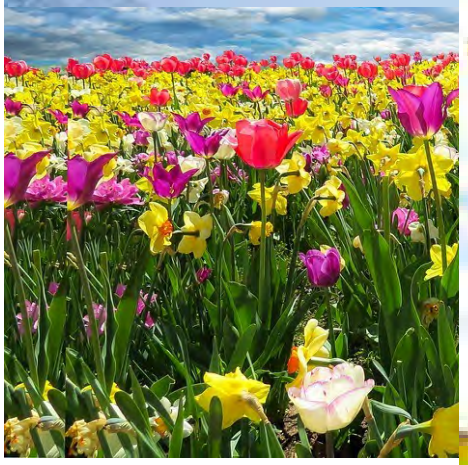
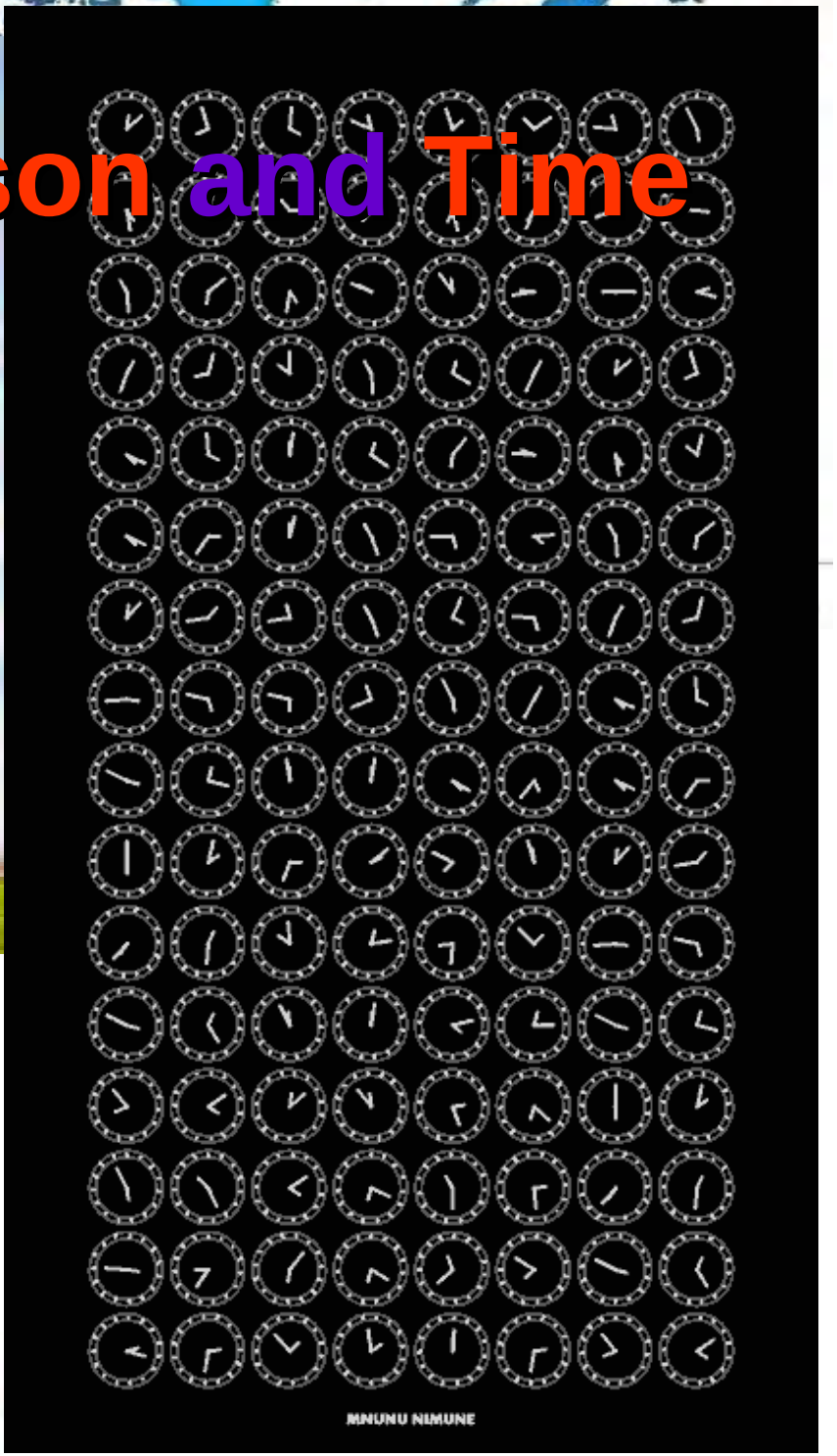


Fig. 116 The shifting of the pressure and wind belts in the northern hemisphere—showing their positions in summer and winter and at the equinoxes



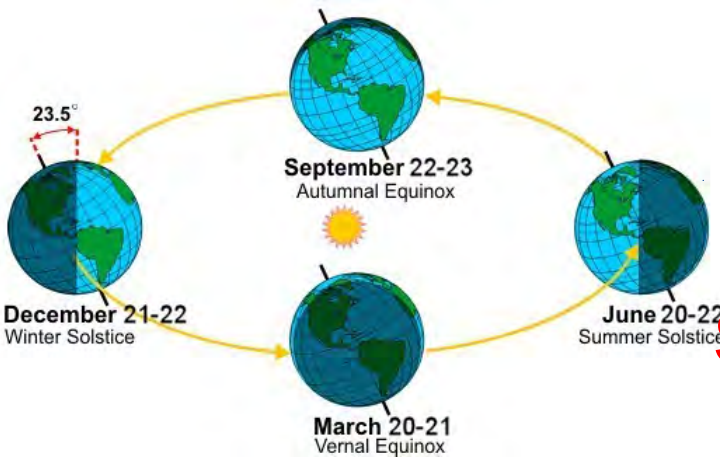
Season and Time

ഋതുഭേദങ്ങളും സമയവും

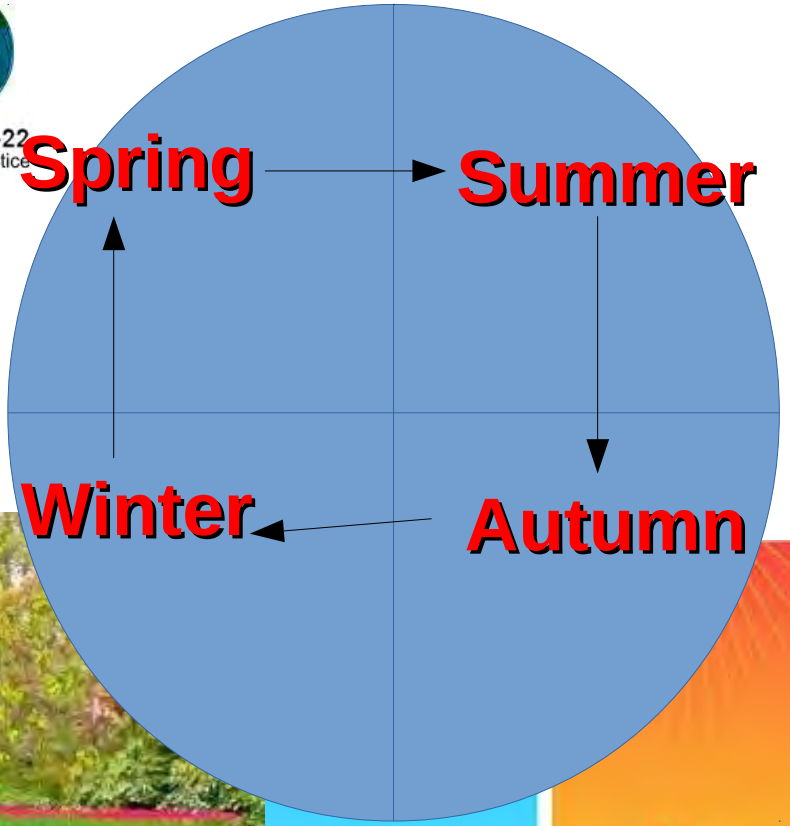


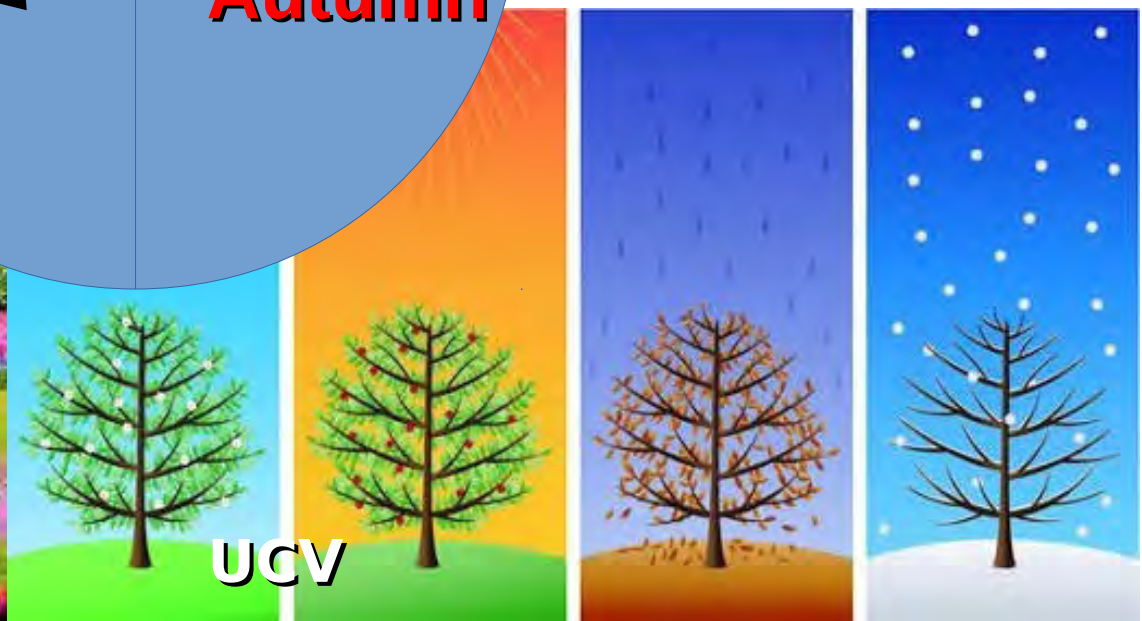
Seasons

Arrange the season in the order of their occurrence



Sp:SAW

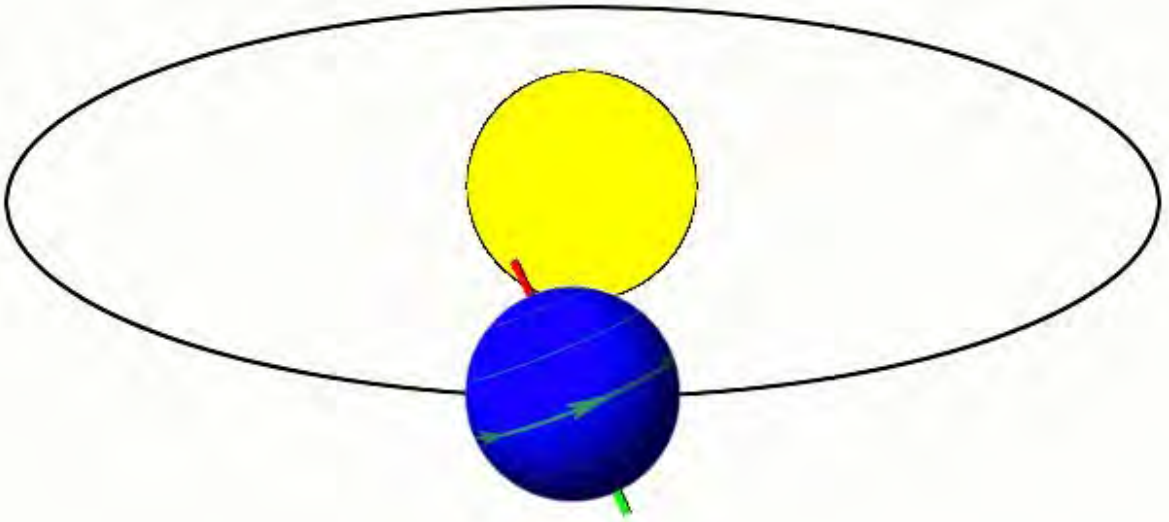




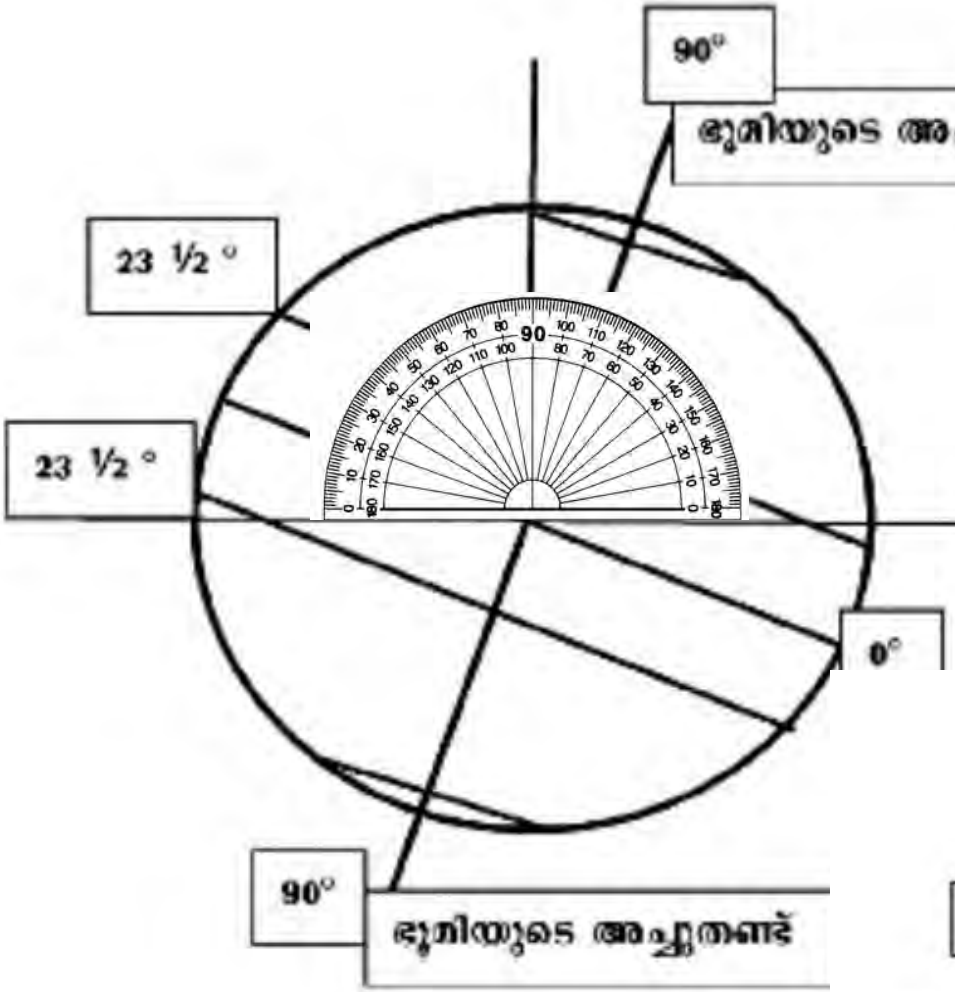
UCV

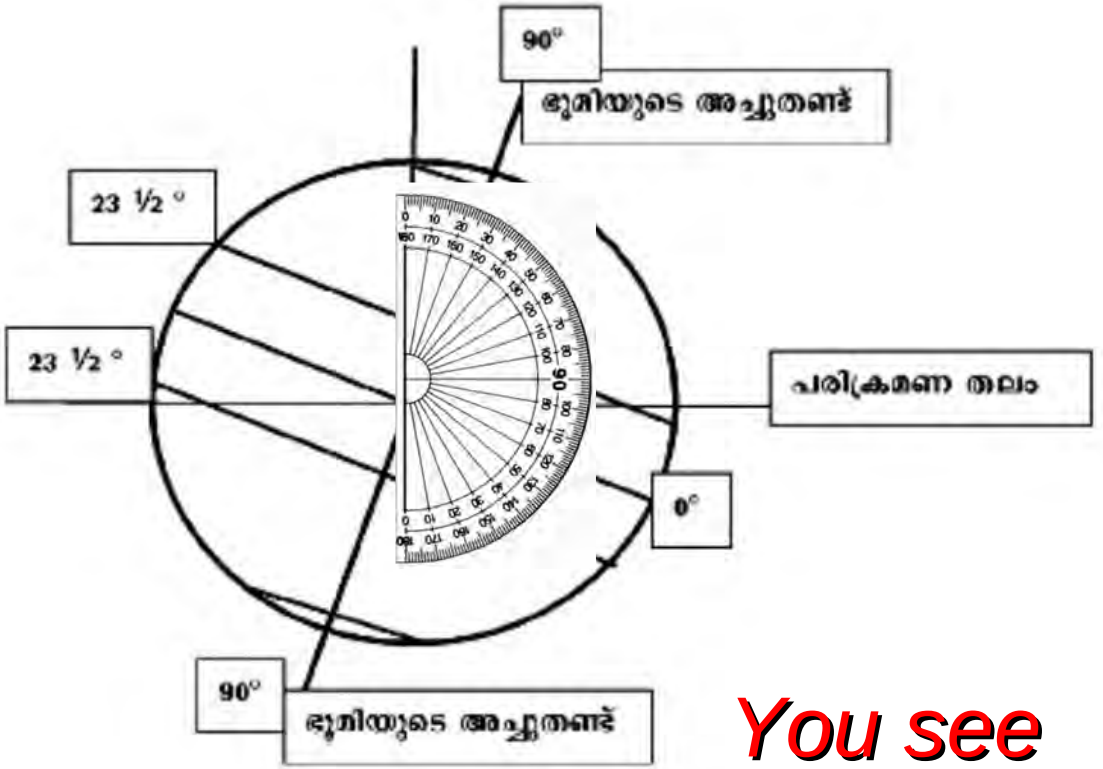
What are the causes of seasonal change?
Revolution, axis tilt, apparent movement of the sun, elliptical orbit

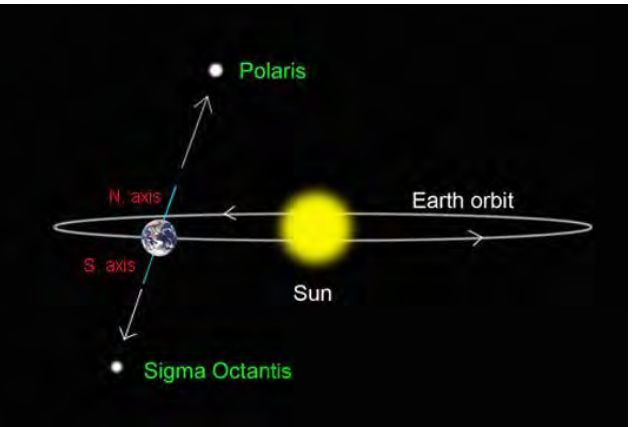
ഋതുഭേദങ്ങൾക്ക് കാരണമ



The axis of the earth is tilted at an angle of 66½° from the orbital plane. If measured from the vertical plane this would be 23½° The earth maintains this tilt throughout its revolution. This is known as the parallelism of the earth's axis.



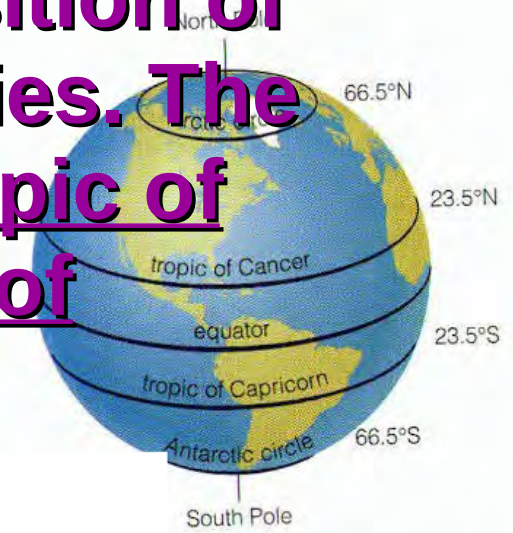


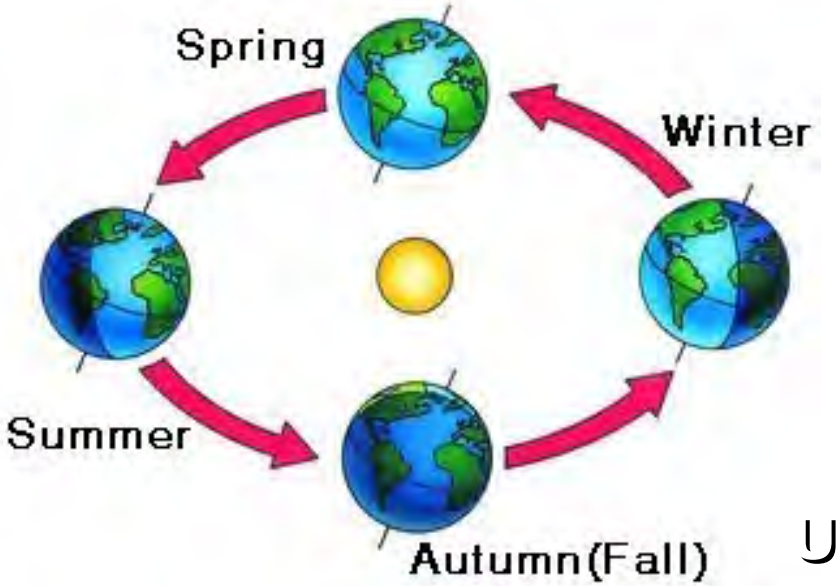


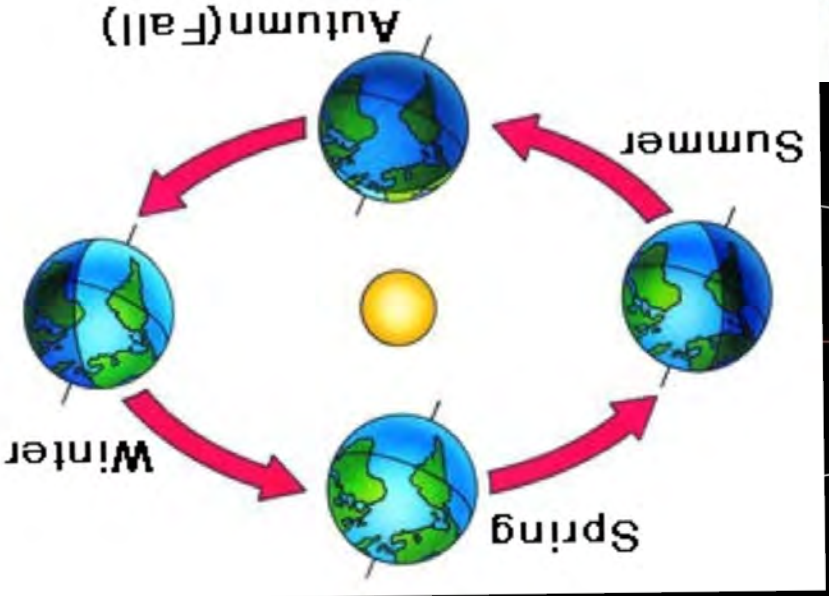
You see

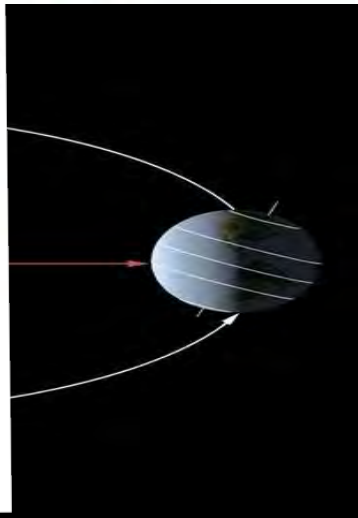
The apparent movement of the Sun

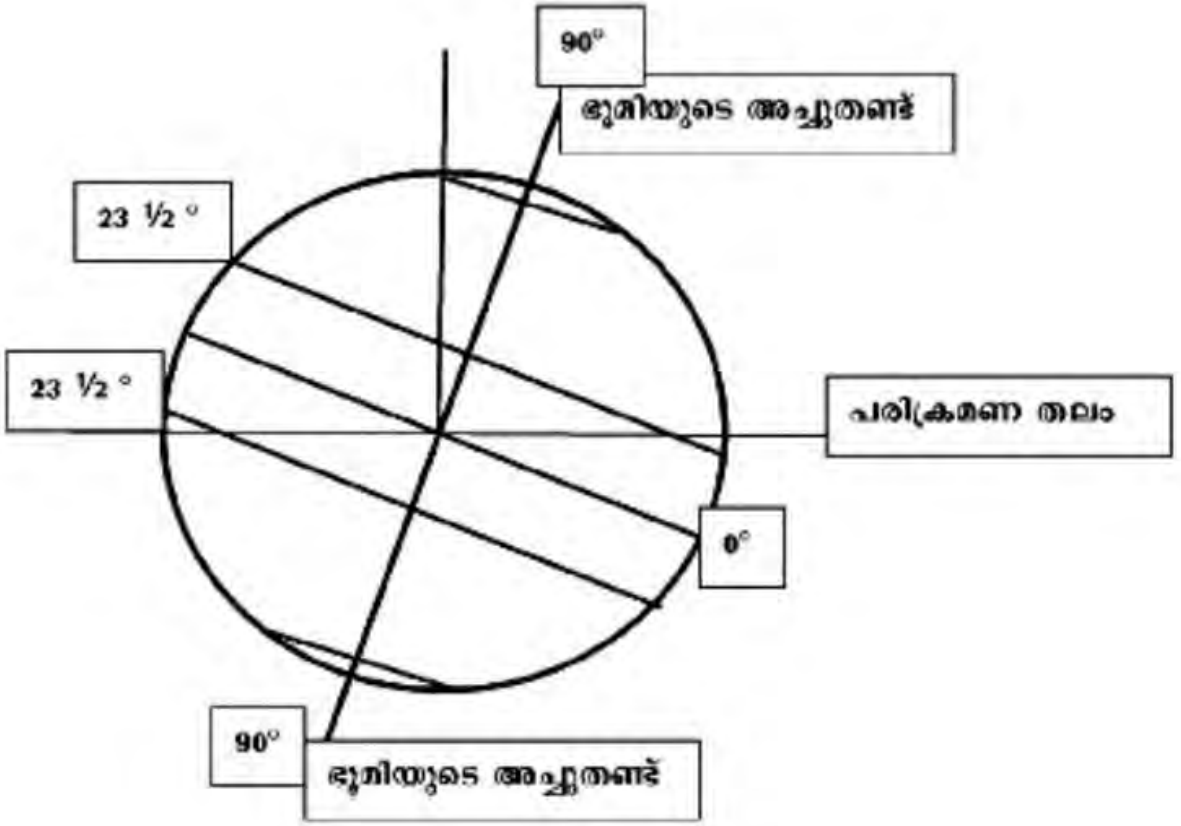
- **Since the parallelism is maintained throughout the revolution, the position of the sun in relation to the earth varies. The sun shifts apparently between <u>Tropic of Cancer(23.5 degree N) and Tropic of Capricorn(23.5 degree S).</u>**

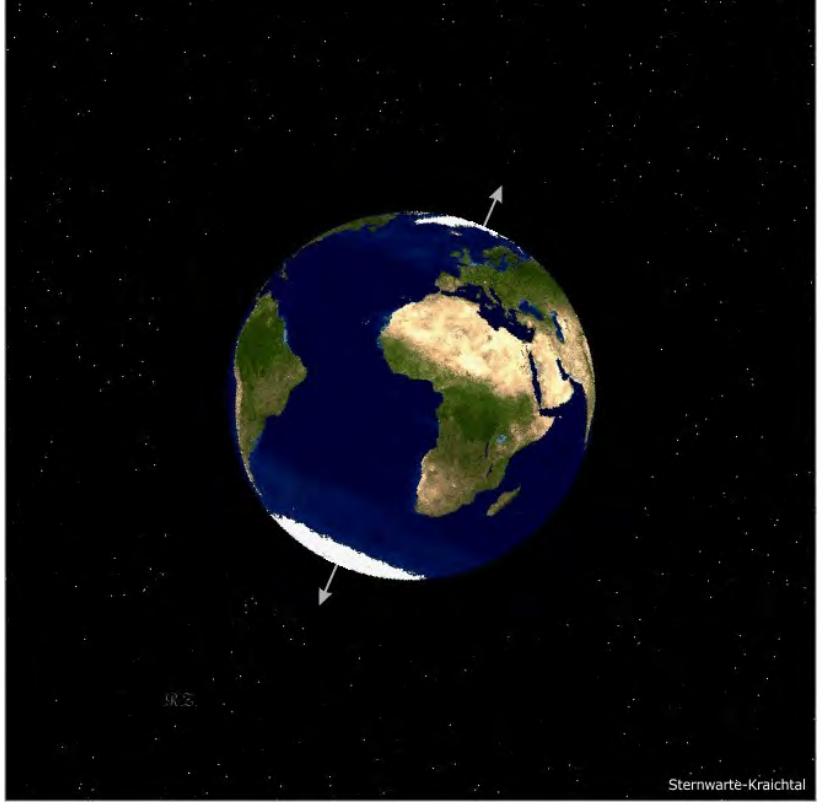












ഭൂമിയുടെ അച്ചുതണ്ടിന്റെ ചരിവ് എത്ര എന്ന ചോദ്യത്തിന് രണ്ട് വിദ്യാർത്ഥികൾ നൽകിയ ഉത്തരങ്ങളാണ് ചുവടെ കൊടുത്തിട്ടുള്ളത്. ടീച്ചർ രണ്ട് ഉത്തരങ്ങൾക്കും ശരി നൽകി. ടീച്ചറുടെ തീരുമാനത്തിന് ന്യായീകരണം എഴുതുക.

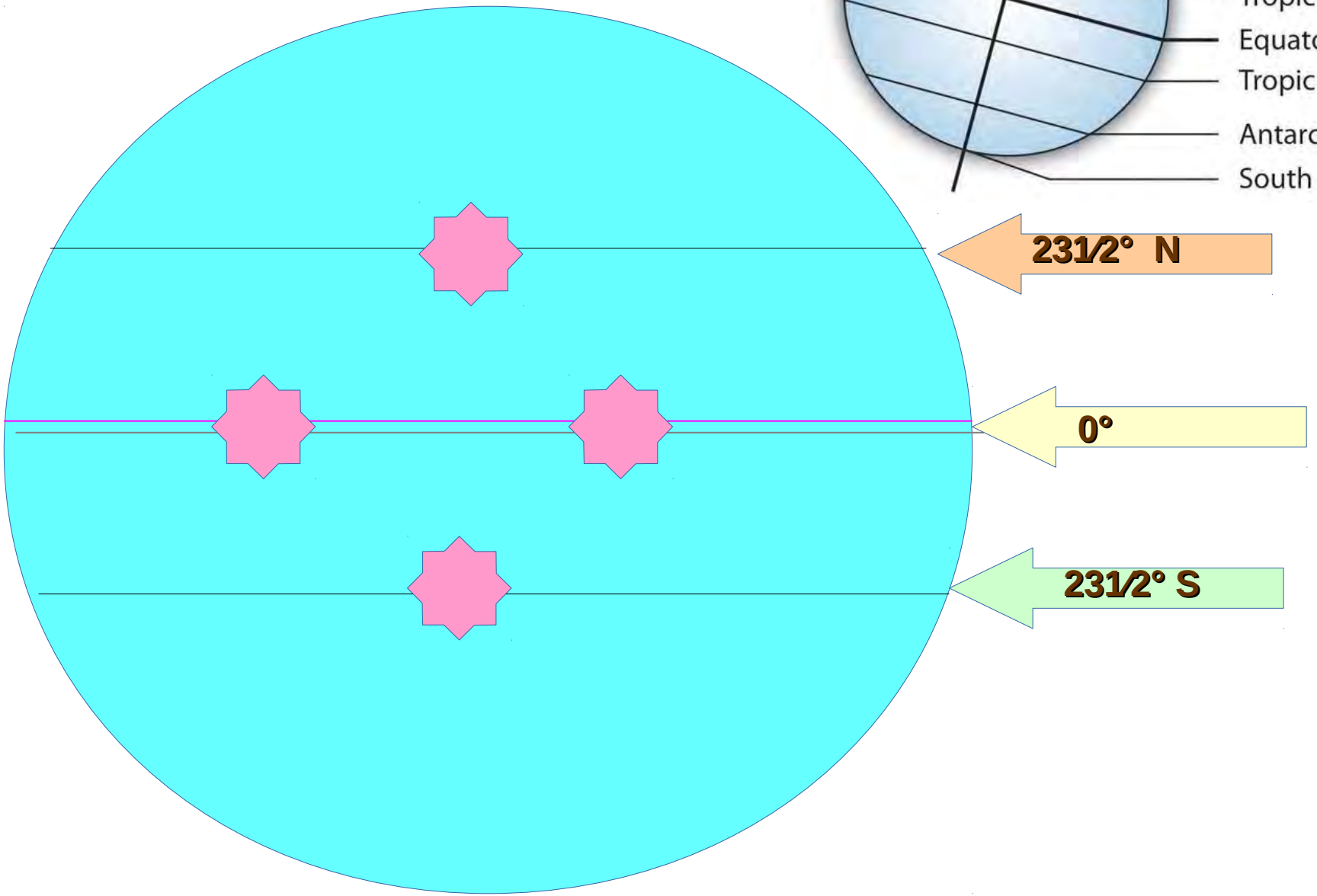
ഭൂമിയുടെ അച്ചുതണ്ടിന് 23½° ചരിവുണ്ട്	ഭൂമിയുടെ അച്ചുതണ്ടിന്റെ ചരിവ് 66½° യാണ്

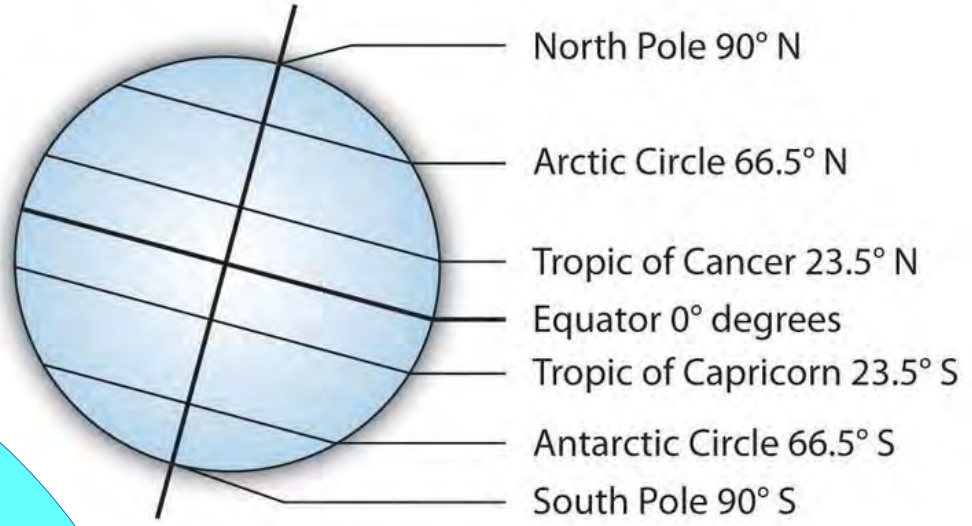
സ്കോർ : 2, സമയം : 2 മിനിട്ട്

■ **ഉത്തരസൂചിക**

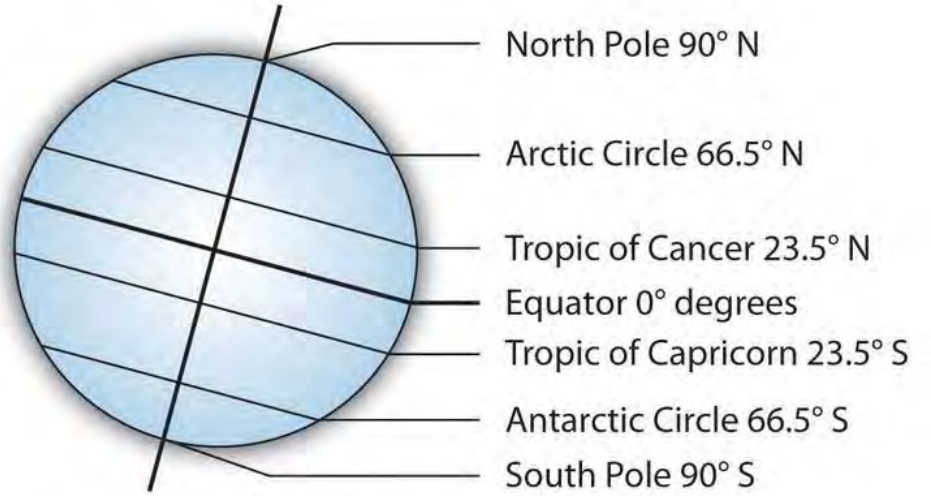
- ഭൂമിയുടെ അച്ചുതണ്ടിന്റെ ചരിവ് പരിക്രമണ തലത്തിൽ നിന്ന് 66½° യാണ്, പരിക്രമണതലത്തിന്റെ ലംബത്തിൽ നിന്ന് 23½° യും.

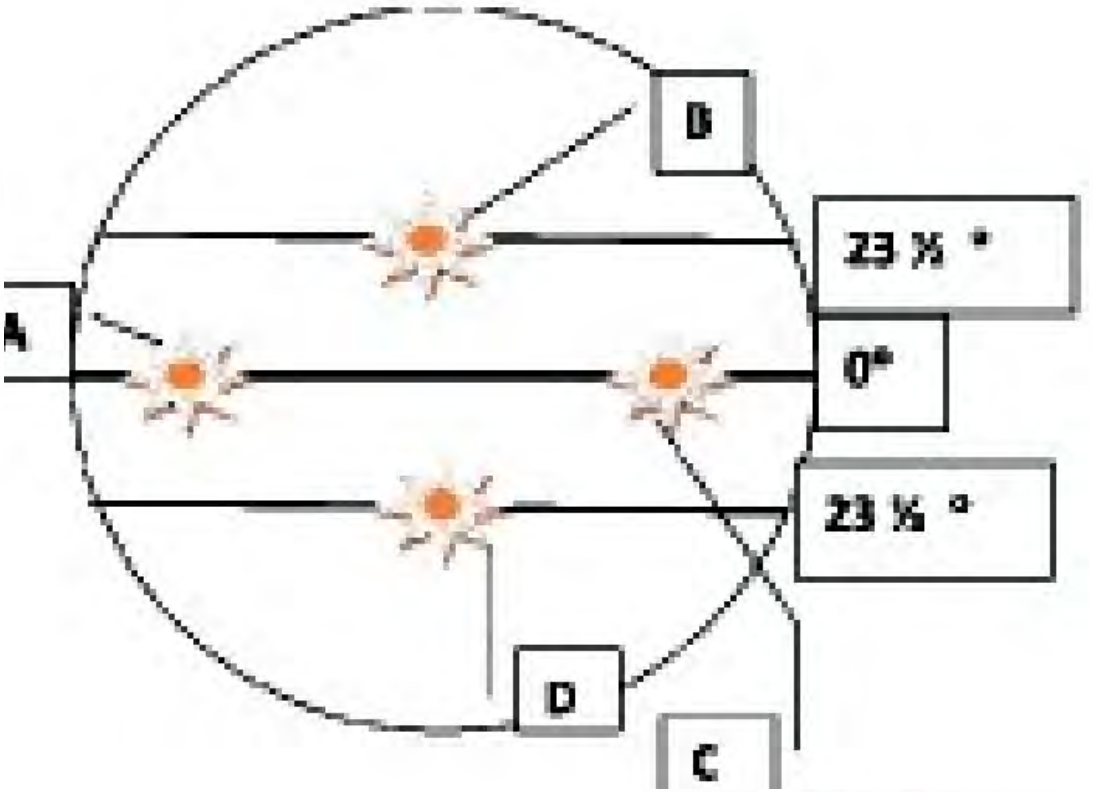
Say the Day & Latitude ?



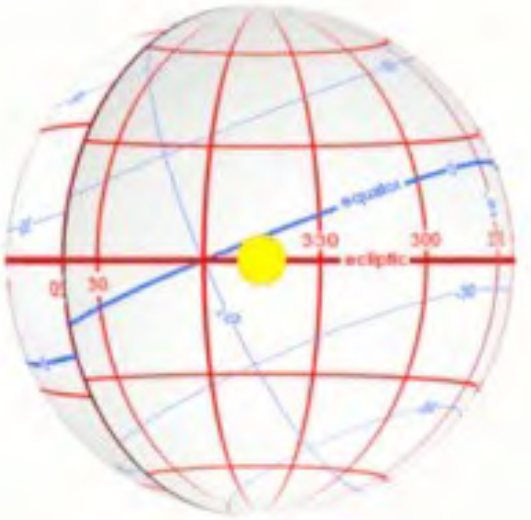


UCV



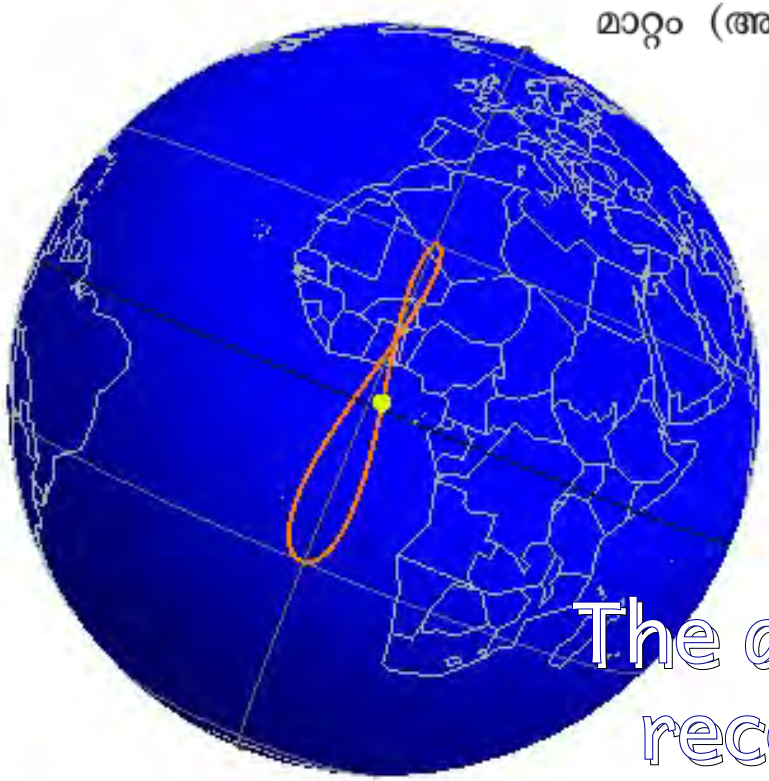


Since the parallelism is maintained throughout the revolution, the position of the sun in relation to the earth varies. The sun shifts apparently between Tropic of Cancer (231⁄2° north) and Tropic of Capricorn (231⁄2° south). This is known as the apparent movement of the sun.



21 March

അച്ചുതണ്ടിന്റെ ചരിവ്, അച്ചുതണ്ടിന്റെ സമാന്തരത, സൂര്യന്റെ അപേക്ഷിക സ്ഥാന മാറ്റം (അയനം).



ചുവടെ കൊടുത്തിട്ടുള്ളവയിൽ ഋതുഭേദങ്ങൾക്ക് കാരണമാകുന്ന ഘടകം തിരിച്ചറിഞ്ഞെഴുതുക.

a. ഭൂമിയുടെ പരിക്രമണം

b. അച്ചുതണ്ടിന്റെ ചരിവ്

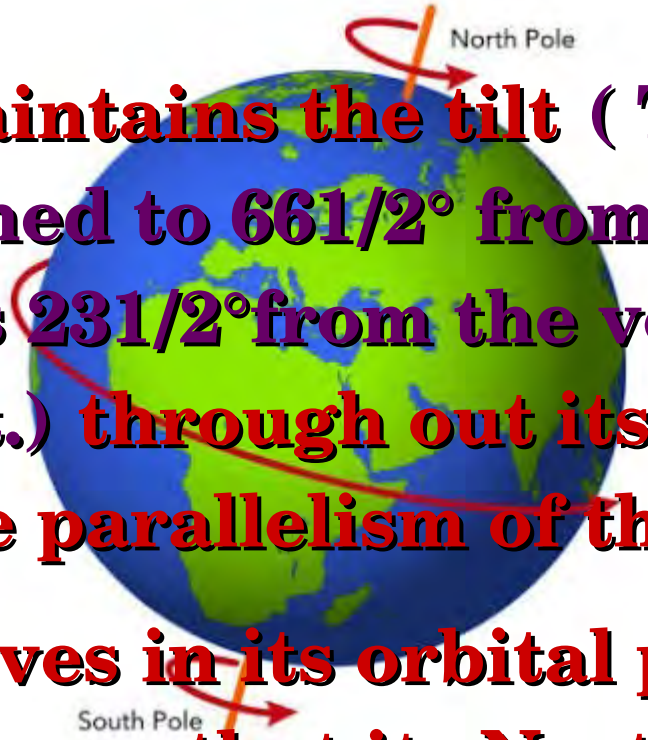
c. അച്ചുതണ്ടിന്റെ സമാന്തരത

d. മുകളിൽ സൂചിപ്പിച്ചിട്ടുള്ളവ മുന്നും

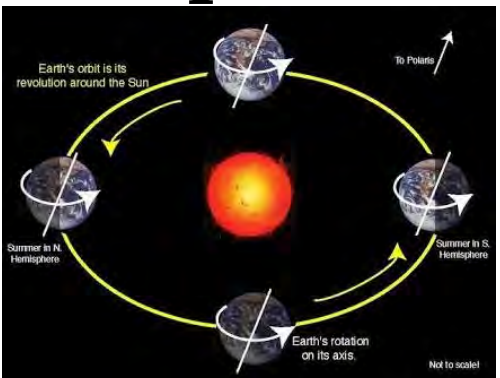
The amount of solar energy received is not uniform at any place on the earth during this journey. Why?

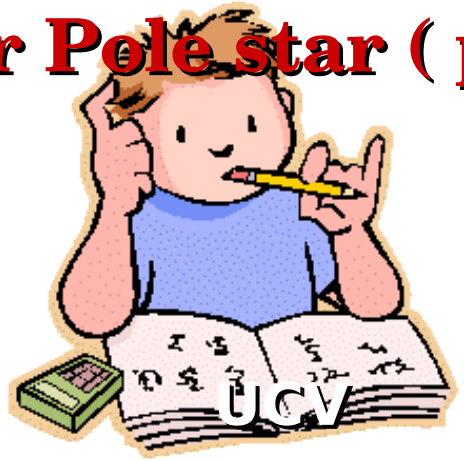
Change in the apparent position of the sun due to the inclination and parallelism of the earth's axis.

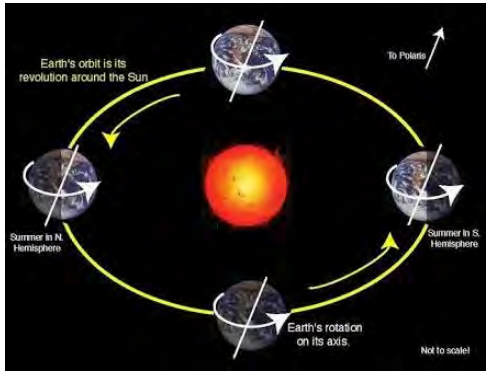
The parallelism of the Earth's axis

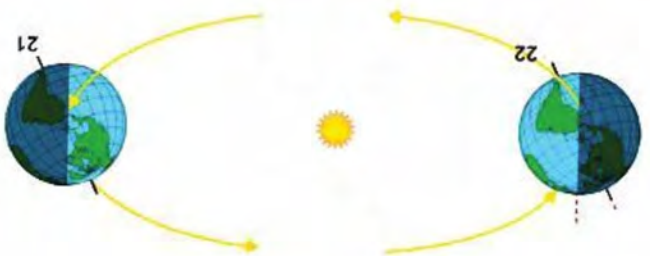


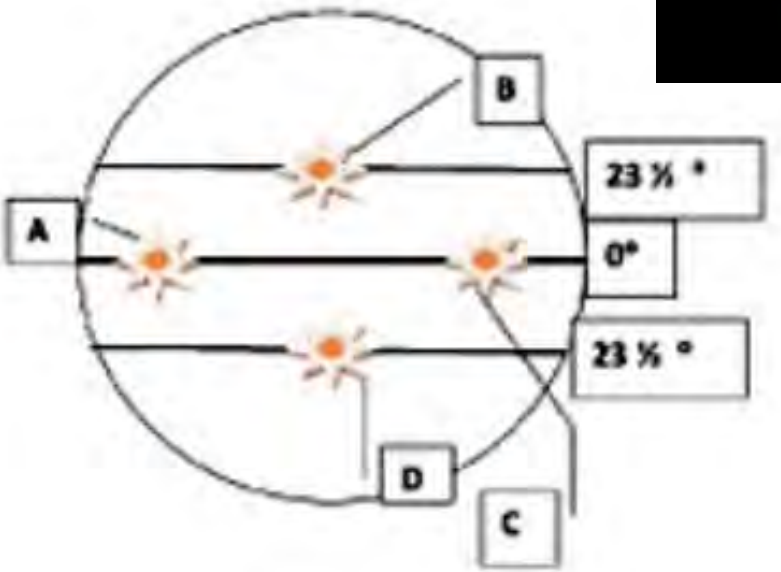
- **The Earth maintains the tilt (The axis of the earth is inclined to 661/2° from the plane of the orbit and it is 231/2°from the vertical to the plane of orbit.) through out its revolution is known as The parallelism of the Earth's axis.**
- **The earth moves in its orbital path around the sun in such a way that its North pole always points towards a star Pole star (polaris)**







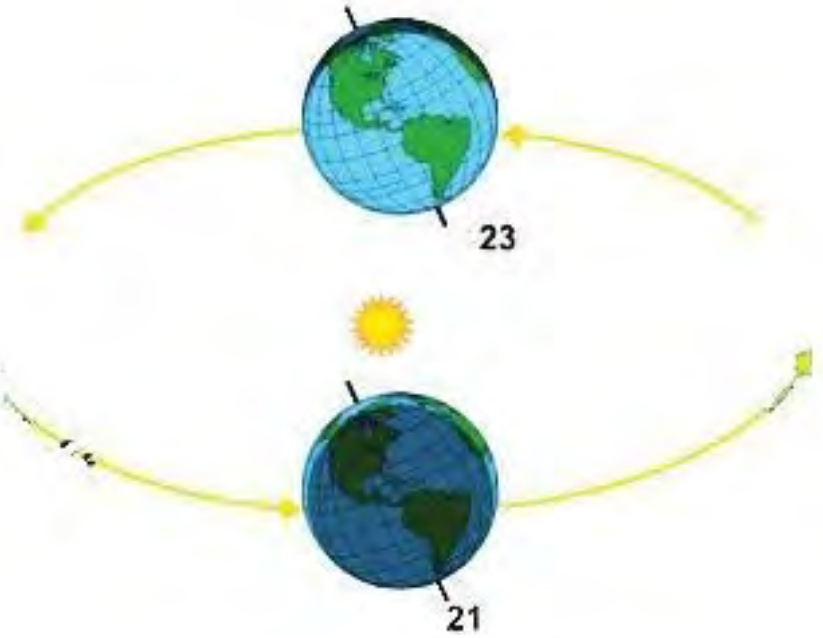


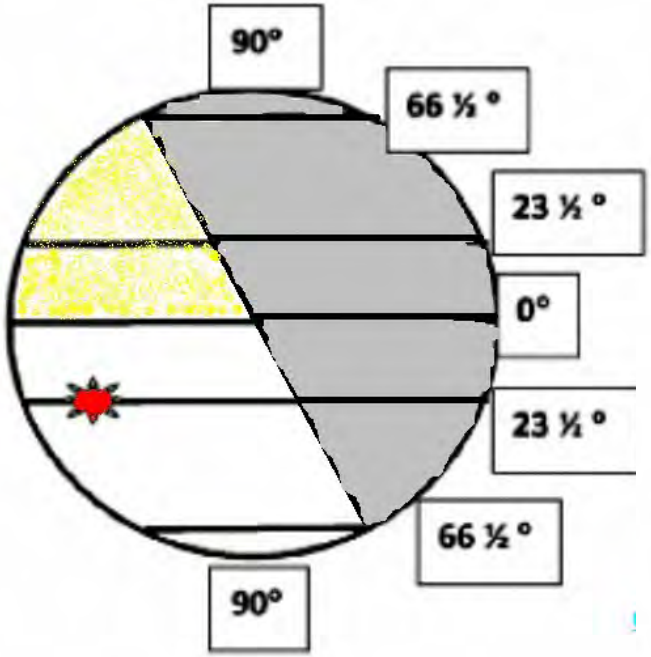


ചോദ്യങ്ങൾ -

- ഏതേതു ദിവസങ്ങളിലാണ് ഓരോ അക്ഷാംശത്തിലും സൗരോർജ്ജം ലംബമായി പതിക്കുന്നത്?
- ഈ ദിവസങ്ങളിൽ രാത്രിയുടെയും പകലിന്റെയും ദൈർഘ്യം ഏതുവിധമാണ്?
- ഈ ദിവസങ്ങളെ അറിയപ്പെടുന്ന പേരെന്ത്?


22
21


23
21


90°
66 ½ °
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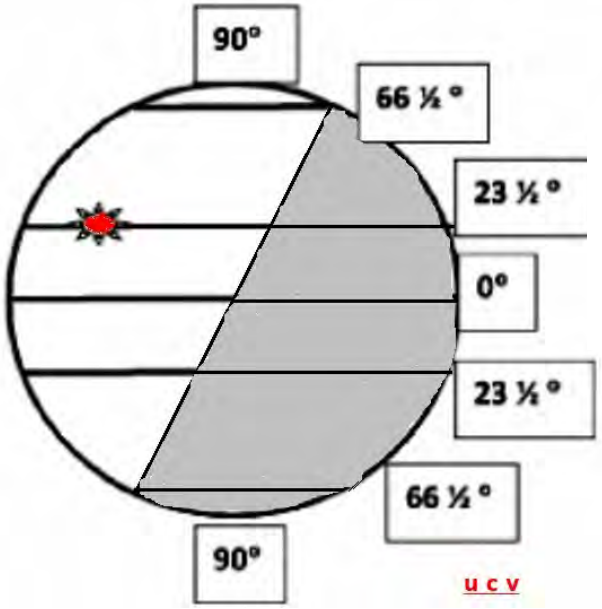
90°


90°
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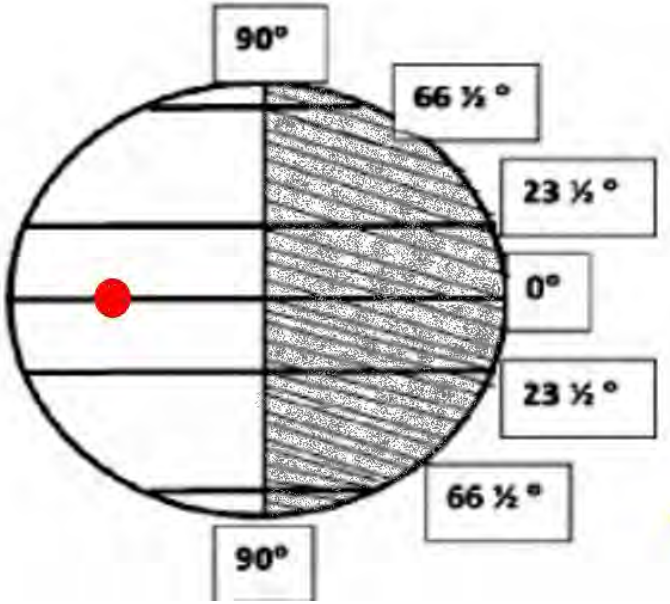
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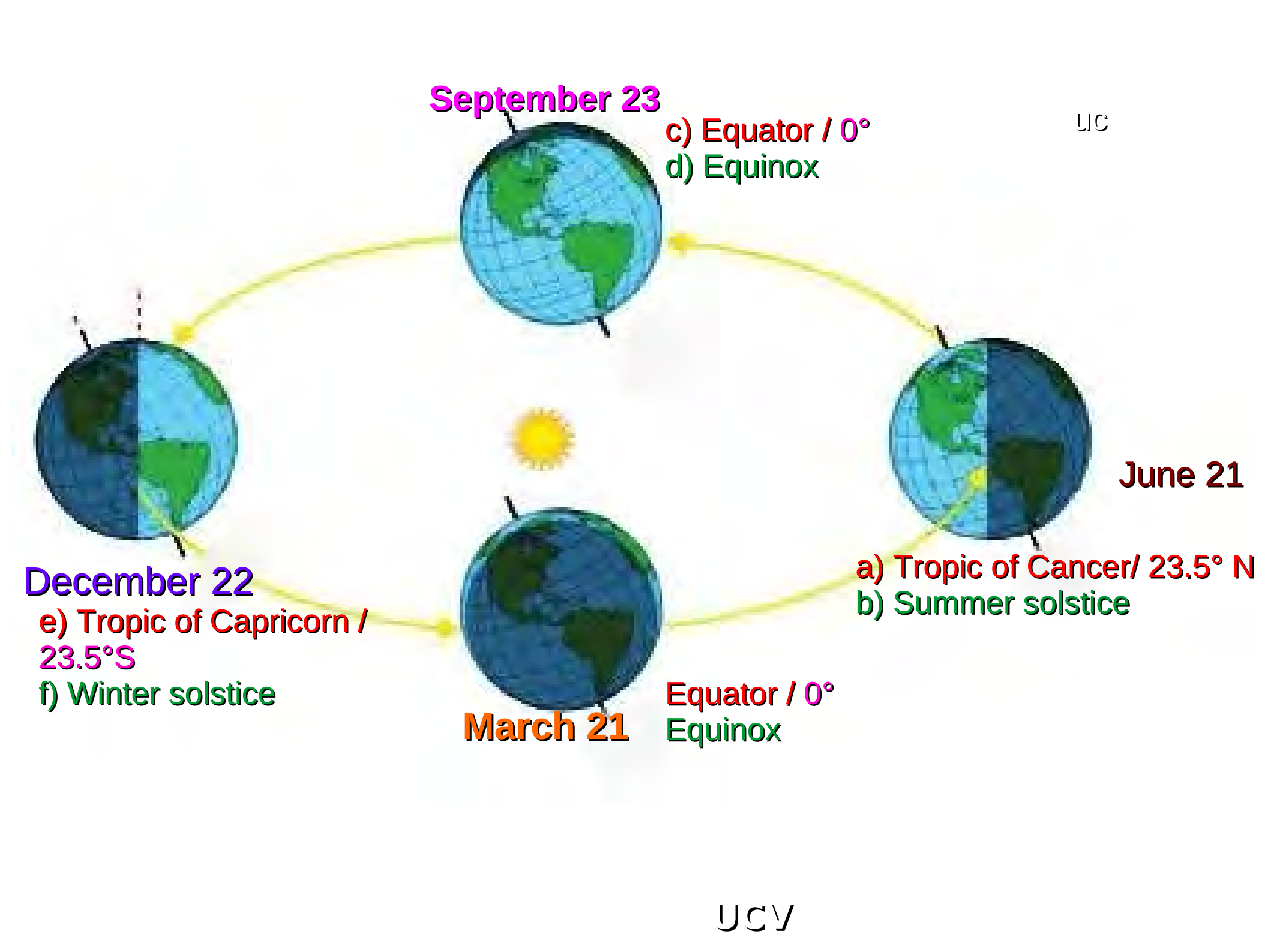
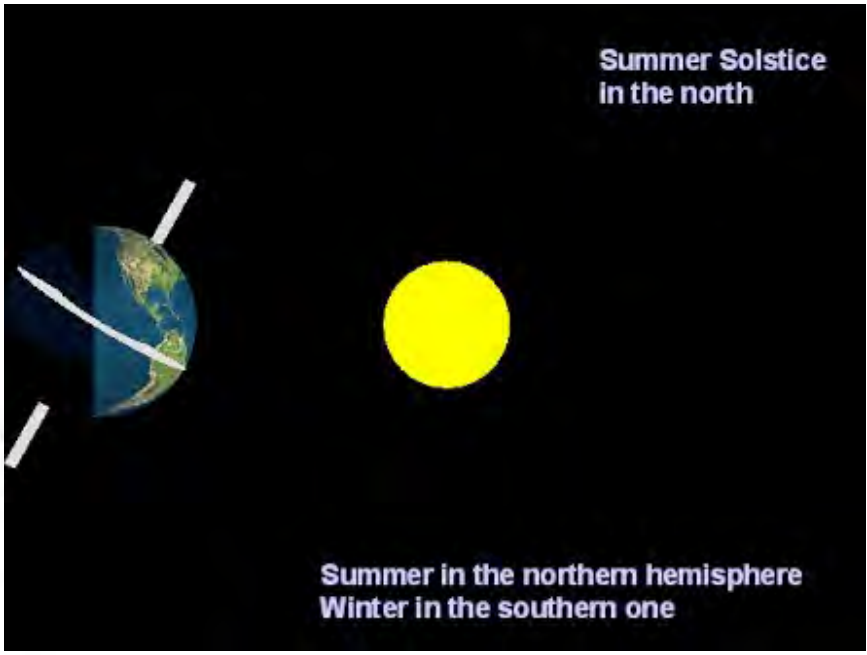
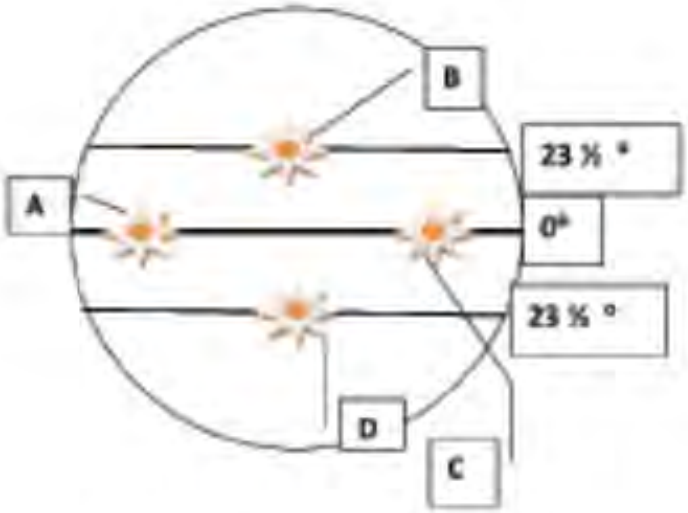
90°


September 23
c) Equator / 0°
d) Equinox
June 21
a) Tropic of Cancer/ 23.5° N
b) Summer solstice
December 22
e) Tropic of Capricorn / 23.5°S
f) Winter solstice
March 21
Equator / 0°
Equinox





അംഗങ്ങളുടെ ശ്രദ്ധയെ മോണിട്ടറിലേക്ക് ക്ഷണിക്കുന്നു. ചിത്രം വിശകലനം ചെയ്തു പട്ടിക പൂർത്തിയാക്കാൻ ആവശ്യപ്പെടുന്നു.

ചിത്രത്തിലെ സ്ഥാനങ്ങൾ	സൂര്യപ്രകാശം ലംബമായി പതിക്കുന്ന അക്ഷാംശമേഖല
A	
B	
C	
D	

സ്ഥാനം: A

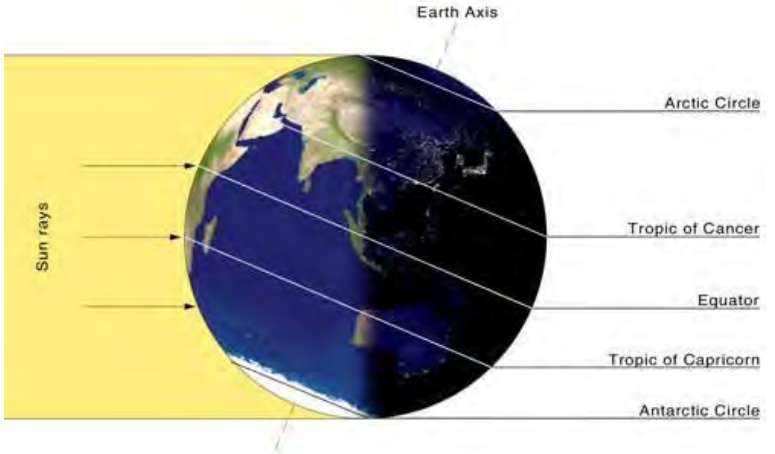
- മധ്യരേഖാപ്രദേശത്ത്
- മാർച്ച് 21
- തുല്യമായ പകലും രാത്രിയും
- സമരാത്രദിനങ്ങൾ

സ്ഥാനം: B

- ഉത്തരായനരേഖ
- ജൂൺ 21
- ഉത്തരാർധഗോളത്തിൽ ദൈർഘ്യമേറിയ പകലും ദൈർഘ്യം കുറഞ്ഞ രാത്രിയും.
- ഗ്രീഷ്മ അയനാന്തദിനം

സ്ഥാനം: C

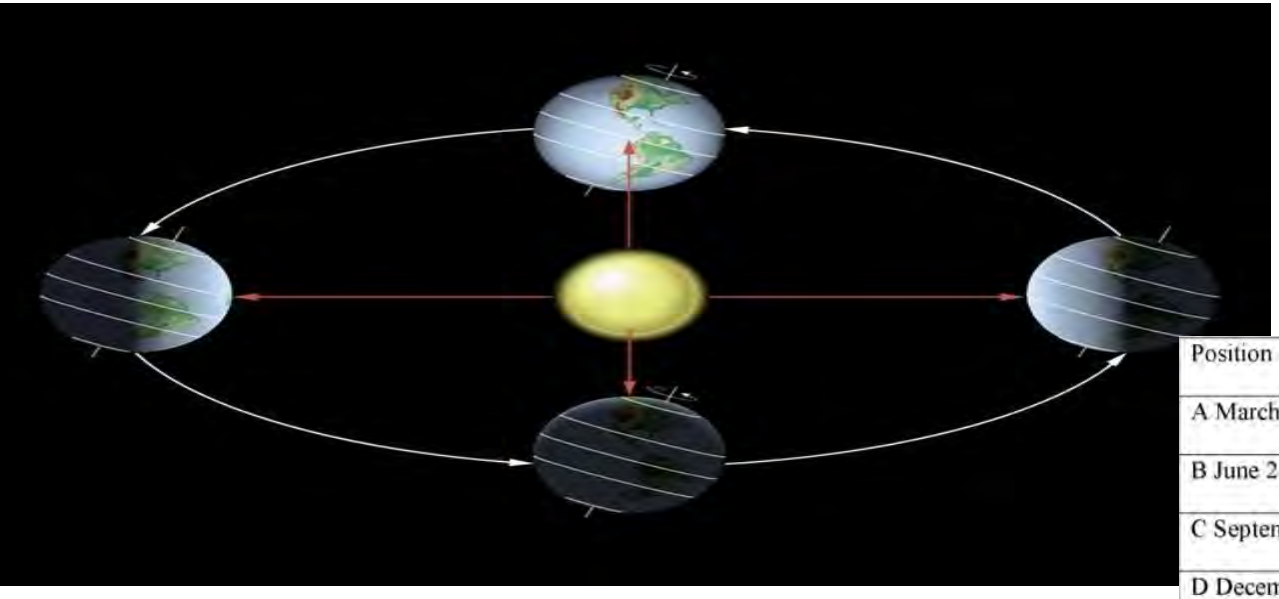
- മധ്യരേഖാപ്രദേശത്ത്
- സെപ്തംബർ 23
- തുല്യമായ പകലും രാത്രിയും
- സമരാത്രദിനങ്ങൾ

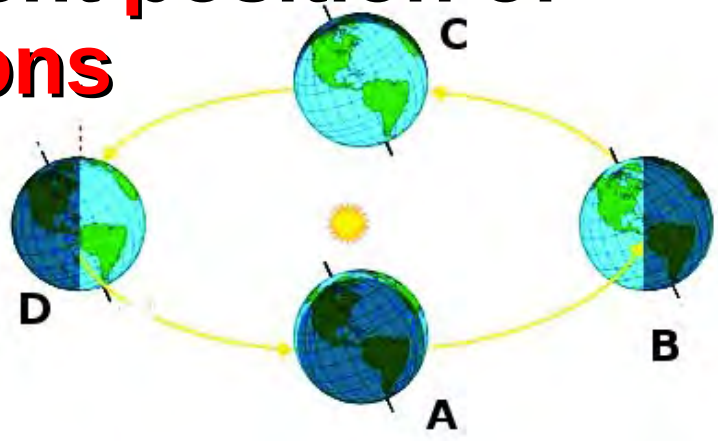


സ്ഥാനം: D

- ദക്ഷിണായനരേഖ
- ഡിസംബർ 22
- ഉത്തരാർധഗോളത്തിൽ ദൈർഘ്യമേറിയ രാത്രിയും ദൈർഘ്യം കുറഞ്ഞ പകലും.
- ശൈത്യഅയനാന്തദിനം

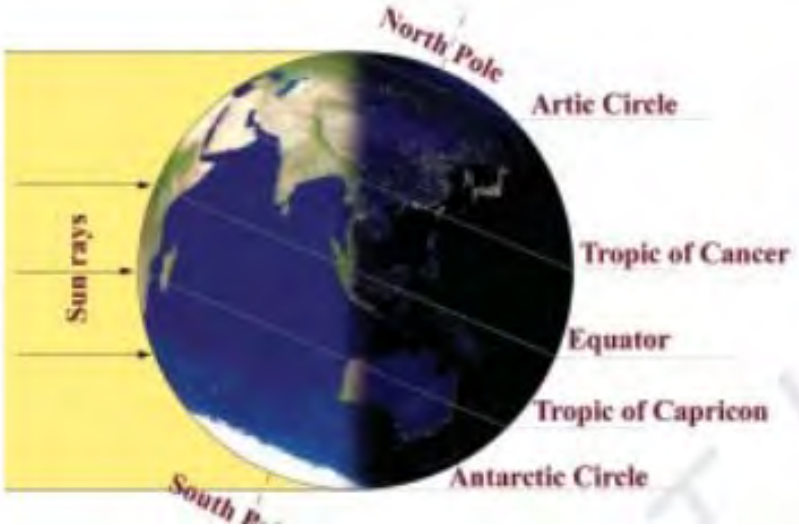
Describe the changes in apparent position of the sun during seasons





Position	Solar rays are vertical over:	Length of day and night
A March 21	Equator	Equal
B June 2		
C September 28		
D December 22		

Months	Apparent movement of the sun	seasons Northern Hemisphere	seasons Southern hemisphere
From March 21 to June21			
From June21 to September 23			
From September 23to December 22			
From December 22 to March 21			



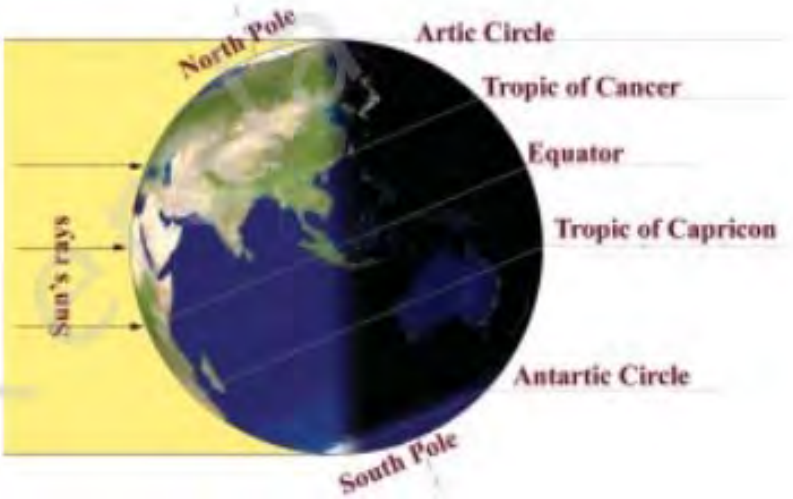
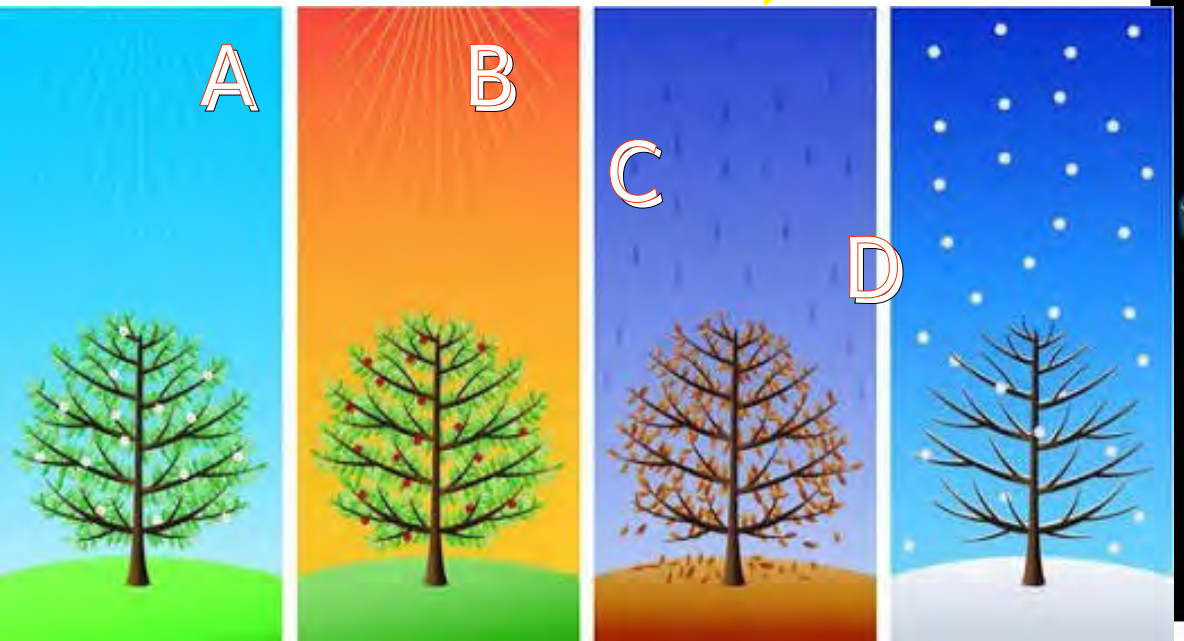


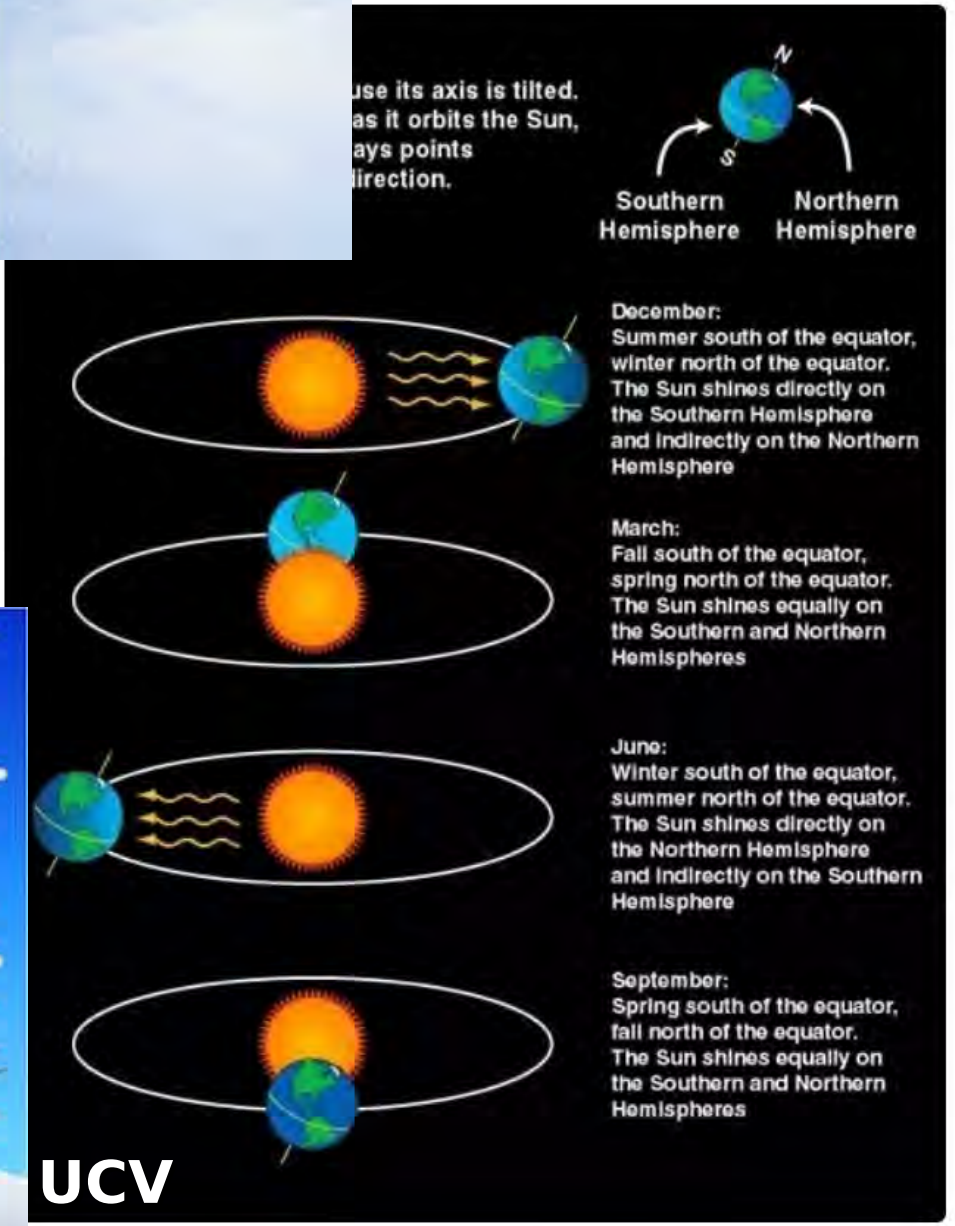
	Fig A	Fig B
Day	22 December	21 June
The latitude at which sun's rays fall vertically	a. - - - - - - - - - - - -	b. - - - - - - - - - - - -
Duration of day in the northern hemisphere	c. - - - - - - - - - - - -	d. - - - - - - - - - - - -
Duration of night in the northern hemisphere	e. - - - - - - - - - - - -	f. - - - - - - - - - - - -
The name by which this day is known in the Northern hemisphere	g. - - - - - - - - - - - -	h. - - - - - - - - - - - -

Distinguish between Summer solstice & Winter solstice ?

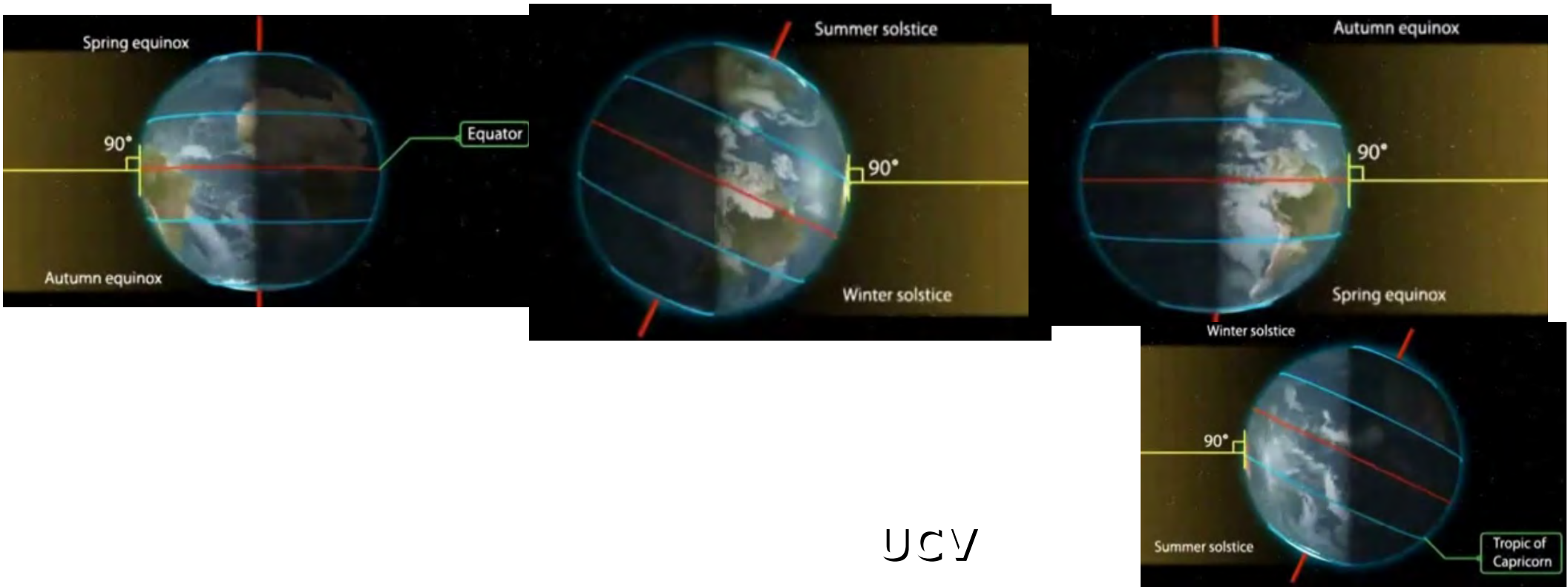
UCV

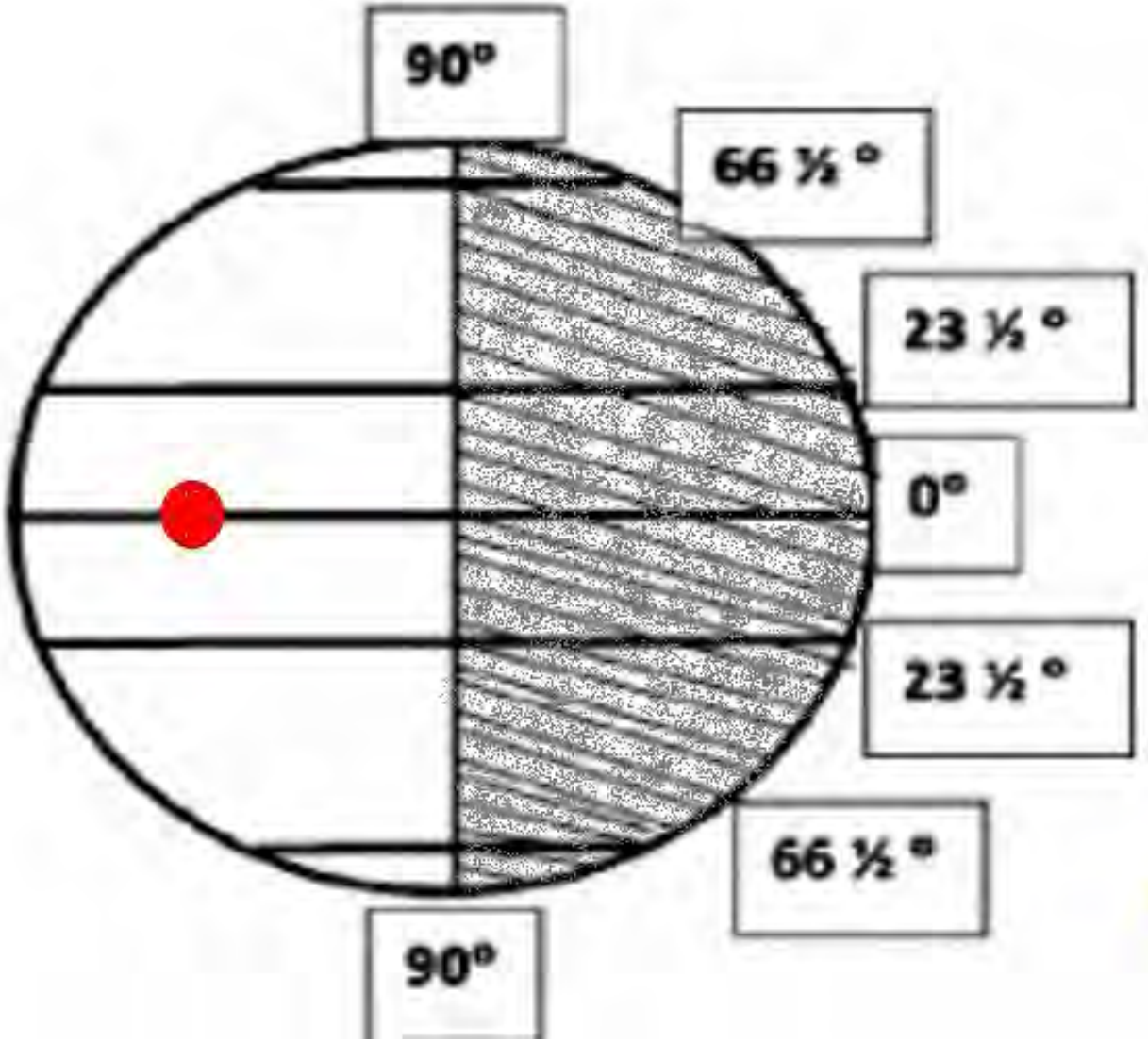
What it represent ?



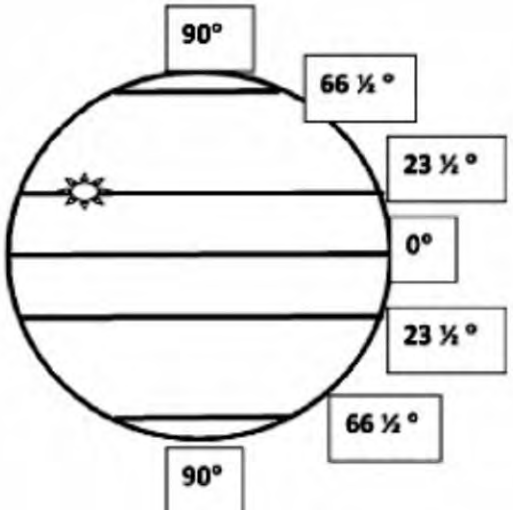


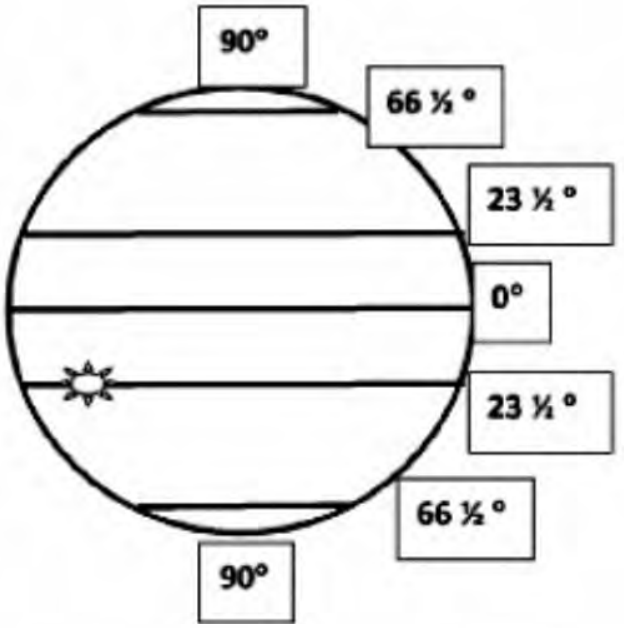
Months	The apparent movement of the sun	Seasons	
		Northern hemisphere	Southern hemisphere
From March 21 to June 21	From the Equator to the Tropic of Cancer	Spring	Autumn
From June 21 to September 23	From the Tropic of Cancer to the Equator	Summer	Winter
From September 23 to December 22	From the Equator to the Tropic of Capricon	Autumn	Spring
From December 22 to March 21	From the Tropic of Capricon to the Equator	Winter	Summer





Find out the position of sun & dates ?


90°
66 ½ °
23 ½ °
0°
23 ½ °
66 ½ °
90°


90°
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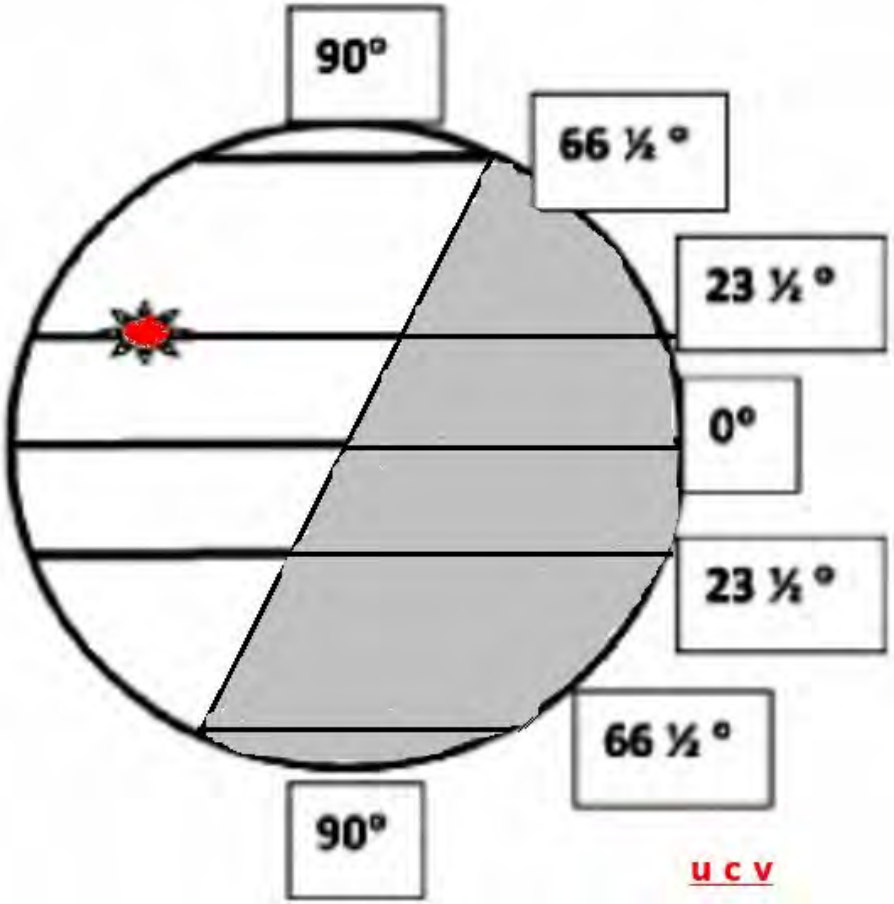
23 ½ °
66 ½ °
90°


90°
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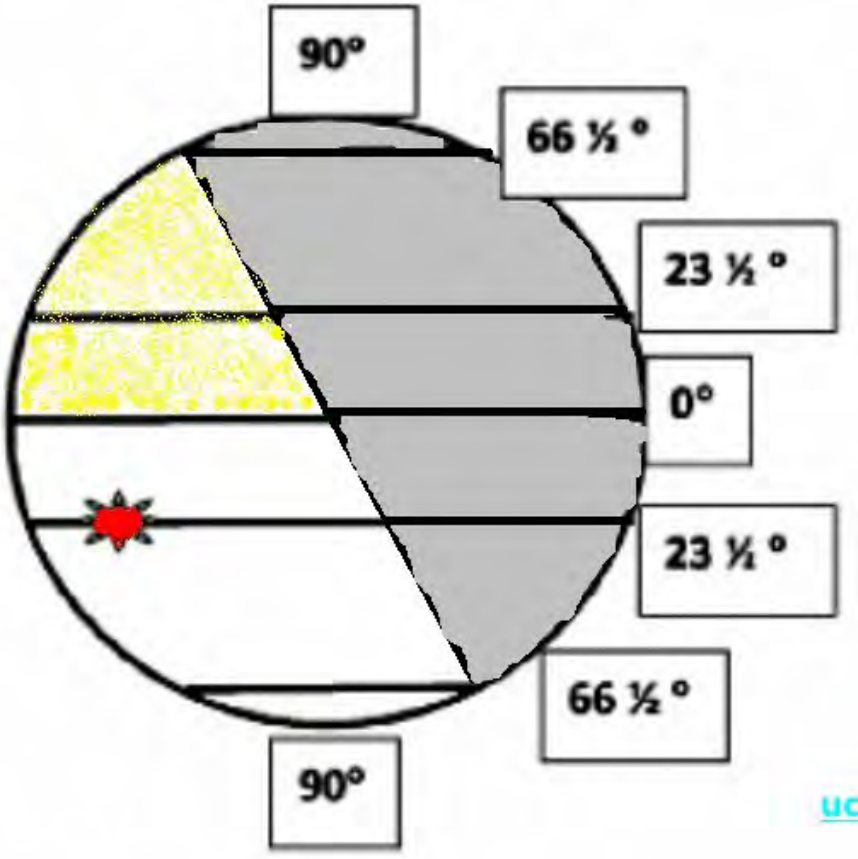
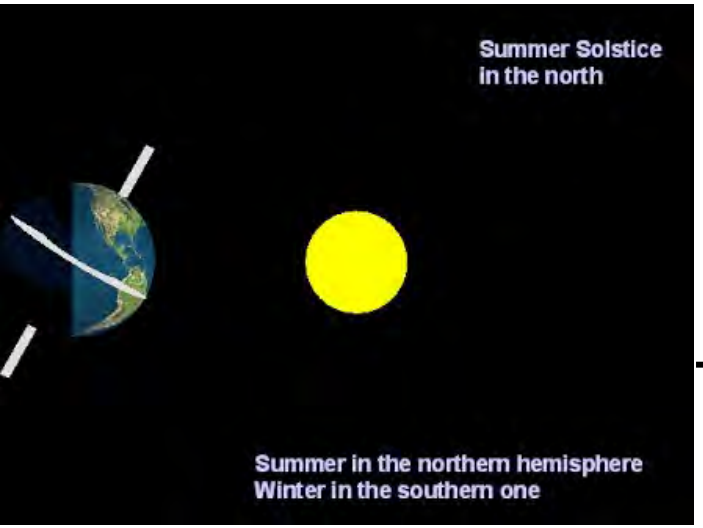
u c v


90°
66 ½ °
23 ½ °
0°
23 ½ °
66 ½ °
90°

ucv



Equinox

The length of day and night will be equal during these days on both the Hemispheres

Solstice

The longest day& shortest night / longest night & shortest day in the one hemisphere.

March 21	**Equinox** **The sun will be vertically above the Equator**
June 21	**The summer Solstice** **The sun will be vertically above the Tropic of Cancer**
September 23	**Equinox** **The sun will be vertically above the Equator**
December 22	**The winter solstice** **The sun reaches vertically above the tropic of Capricorn**

UCV

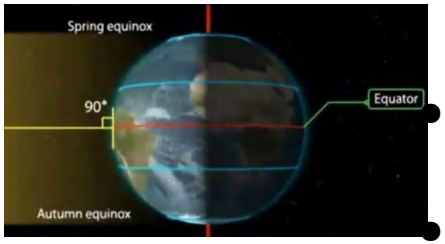
Day	Relative position of the Sun	Speciality of the day
21 March	Equator	Equinox
21 June	(a)	(b) .....
23 September	(c).....	(d) .....
22 December	(e)	(f) .....

SSLC March 2019
3 score

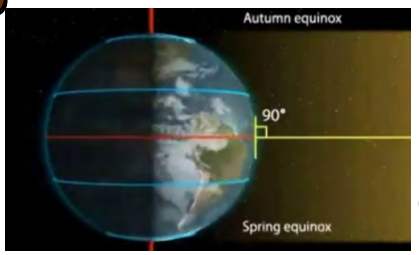
UCV

Equinoxes

The northern and southern hemisphere are equally inclined towards the sun. The circle of illumination passes through the North & South poles. Days & nights are equal.

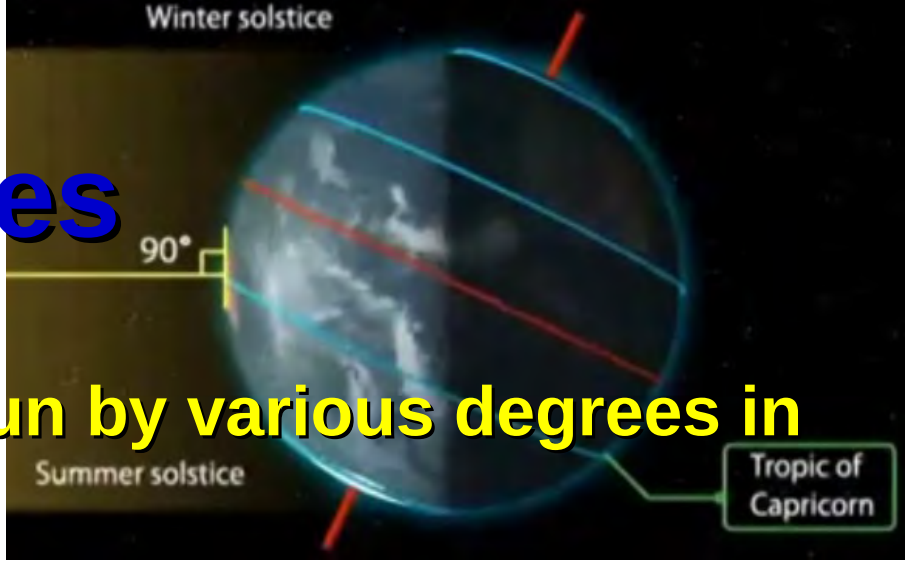


- **March 21**
- **The sun rays are vertical at the equator The position on March 21 is called Spring Equinox**
- **It is the situation between Winter & Summer in northern hemisphere.**



- **September 23**
- The sun rays are vertical at the equator The position on September 23 is called Autumn Equinox
- It is the situation between Summer & Winter in northern hemisphere

UCV

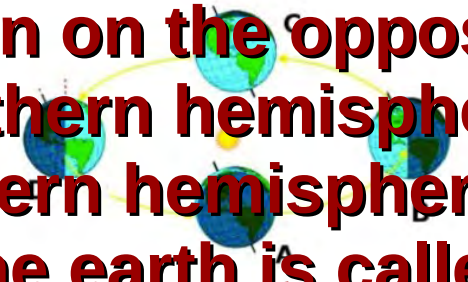


Solstices

- The earth leans towards the sun by various degrees in the course of one revolution.

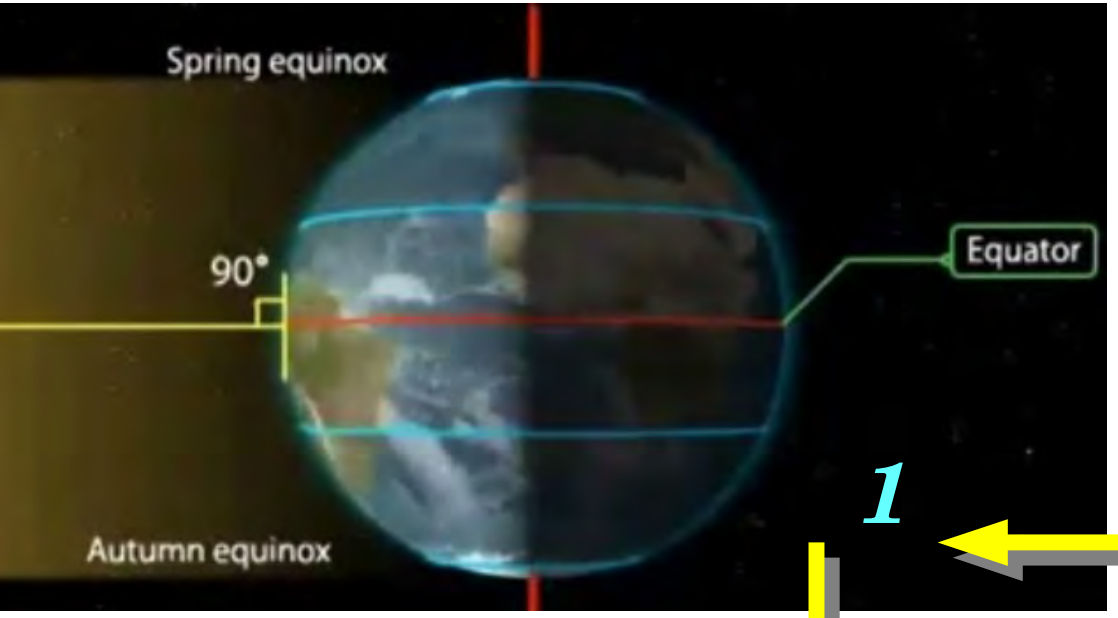
- On June 21 the earth leans towards the sun at the maximum angle the northern hemisphere is tipped towards the sun and the southern hemisphere away from the sun. This condition of the earth in relation to sun is called Summer solstice.

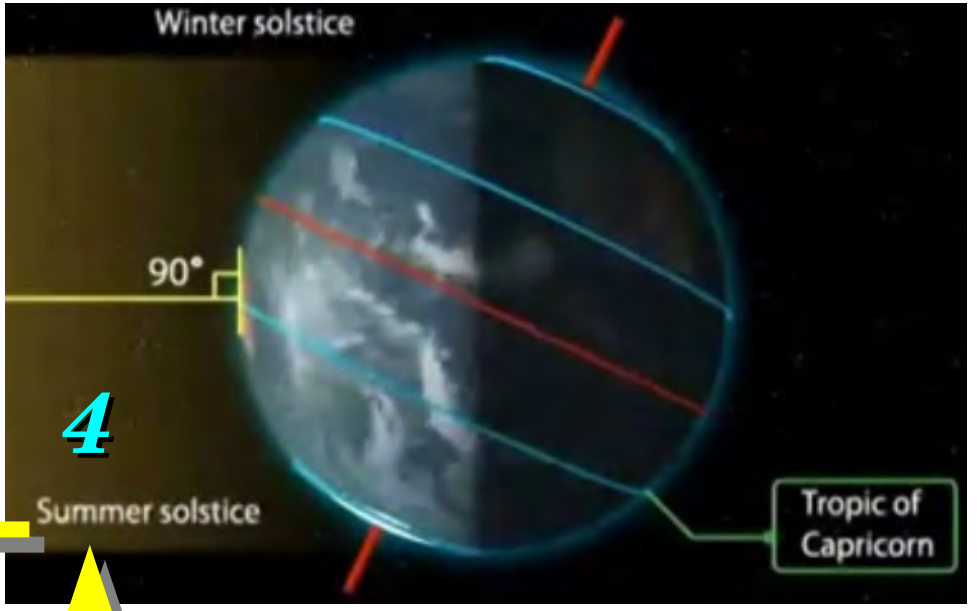
- After 6 months on December 22 the earth occupies equivalent position on the opposite point in its orbit. This time the southern hemisphere is tipped towards the sun and northern hemisphere away from the sun. This position of the earth is called **Winter solstice.**



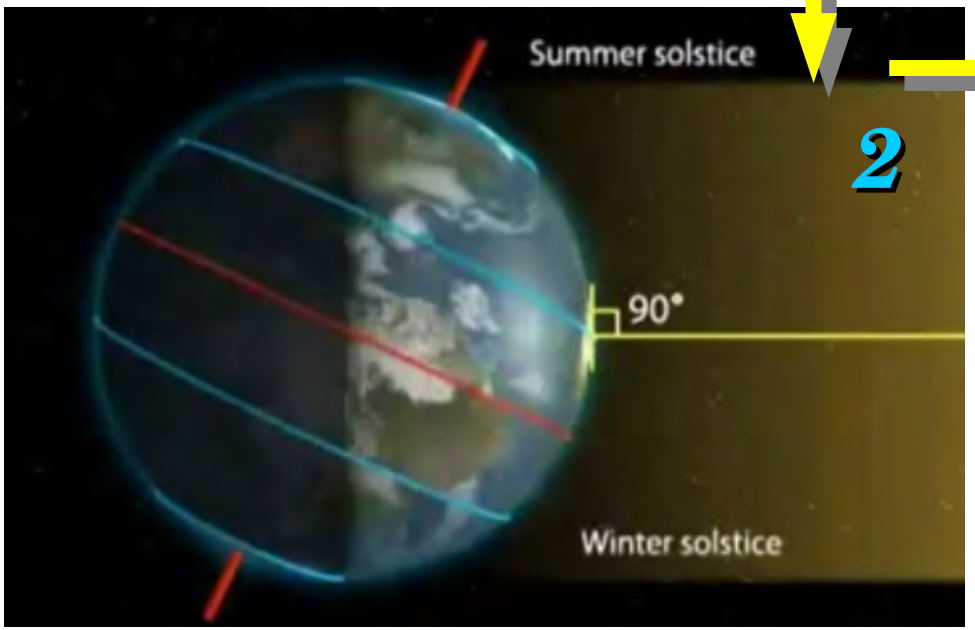
UCV

Identify pictures, vertical sun rays & latitude





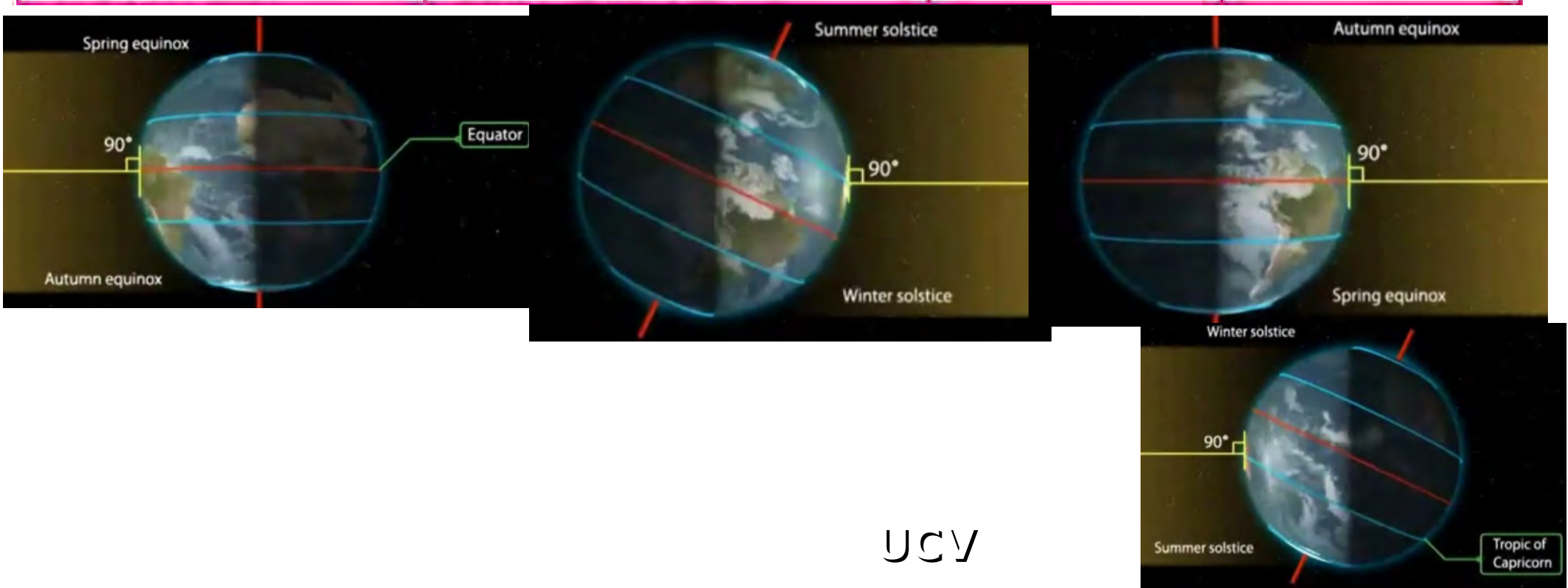
1



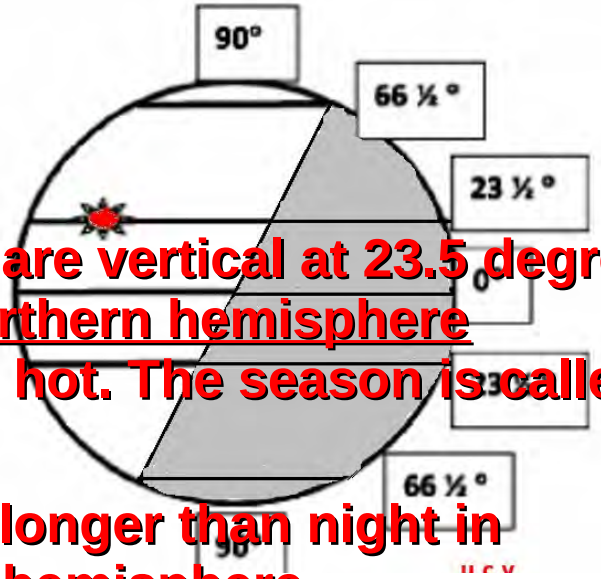
3

UCV

മാസങ്ങൾ	സൂര്യന്റെ അയനം	ഋതുക്കൾ	
		ഉത്തരാർധ ഗോളം	ദക്ഷിണാർധ ഗോളം
മാർച്ച് 21 മുതൽ ജൂൺ 21 വരെ	ഭൂമധ്യരേഖയിൽനിന്ന് ഉത്തരായനരേഖയിലേക്ക്	വസന്തം	ഹേമന്തം
ജൂൺ 21 മുതൽ സെപ്തംബർ 23 വരെ	ഉത്തരായനരേഖയിൽനിന്ന് ഭൂമധ്യരേഖയിലേക്ക്	ഗ്രീഷ്മം	ശൈത്യം
സെപ്തംബർ 23 മുതൽ ഡിസംബർ 22 വരെ	ഭൂമധ്യരേഖയിൽനിന്ന് ദക്ഷിണായനരേഖയിലേക്ക്	ഹേമന്തം	വസന്തം
ഡിസംബർ 22 മുതൽ മാർച്ച് 21 വരെ	ദക്ഷിണായനരേഖയിൽനിന്ന് ഭൂമധ്യരേഖയിലേക്ക്	ശൈത്യം	ഗ്രീഷ്മം



- **June 21-**



sun rays are vertical at 23.5 degree N the northern hemisphere becomes hot. The season is called summer

days are longer than night in northern hemisphere

on & above 66.5 degree N the day is 24 hour long

@ the pole the day is 6 month long

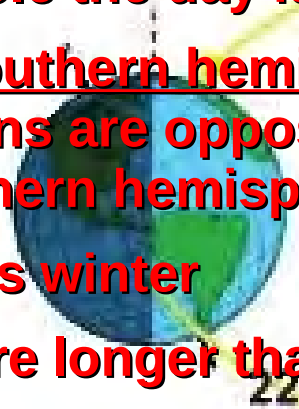
- In the southern hemisphere, the conditions are opposite to that in the northern hemisphere

season is winter

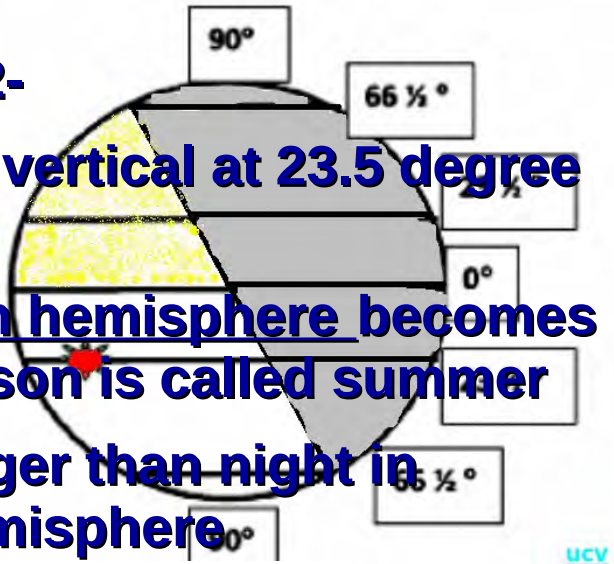
nights are longer than days

66.5 degree S the night is 24 hour long

@ the pole the night is 6 month long



- **December 22-**



sun rays are vertical at 23.5 degree S

the southern hemisphere becomes hot. The season is called summer

days are longer than night in southern hemisphere

on & above 66.5 degree S the day is 24 hour long

@ the pole the day is 6 month long

- In the northern hemisphere, the conditions are opposite to that in the southern hemisphere

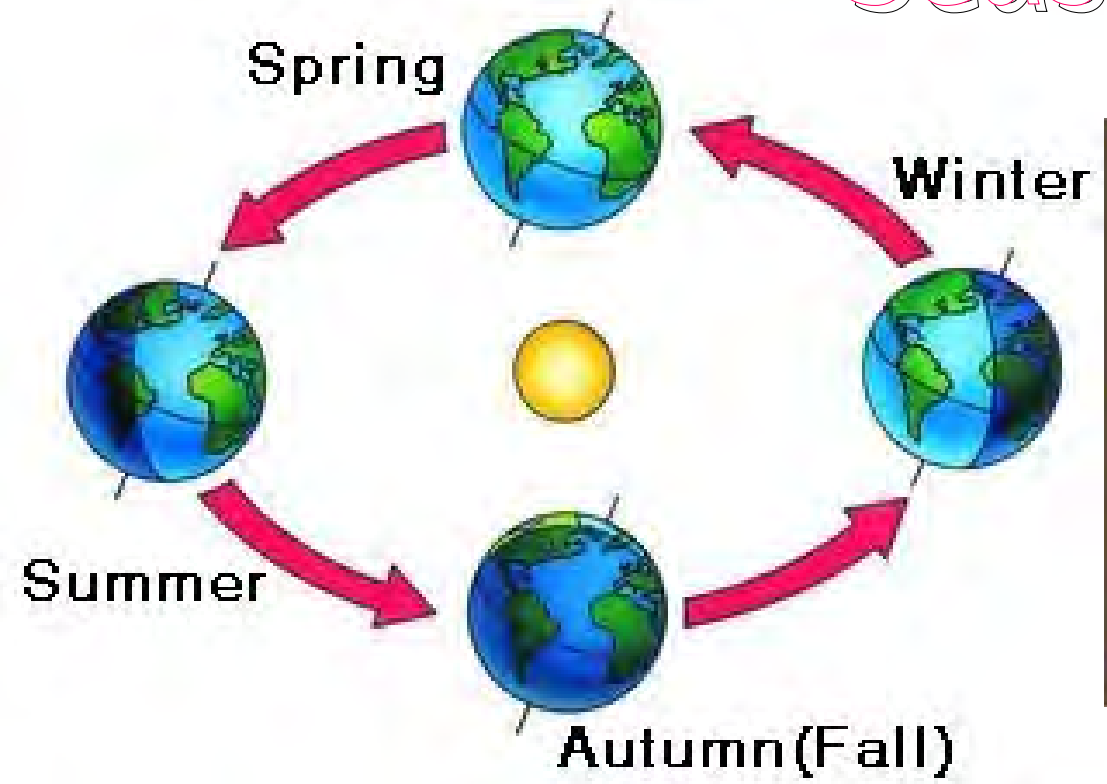
season is winter

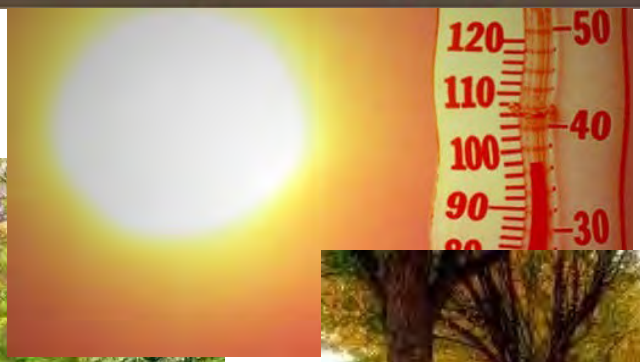
nights are longer than days

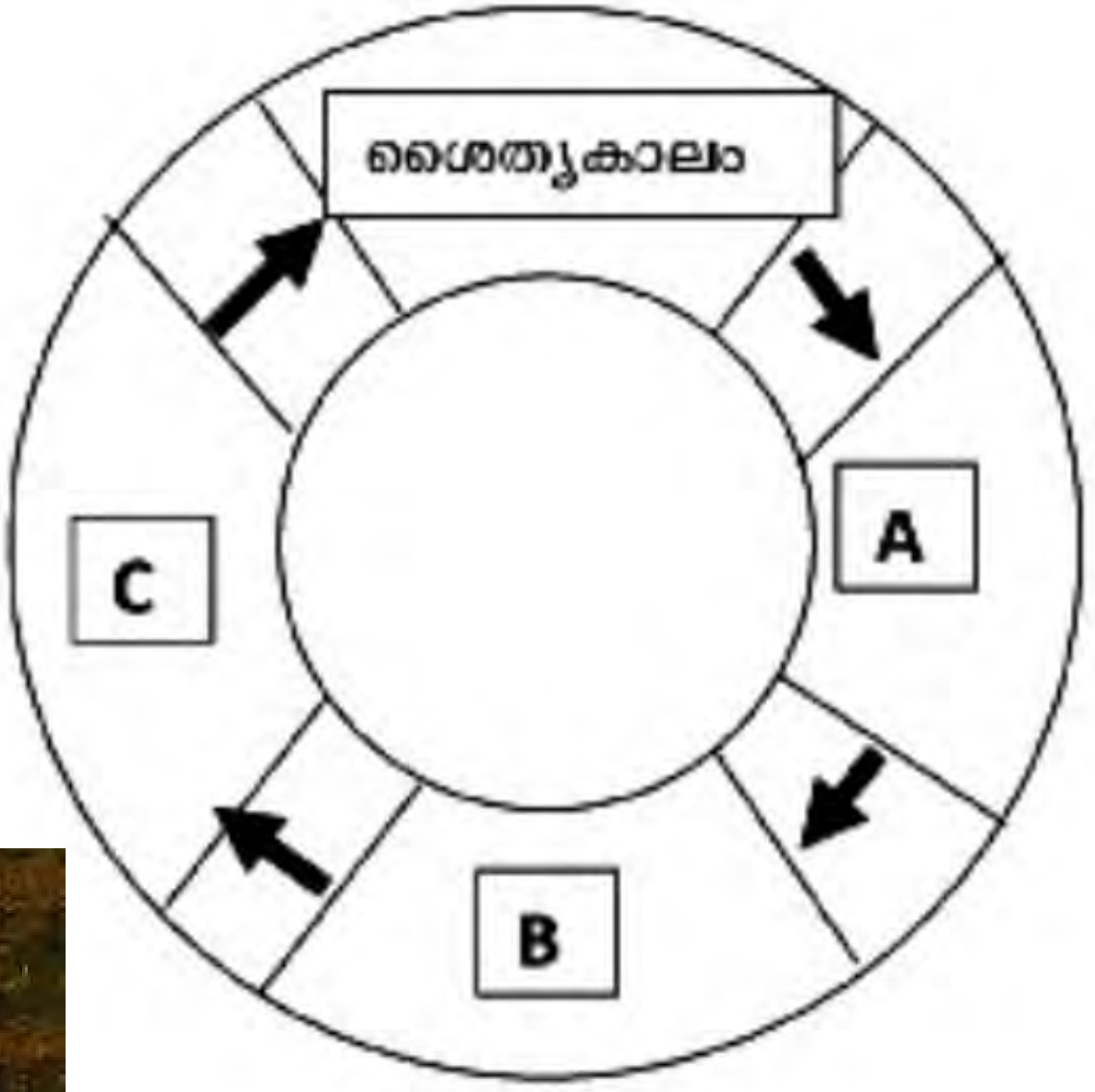
66.5 degree N the night is 24 hour long

- @ the pole the night is 6 month long

Seasons







Shivagreeha

UCV

Sp SAW

Traditional seasons of India

Vasantha	March April
Greehma	May June
Varsha	July August
Sarath	September October
Hemanta	November December
Sisira	January February

you see

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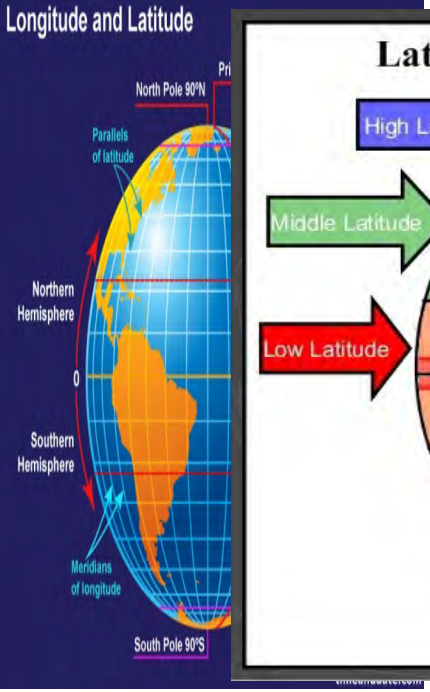

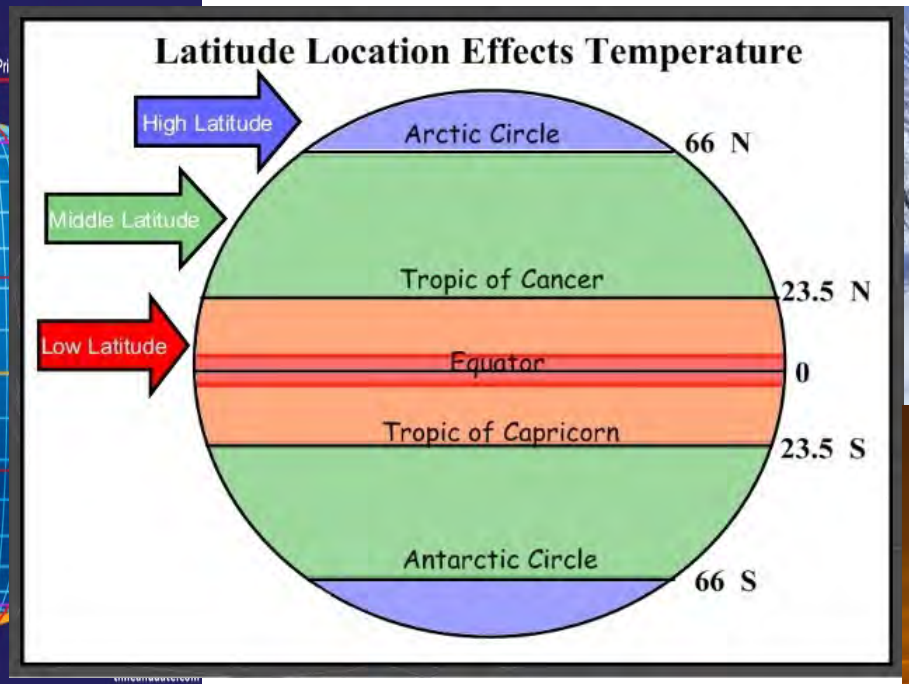

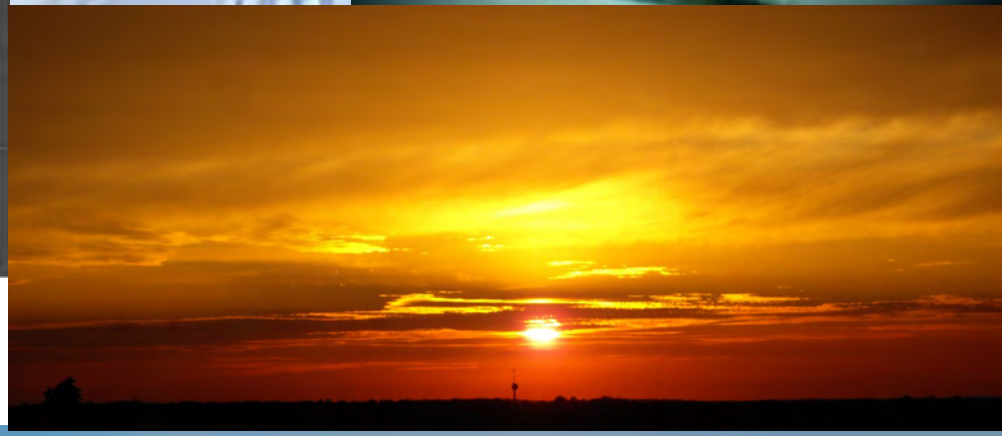

Generally,hot climate prevails in the equatorial region throughout the year. Seasonal difference are profound in the mid latitudes. Towards the poles, summer are cooler & shorter and winters, severe and longer.

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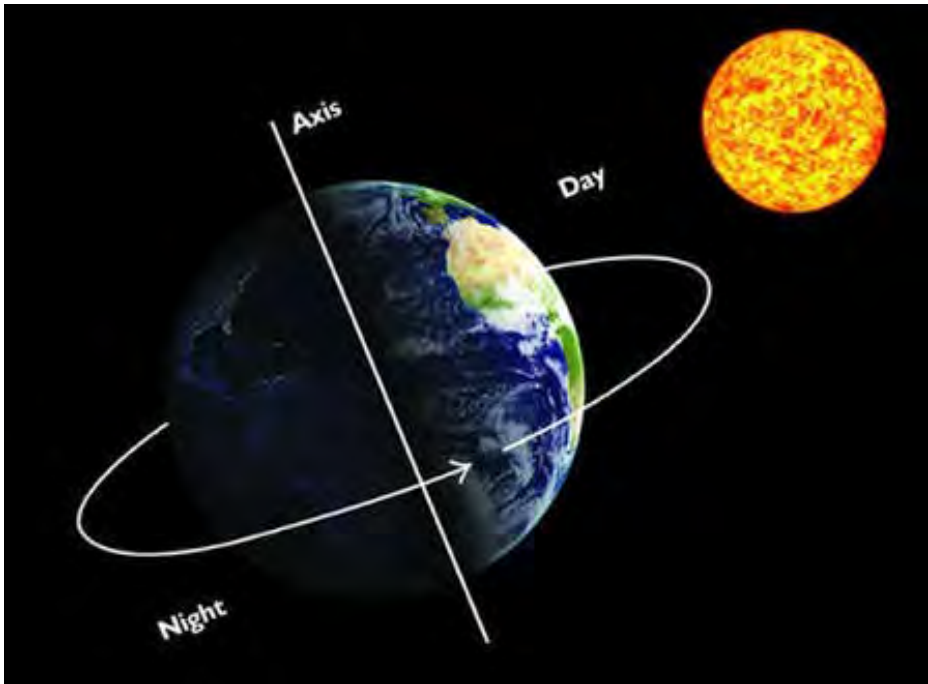
Effects of the rotation of the Earth

- Formation of days and night
- Changes in the direction of winds
- Occurrence of sun Rise, Noon & Sun set
- Concept of time
- Changes in the dates



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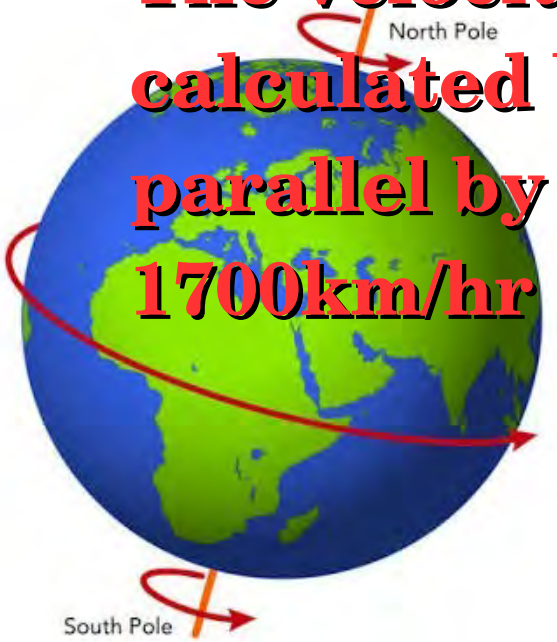
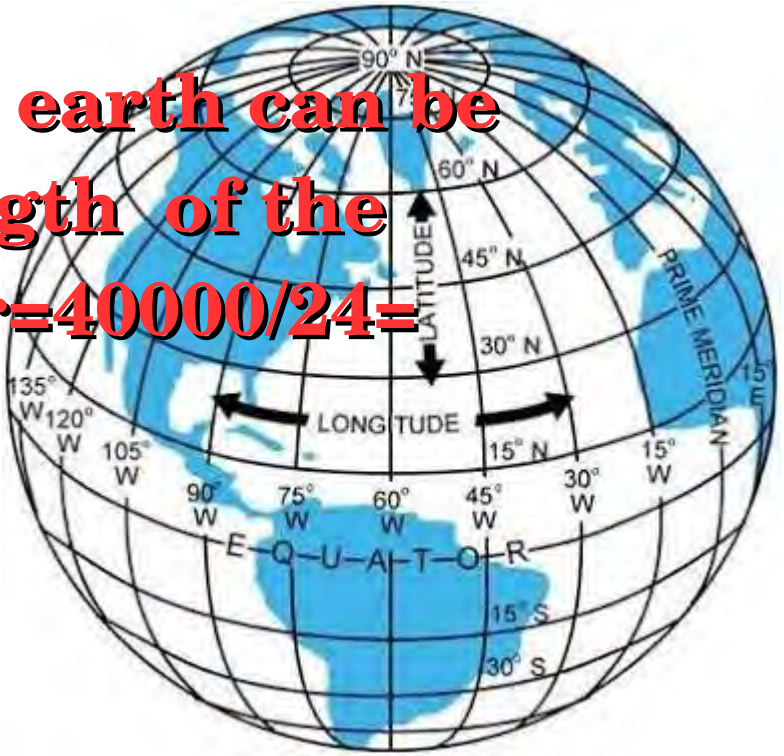
Facts associated with rotation

- The earth rotates from west to east
- It takes 24 hours to complete on rotation
- As the earth rotates from west to east, the sun rises first in the eastern side.
- The velocity of rotation of the earth can be calculated by dividing the length of the parallel by 24 hours (equator=40000/24= 1700km/hr)





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I looked at the clock - it was showing 12. The air hostess announced that we should set all our watches back by five and a half hours. As per our watches it was 5. 30 Indian Standard Time. One could say the aircraft was flying towards the West, literally swallowing our Indian Standard Time! We had to turn back the hands of our watches every now and then accordingly.

Excerpted from S K Pottekkat's

Pathirasooryante Naattil
("In the Land of the Midnight Sun")

The land of midnight sun

The sun shines even at midnight! Not for a single day, but for six months throughout in the Arctic and the Antarctic Circles. But don't think that the sun will be vertically overhead during those days. The sun can be seen only on the horizon. The remaining six months are shrouded in darkness. Day light lasts only for one or two hours. The land will be covered with snow. Human life and limited agriculture here are all scheduled according to the peculiarities of this climate.

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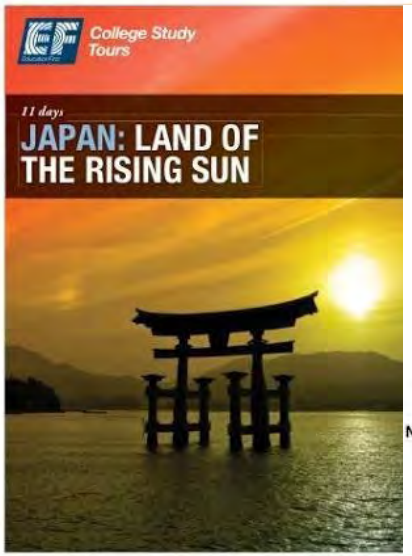
The people of which Indian state sees the sun first?



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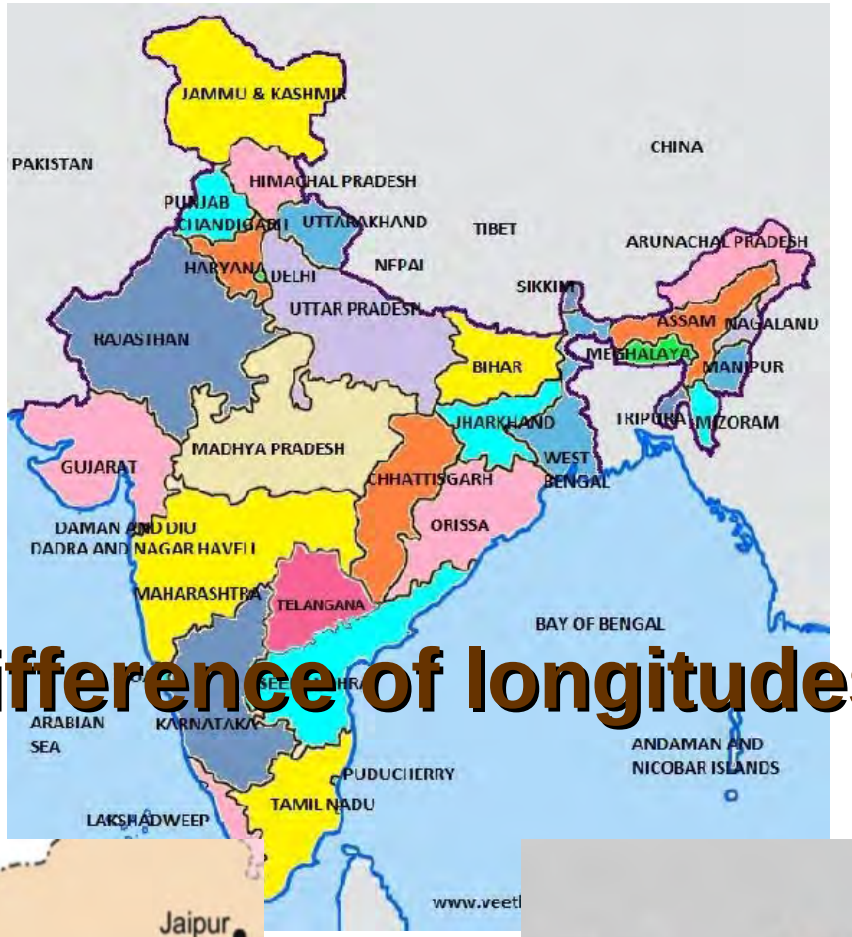
68°

97°



Difference of longitudes?

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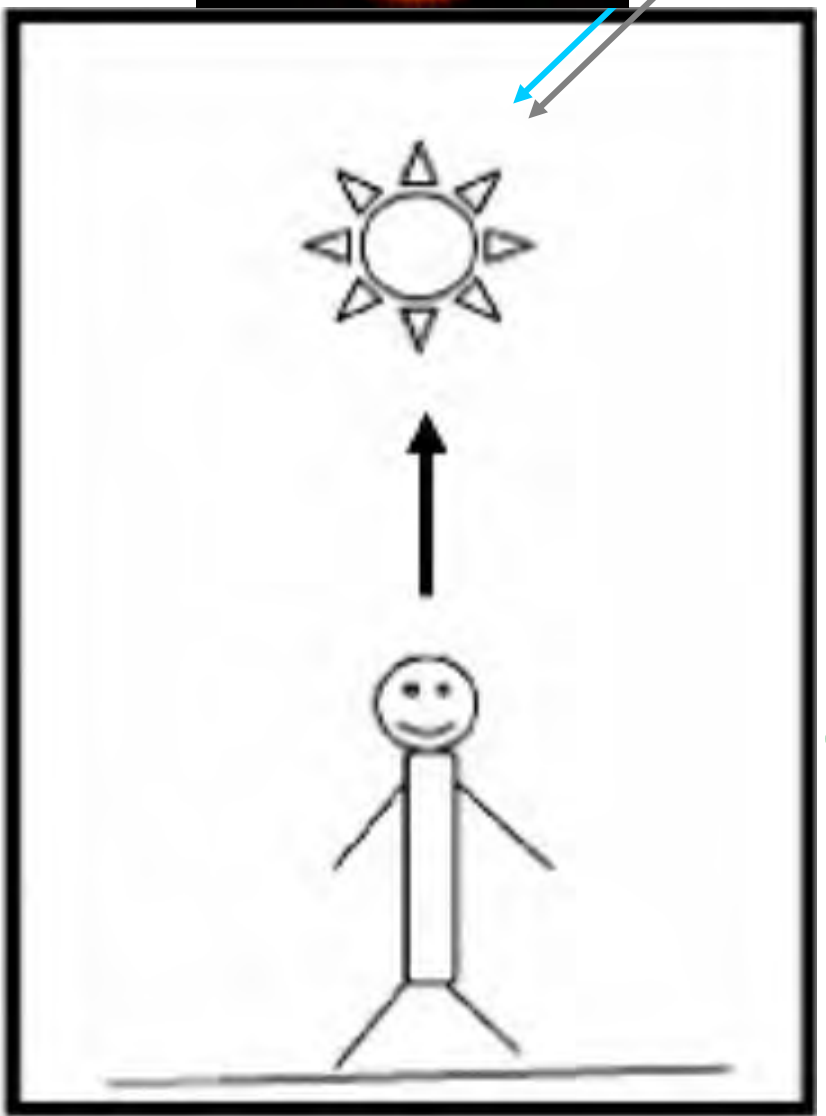
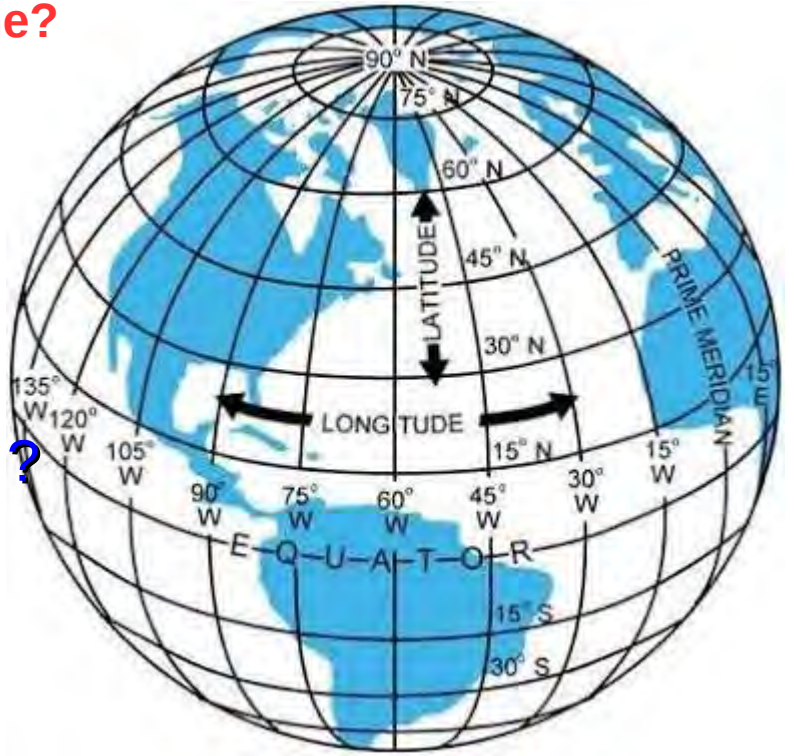
What is the time now?
What is local time?



When the sun is vertically overhead, it is noon. The time estimated at each place, based on the apex position of the sun, is termed as the local time.

Is the local time in all the Indian states the same?



Can you say
12 AM for Midnight ?
12 PM for Noon ?

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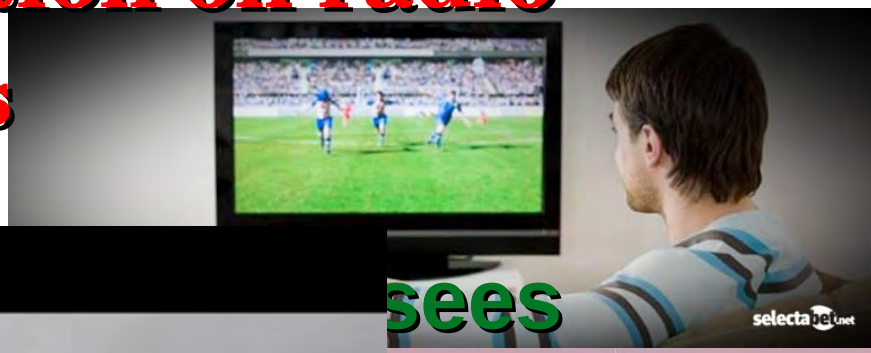
Is the local time in all Indian states the same?

What will be the complications if there are several local times in a country?

Cannot prepare a railway time table applicable throughout the country

Cannot give information on radio programs

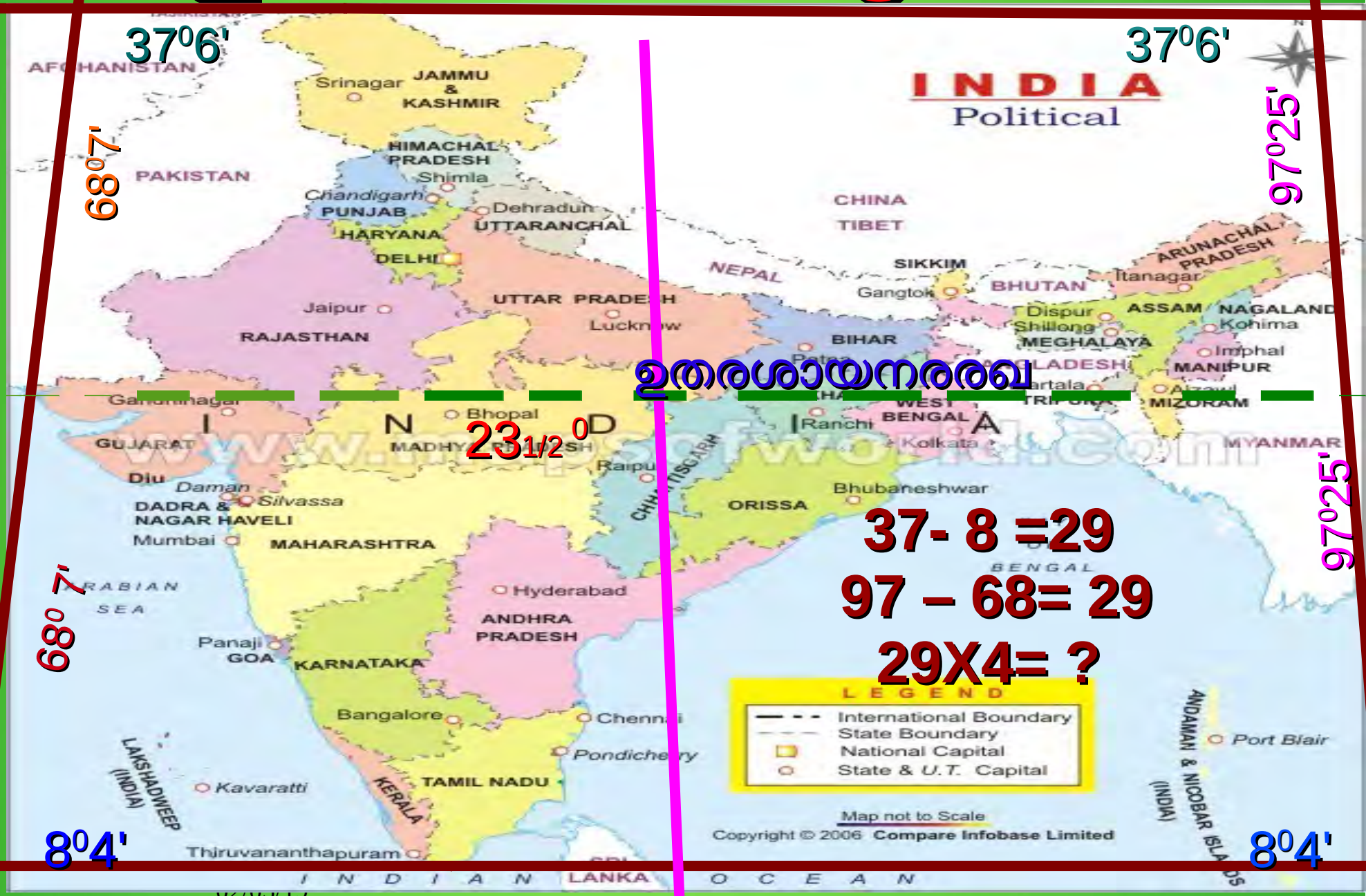


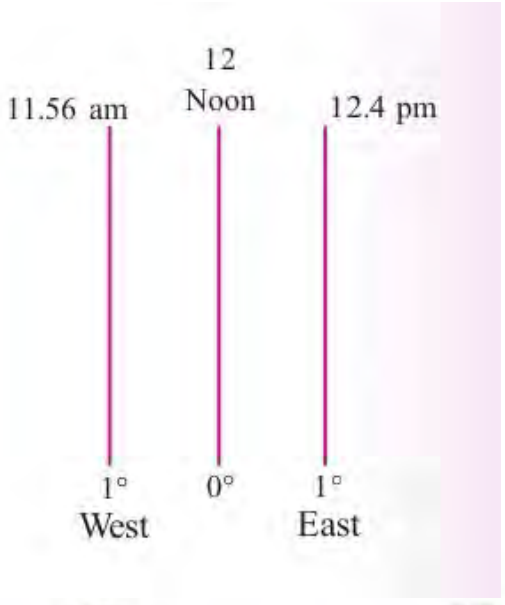
sees

the sun first?

you see

ഇന്ത്യ ഭൂമധ്യരേഖ ഭൗതിക ഭൂമിശാസ്ത്രം





Middle latitude Standard time

- On converting 24 hours into minutes
24 x 60 = 1440 minutes
- That is, the time required for the completion of one rotation
= 1440 minutes
- The time required for the earth to complete the rotation of 1° longitude is
1440 / 360
= 4 minutes.

The time required for the rotation of 15° longitudinal area
Is 15 x 4 = 60 minutes (1 hour).
7.5° area = 7.5x 4 = 30 minutes
time advances towards the east and recedes towards the west.
82.5 degree East = ?

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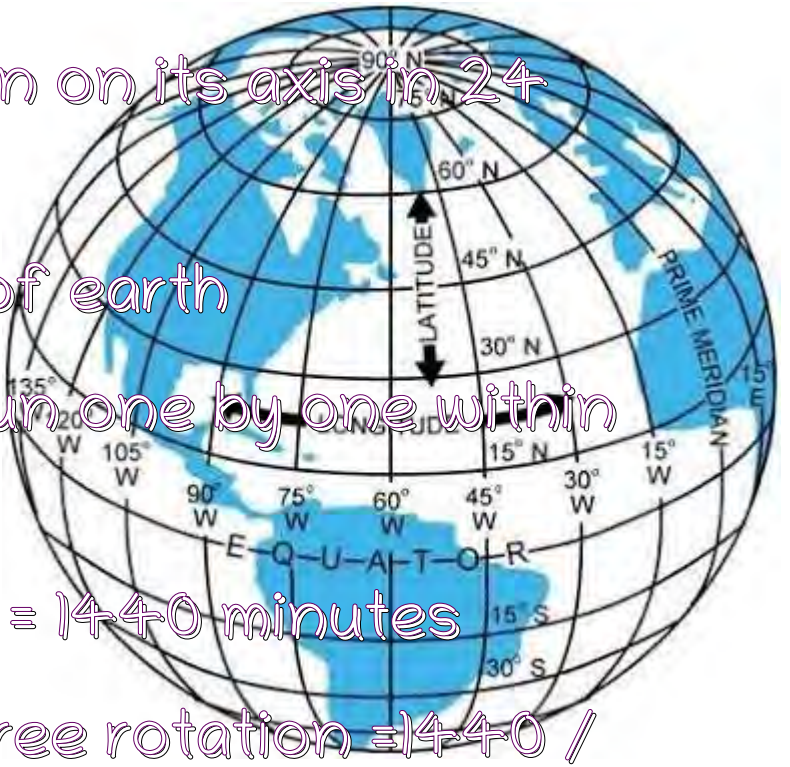
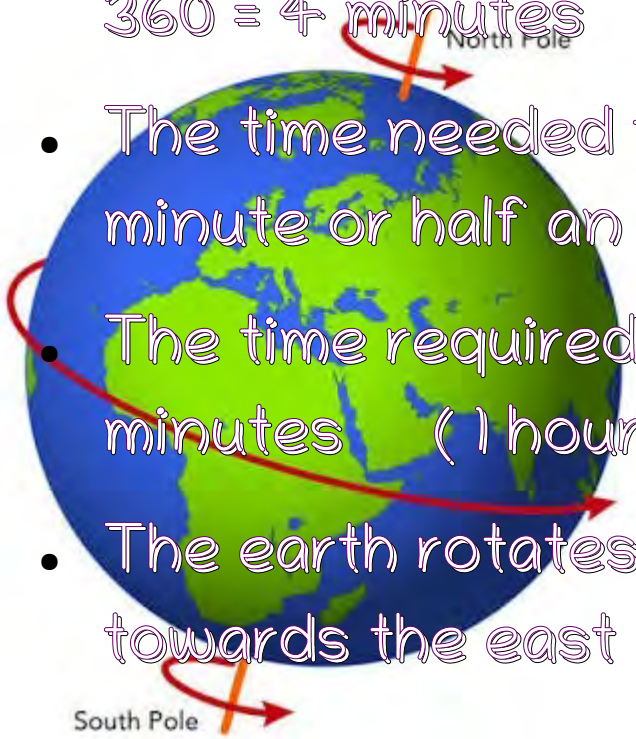
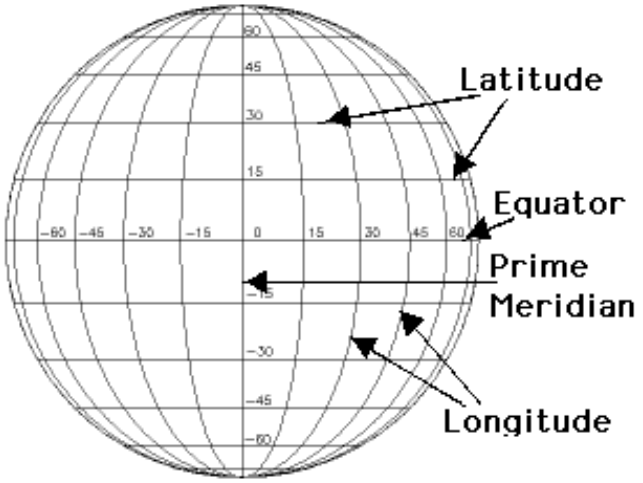
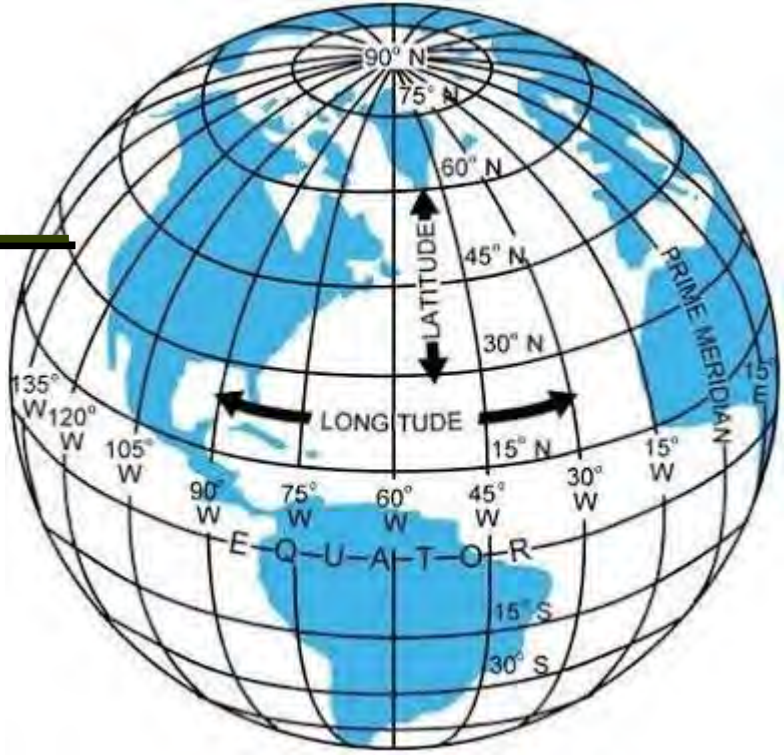
- The earth makes one complete rotation on its axis in 24 hours
- There are 360 longitudes on the glob of earth
- All the meridians are exposed to the sun one by one within one day
- One day =24 hours = 24 X 60 minutes = 1440 minutes
- The time needed to complete the 1degree rotation =1440 / 360 = 4 minutes
- The time needed for 7.5 degree rotation = 7.5 X 4 = 30 minute or half an hour
- The time required for 15 degree rotation = 15 X 4 = 60 minutes (1 hour)
- The earth rotates from west to east, time advances towards the east and recedes towards the west







Longitudes



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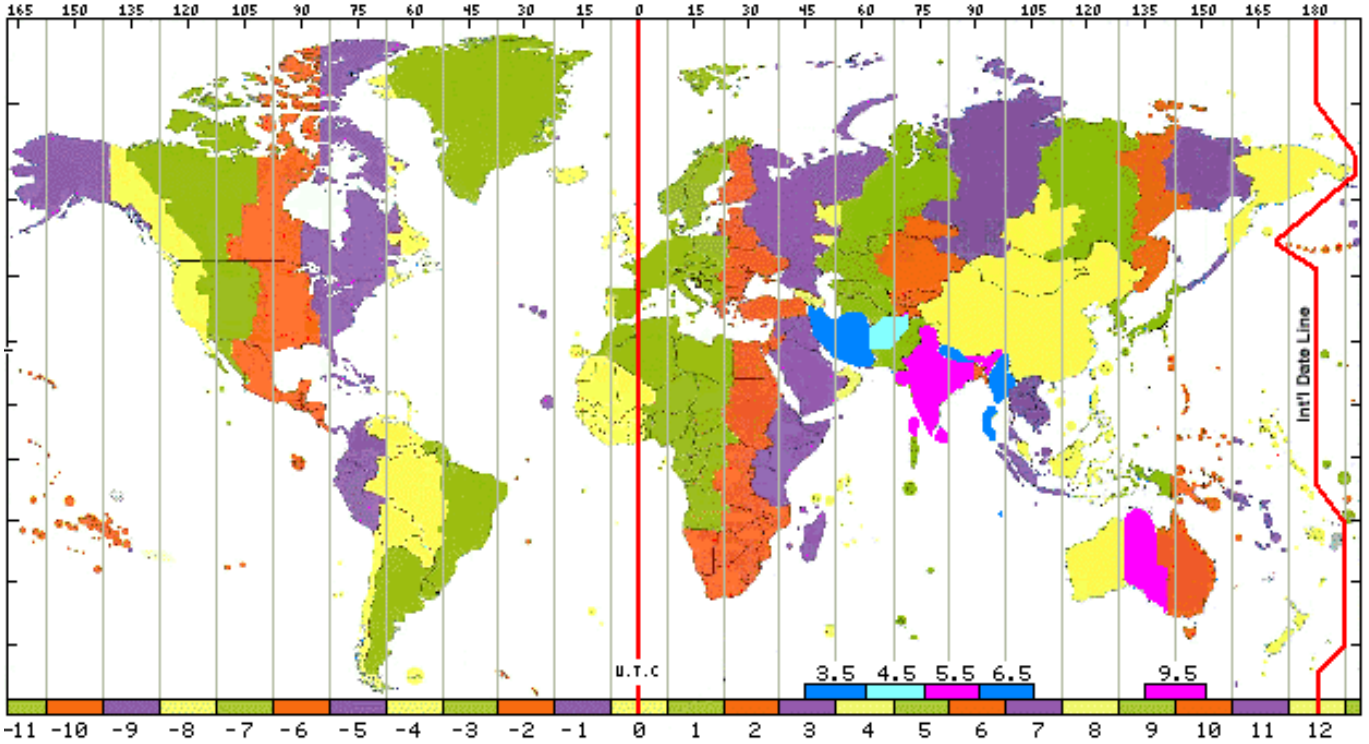
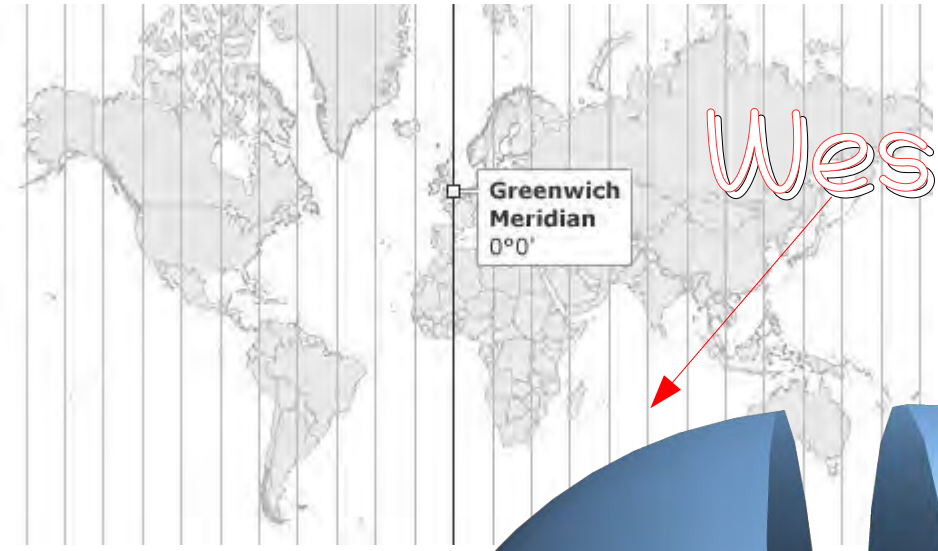
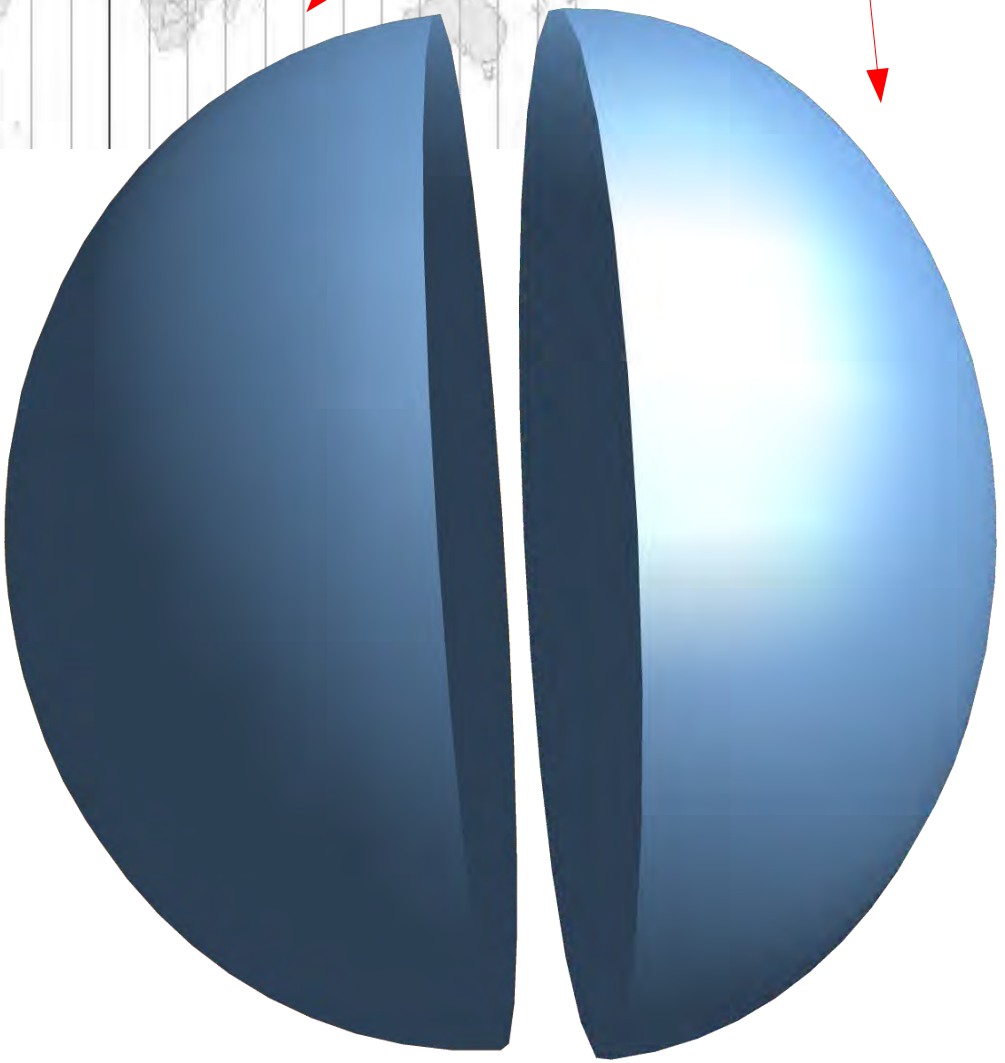
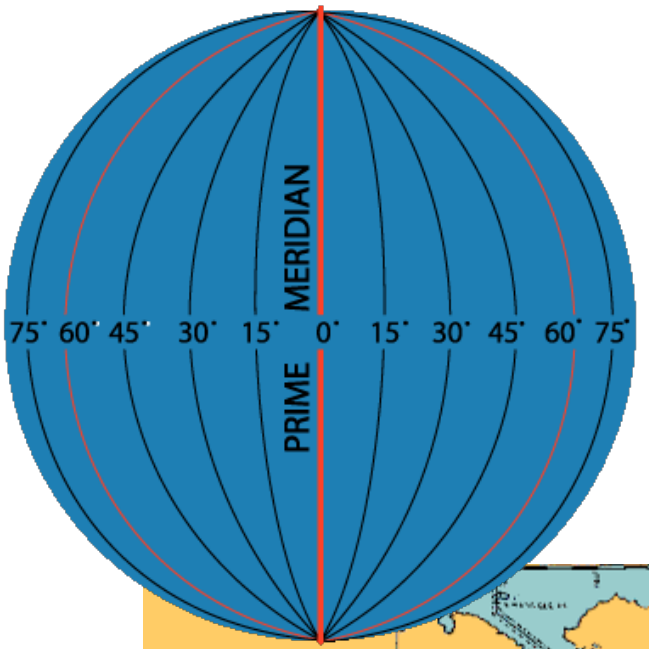
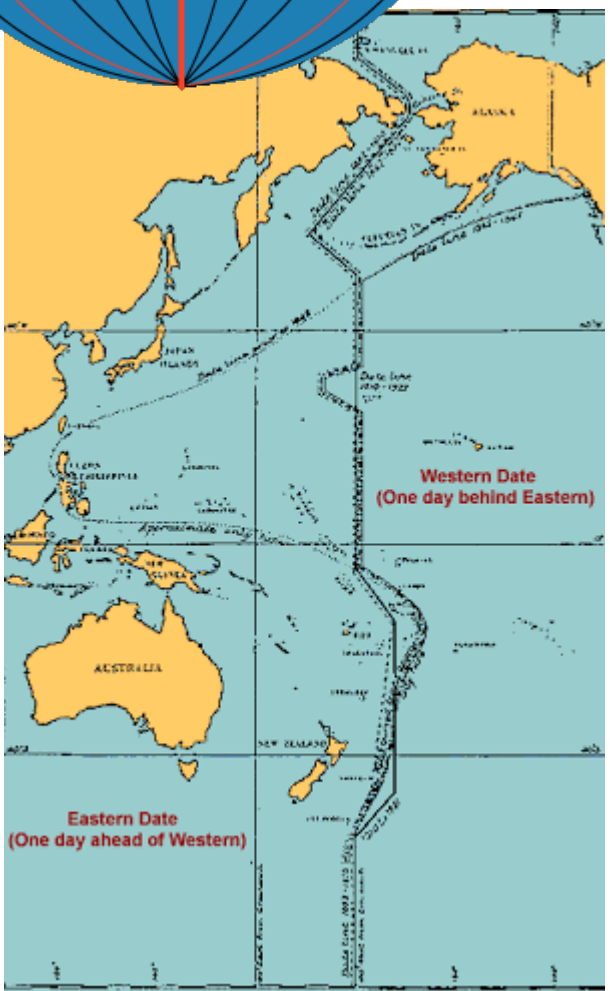




West & East







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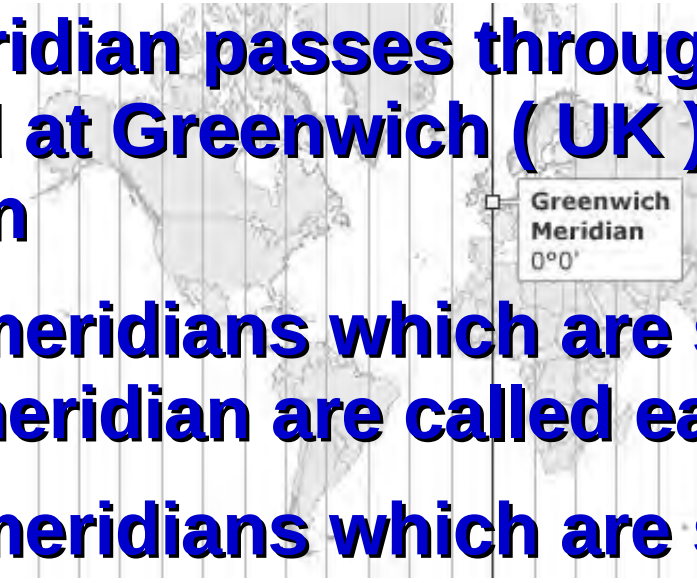
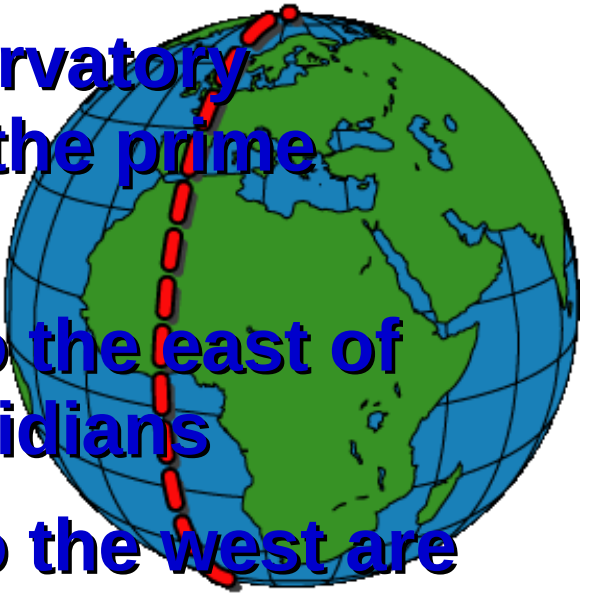
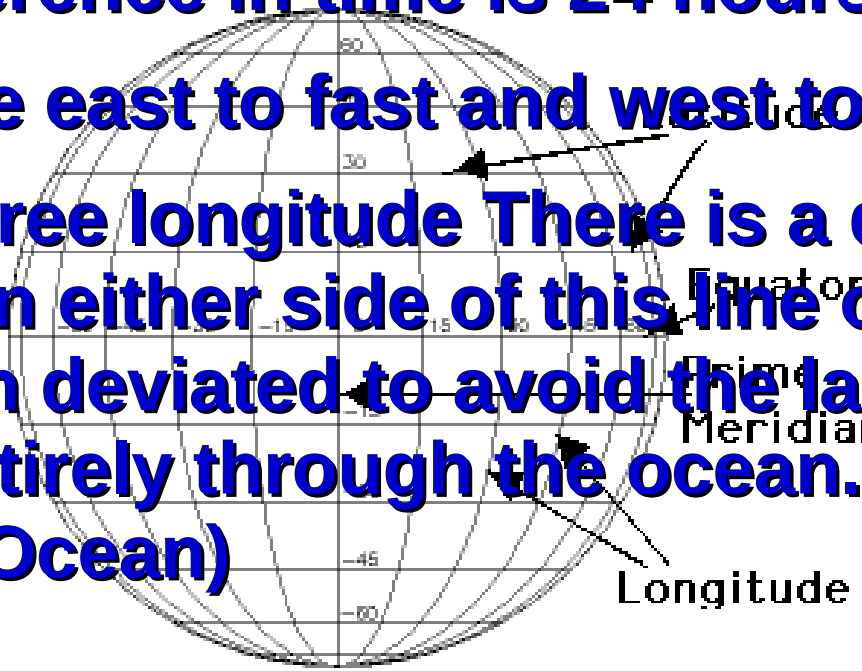
- The meridian passes through an observatory situated at Greenwich (UK) is called the prime meridian
- Those meridians which are situated to the east of prime meridian are called eastern meridians
- Those meridians which are situated to the west are called western meridians
- 180 degree east & west are the same meridians but the difference in time is 24 hours / one full day
- The time east to fast and west to slow
- 180 degree longitude There is a difference of 24 hours on either side of this line of longitude. So it is drawn deviated to avoid the land areas and to pass entirely through the ocean.(Bering Strait and Pacific Ocean)







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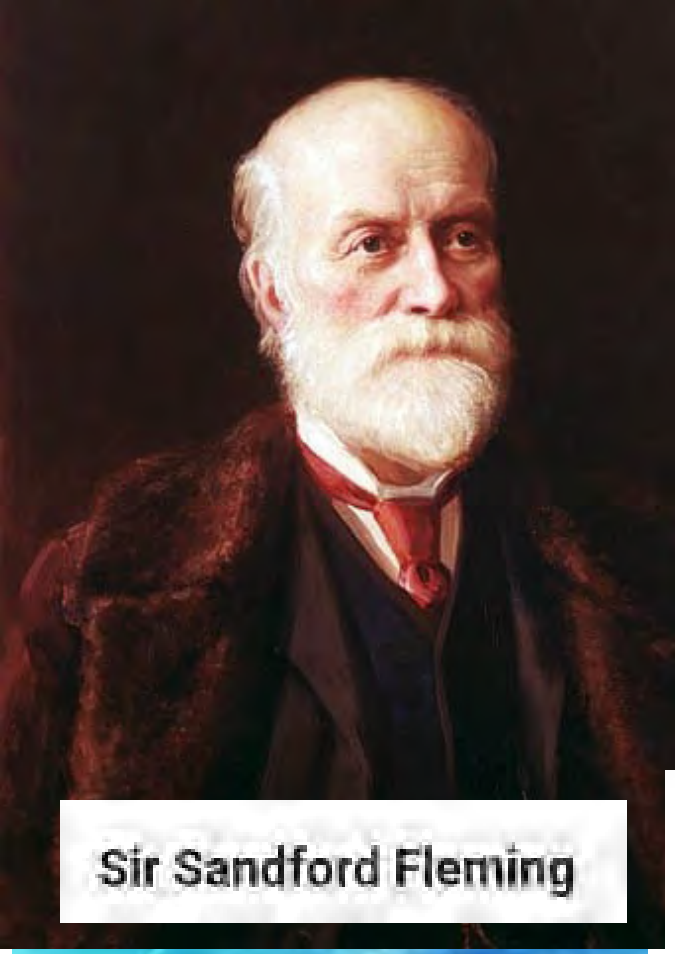
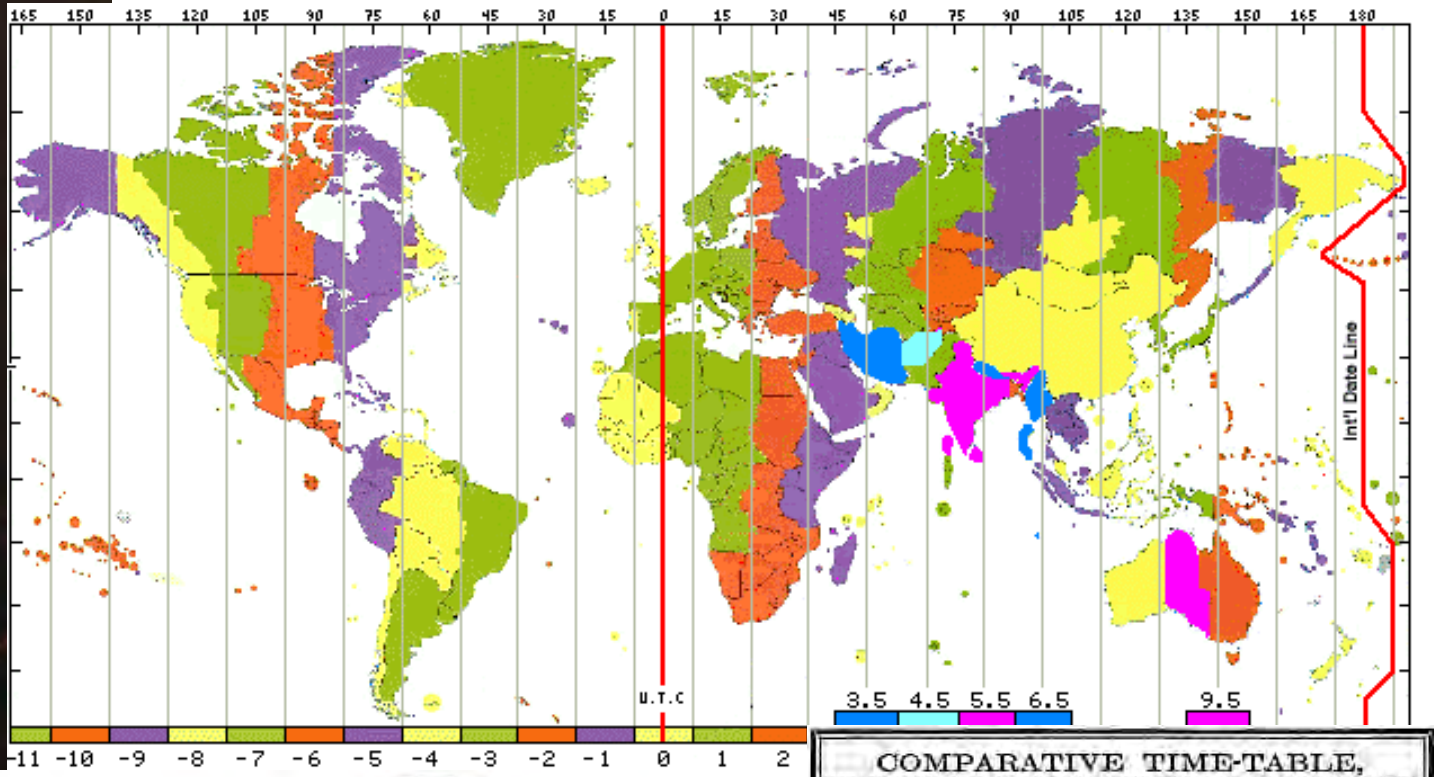


Sir Sandford Fleming



COMPARATIVE TIME-TABLE,

SHOWING THE TIME AT THE PRINCIPAL CITIES OF THE UNITED STATES, COMPARED WITH NOON AT WASHINGTON, D. C.

There is no "Standard Railroad Time" in the United States or Canada; but each railroad company adopts independently the time of its own locality, or of that place at which its principal office is situated. The inconvenience of such a system, if system it can be called, must be apparent to all, but is most annoying to persons strangers to the fact. From this cause many miscalculations and misconnections have arisen, which not unfrequently have been of serious consequence to individuals, and have, as a matter of course, brought into disrepute all Railroad Guides, which of necessity give the local times. In order to relieve, in some degree, this anomaly in American railroading, we present the following table of local time, compared with that of Washington, D. C.

NOON AT WASHINGTON, D. C.		NOON AT WASHINGTON, D. C.		NOON AT WASHINGTON, D. C.	
Albany, N. Y.	12 14 P.M.	Indianapolis, Ind.	11 20 A.M.	Philadelphia, Pa.	12 08 P.M.
Augusta, Ga.	11 41 A.M.	Jackson, Miss.	11 03 "	Pittsburg, Pa.	11 48 A.M.
Augusta, Me.	11 51 "	Jefferson, Mo.	11 00 "	Plattsburg, N. Y.	12 15 P.M.
Baltimore, Md.	12 02 P.M.	Kingston, Can.	12 02 P.M.	Portland, Me.	12 28 "
Beaufort, S. C.	11 47 A.M.	Knoxville, Tenn.	11 33 A.M.	Portsmouth, N. H.	12 25 "
Boston, Mass.	12 24 P.M.	Lancaster, Pa.	12 03 P.M.	Pra. du Chien, Wis.	11 04 A.M.
Bridgeport, Ct.	12 16 "	Lexington, Ky.	11 24 A.M.	Providence, R. I.	12 23 P.M.
Buffalo, N. Y.	11 58 A.M.	Little Rock, Ark.	11 00 "	Quebec, Can.	12 23 "
Burlington, N. J.	12 09 P.M.	Louisville, Ky.	11 26 "	Racine, Wis.	11 18 A.M.
Burlington, Vt.	12 16 "	Lowell, Mass.	12 23 P.M.	Raleigh, N. C.	11 53 "
Canandaigua, N. Y.	11 59 A.M.	Lynchburg, Va.	11 51 A.M.	Richmond, Va.	11 58 "
Charleston, S. C.	11 49 "	Middletown, Ct.	12 18 P.M.	Rochester, N. Y.	11 57 "
Chicago, Ill.	11 16 "	Milledgeville, Ga.	11 35 A.M.	Sackett's Harbor, N.Y.	12 06 P.M.
Cincinnati, O.	11 31 "	Milwaukee, Wis.	11 17 A.M.	St. Anthony Falls,	10 59 A.M.
Columbia, S. C.	11 44 "	Mobile, Ala.	11 16 "	St. Augustine, Fla.	11 42 "
Columbus, O.	11 56 "	Montpelier, Vt.	12 18 P.M.	St. Louis, Mo.	11 07 "
Concord, N. H.	12 23 P.M.	Montreal, Can.	12 14 "	St. Paul, Min.	10 56 "
Dayton, O.	11 32 A.M.	Nashville, Tenn.	11 21 A.M.	Sacramento, Cal.	9 02 "
Detroit, Mich.	11 36 "	Natchez, Miss.	11 03 "	Salem, Mass.	12 26 P.M.
Dover, Del.	12 06 P.M.	Newark, N. J.	12 11 P.M.	Savannah, Ga.	11 44 A.M.
Dover, N. H.	12 37 "	New Bedford, Mass.	12 25 "	Springfield, Mass.	12 16 P.M.
Eastport, Me.	12 41 "	Newburg, N. Y.	12 12 "	Tallahassee, Fla.	11 30 A.M.
Frankfort, Ky.	11 20 A.M.	Newburyport, Mass.	12 28 "	Toronto, Can.	11 51 "
Frederick, Md.	11 59 "	Newcastle, Del.	12 06 "	Trenton, N. J.	12 10 P.M.
Fredericksburg, Va.	11 53 "	New Haven, Conn.	12 17 "	Troy, N. Y.	12 14 "
Fredericton, N. B.	12 42 P.M.	New London, "	12 20 "	Tuscaloosa, Ala.	11 18 A.M.
Galveston, Texas	10 49 A.M.	New Orleans, La.	11 08 A.M.	Utica, N. Y.	12 08 P.M.
Gloucester, Mass.	12 26 P.M.	Newport, R. I.	12 23 P.M.	Vandalia, Ill.	11 18 A.M.
Greenfield, "	12 18 "	New York, N. Y.	12 12 "	Vincennes, Ind.	11 19 "
Hagerstown, Md.	11 56 A.M.	Norfolk, Va.	12 03 "	Wheeling, Va.	11 45 "
Halifax, N. S.	12 54 P.M.	Northampton, Mass.	12 18 "	Wilmington, Del.	12 06 P.M.
Harrisburg, Pa.	12 01 "	Norwich, Ct.	12 20 "	Wilmington, N. C.	11 50 A.M.
Hartford, Ct.	12 13 "	Pensacola, Fla.	11 20 A.M.	Worcester, Mass.	12 21 P.M.
Huntsville, Ala.	11 21 A.M.	Petersburg, Va.	11 59 "	York, Pa.	12 02 "

By an easy calculation, the difference in time between the several places above named may be ascertained. Thus, for instance, the difference of time between New York and Cincinnati may be ascertained by simple comparison, that of the first having the Washington noon at 12 12 P. M., and of the latter at 11 31 A. M.; and hence the difference is 41 minutes, or, in other words, the noon at New York will be 11.17 A. M. at Cincinnati, and the noon at Cincinnati will be 12 43 P. M. at New York. Remember that places West are "slower" in time than those East, and vice versa.

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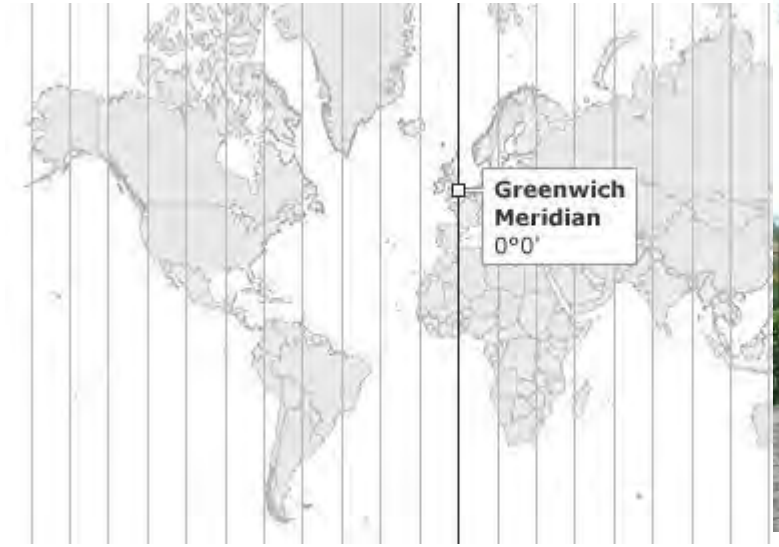
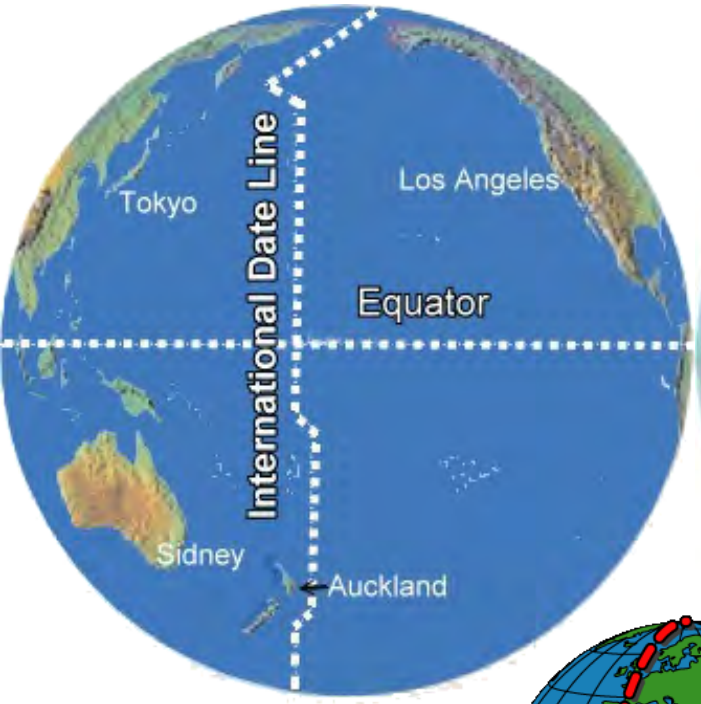
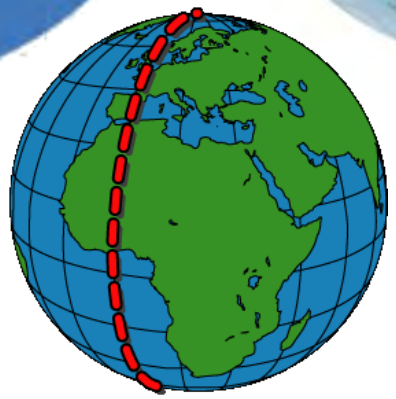
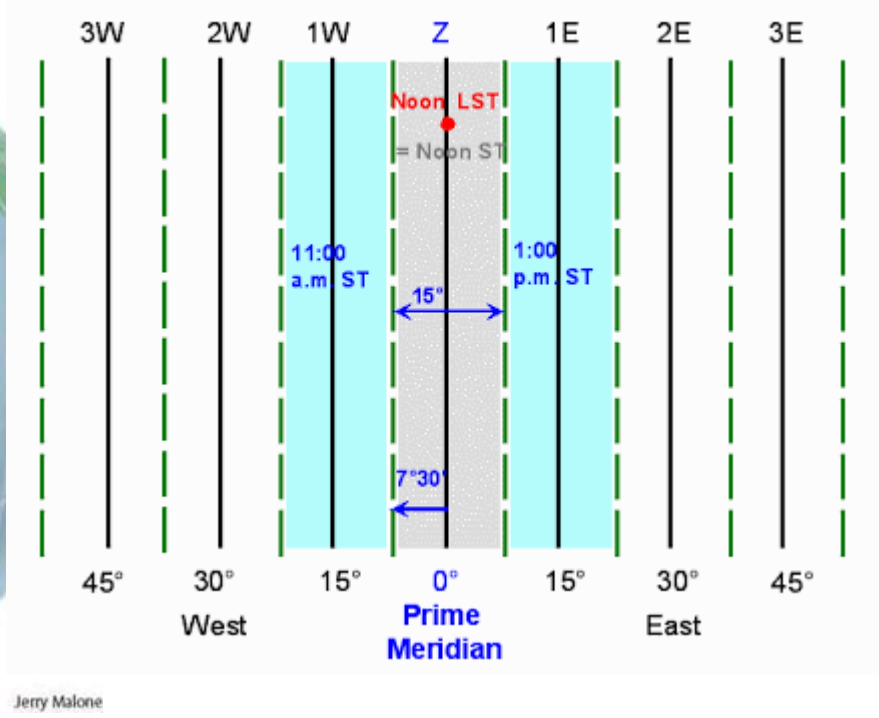

Greenwich
Meridian
0°0'


International Date Line
Tokyo
Los Angeles
Equator
Sidney
Auckland




3W
2W
1W
Z
1E
2E
3E
Noon LST
= Noon ST
11:00
a.m. ST
1:00
p.m. ST
15°
7°30'
45°
30°
15°
0°
15°
30°
45°
West
Prime
Meridian
East
Jerry Malone

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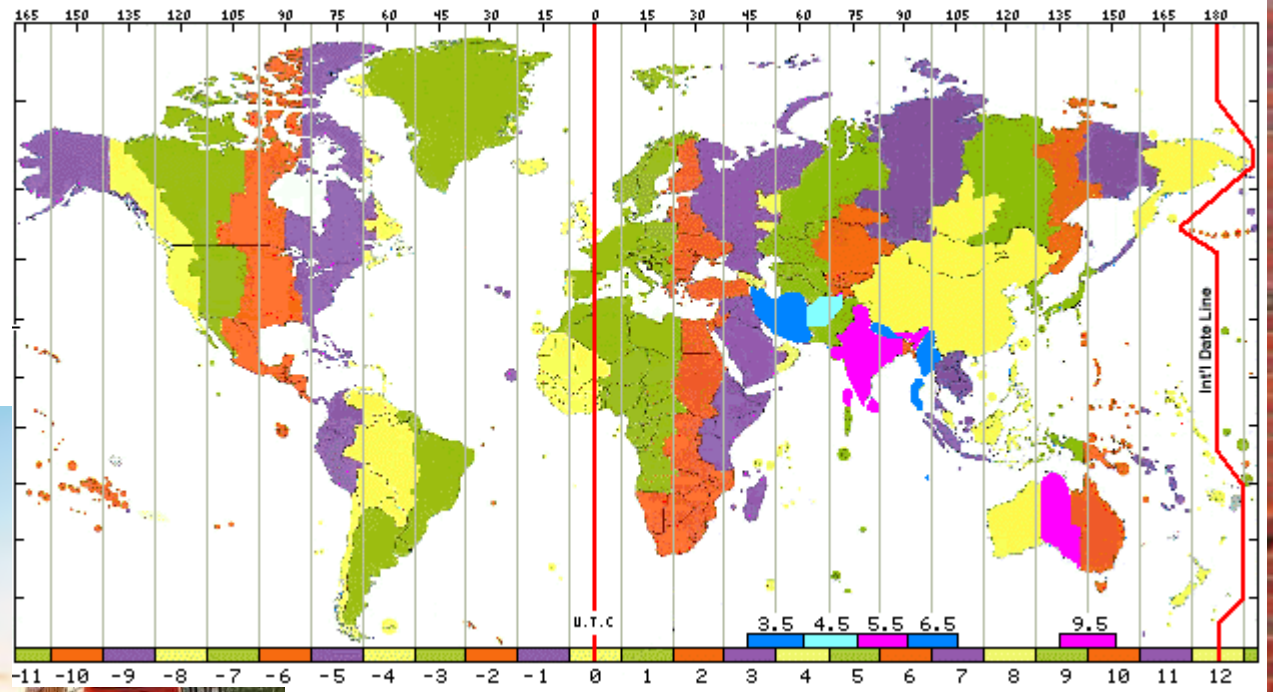
Greenwich time (GMT)

The zero degree longitude is known as the Greenwich meridian. It acquires its name from Greenwich, the place where the Royal British observatory is situated and through which this line passes. Time is calculated worldwide is based on the Greenwich line. Hence this line is also known as the prime meridian. The local time at the prime meridian is known as the Greenwich Mean Time. Based on the Greenwich line, the world is divided into 24 zones, each with a time difference of one hour. These are known as time zones.



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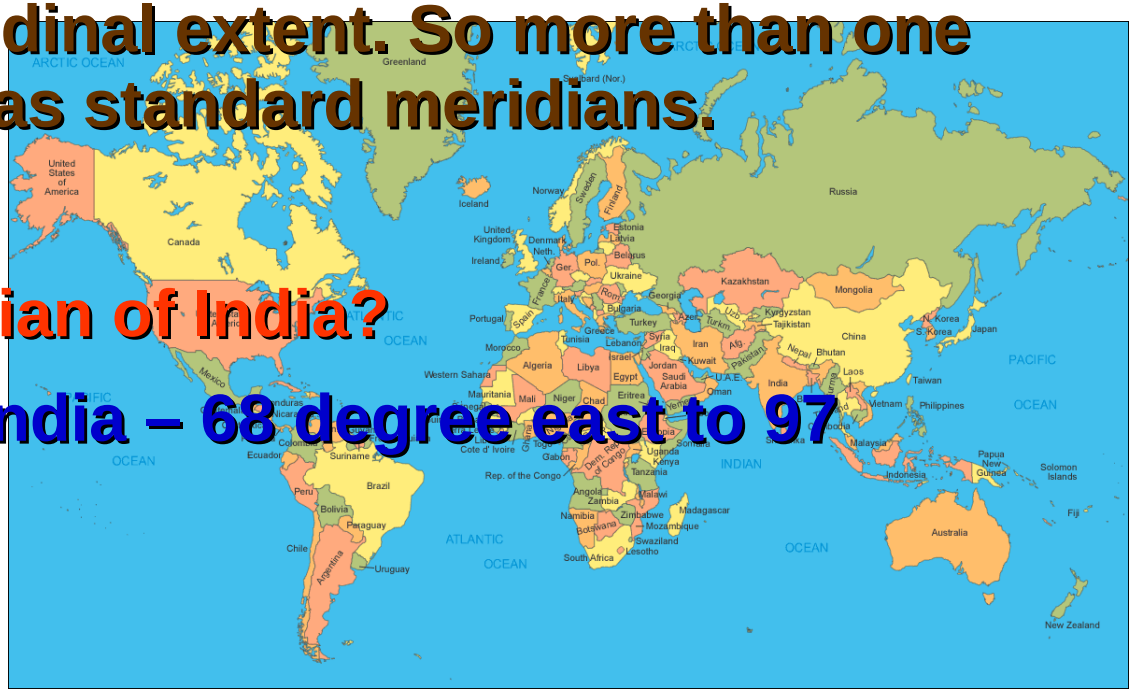
Standard time

- **Every country considers a particular longitude as their standard meridian for determining time. Why?**
- **The local time is different at different longitudes. If the same country follows different time, this may create a lot of confusions and problems. So the longitude passing almost through the middle of the country is considered as the standard meridian.**
- **The local time at this longitude is considered as the Standard Time.**

- **Why do certain countries consider more than one longitude as their standard meridians? Give an example for such a country.**
- **It is not practical to follow only one Standard Time for the countries with wide longitudinal extent. So more than one longitudes are considered as standard meridians.**

  Eg: Russia, China, USA



- **What is the standard meridian of India?**
- **The longitudinal extent of India – 68 degree east to 97 degree east**

  i e 68 + 97= 165

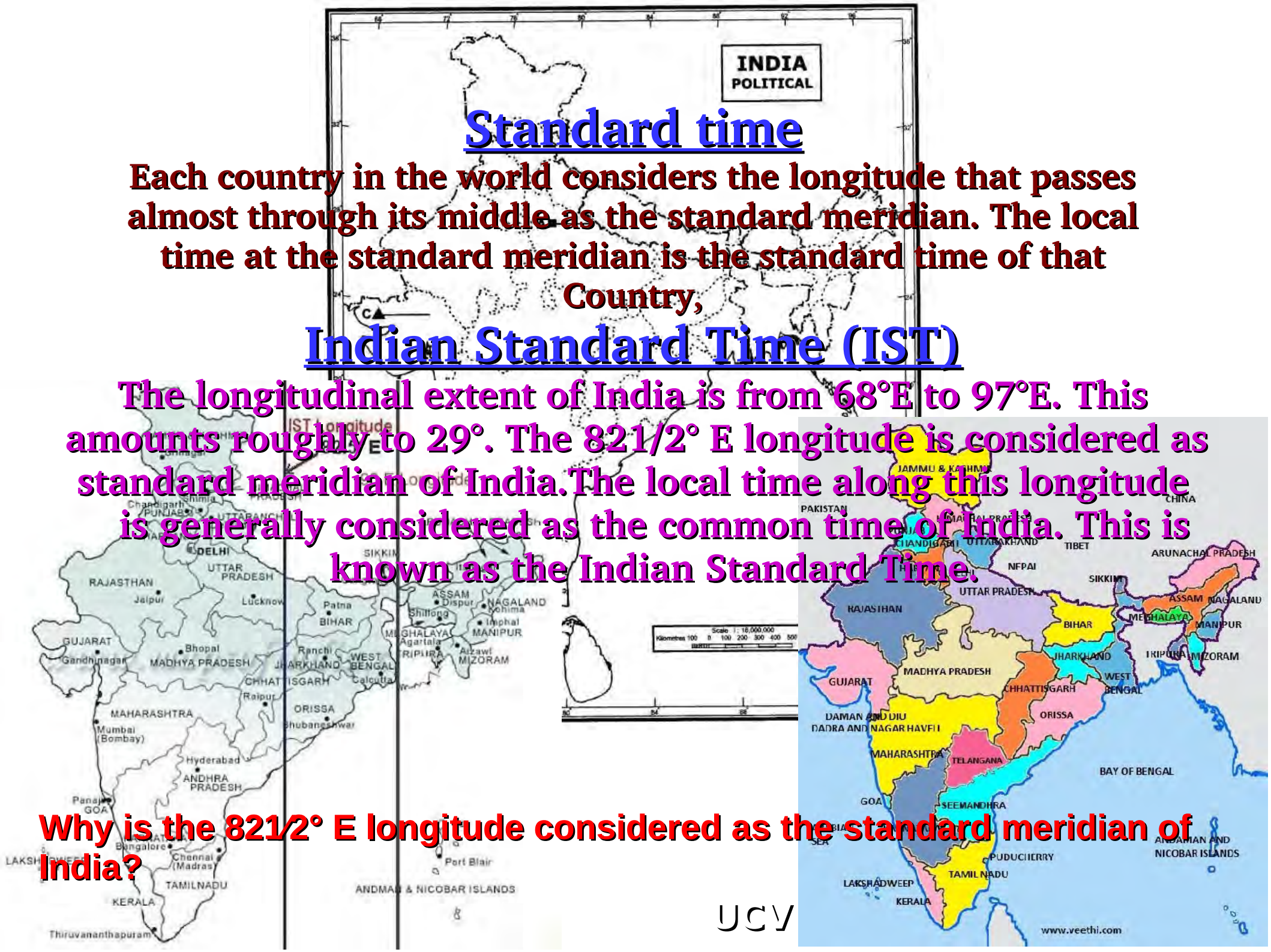
  165 / 2 = 82.5 degree east
- **IST = 82.5 E**
- **82 1⁄2° East longitude passes almost through the middle of the country.**

Standard time

Each country in the world considers the longitude that passes almost through its middle as the standard meridian. The local time at the standard meridian is the standard time of that Country,

Indian Standard Time (IST)

The longitudinal extent of India is from 68°E to 97°E. This amounts roughly to 29°. The 821/2° E longitude is considered as standard meridian of India.The local time along this longitude is generally considered as the common time of India. This is known as the Indian Standard Time.



Why is the 821/2° E longitude considered as the standard meridian of India?

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Rank	Sovereign State	No. of Time Zones
1	France	12
2	United States	11
3	Russia	11
4	Antarctica	10+
5	United Kingdom	9
6	Australia	8
7	Canada	6
8	Kingdom of Denmark	5
9	New Zealand	5
10	Brazil	4
11	Mexico	4
12	Indonesia	3

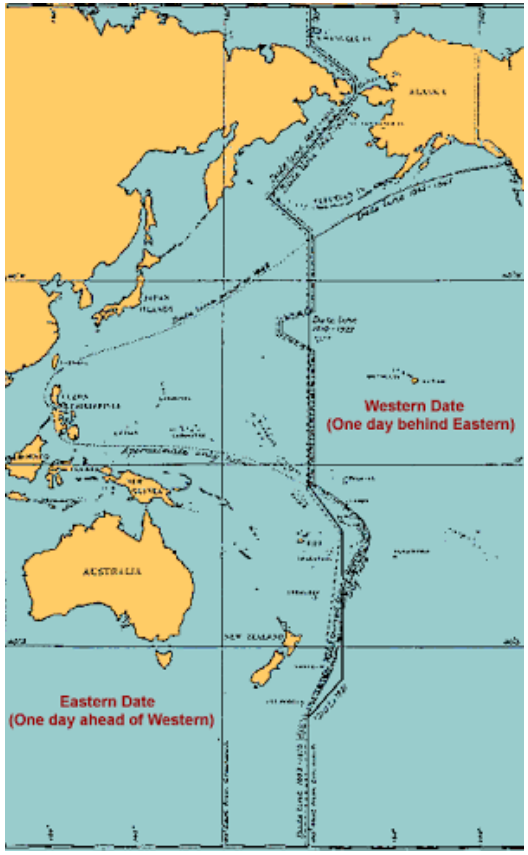
UTC−10:00 — most of French Polynesia
UTC−09:30 — Marquesas Islands
UTC−09:00 — Gambier Islands
UTC−08:00 — Clipperton Island
UTC−04:00 (AST) — Guadeloupe, Martinique, Saint Barthelemy, Saint Martin
UTC−03:00 (PMST) — French Guiana, Saint Pierre and Miquelon
UTC+01:00 (CET) — Metropolitan France
UTC+03:00 — Mayotte
UTC+04:00 — Réunion
UTC+05:00 — Kerguelen Islands, Crozet Islands
UTC+11:00 — New Caledonia
UTC+12:00 — Wallis and Futuna

UCV

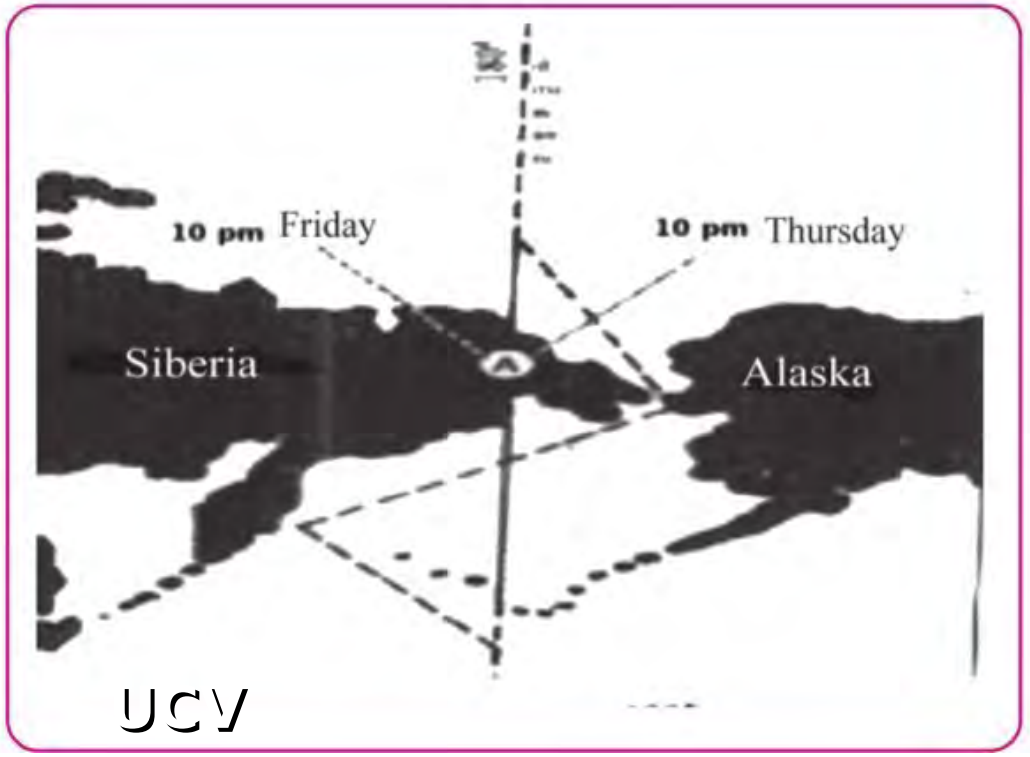
you see

International Date Line

Think of the difficulties if the same place records two different times with 24 hours difference. To solve this problem, adjustments have been made avoiding the land areas along the 180° longitude. Note the longitude marked with broken lines. The line is so arranged as to avoid some of the islands to the south of the Bering Strait in the Pacific Ocean. The travellers who cross this line from the east calculate time by advancing one day and those who cross the line from the west deduct one day. This imaginary line is known as the International Date Line.



Note the International Date Line marked on the globe. Identify the continents situated to the east and the west of this line. The travellers to which of these continents will gain one day on crossing the International Date Line?



Greenwich

82.5° E?

Longitude

180° 165° 150° 135° 120° 105° 90° 75° 60° 45° 30° 15°

WEST

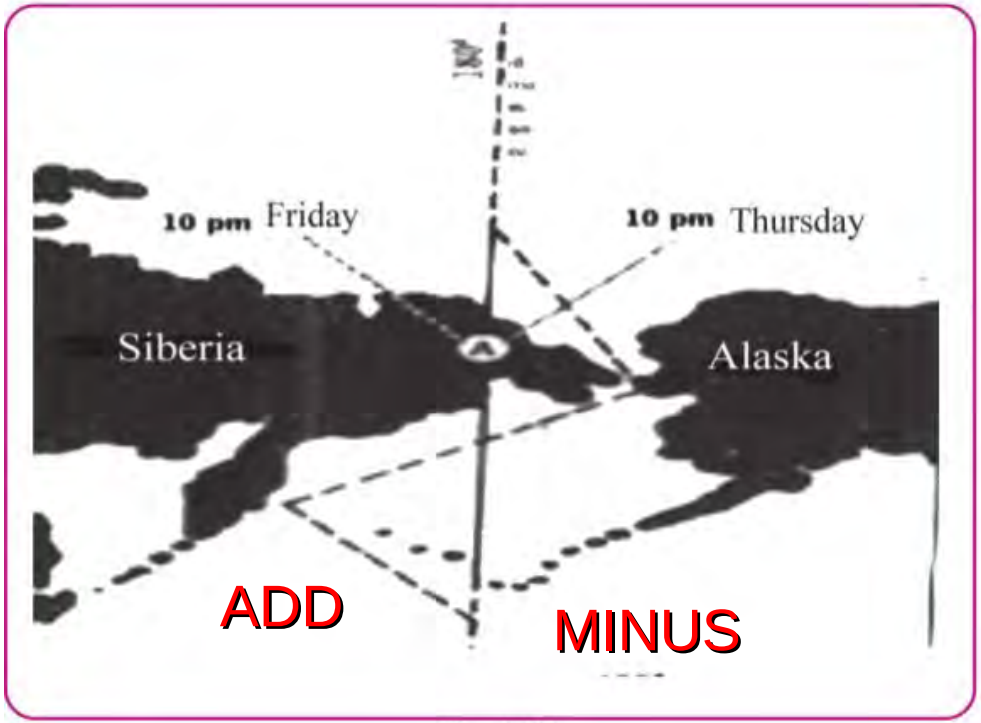
MINUS

0°

15° 30° 45° 60° 75° 90° 105° 120° 135° 150° 165° 180°

EAST

ADD



Answer the following questions based on IDL

(i) what is IDL?

(ii) Explain the peculiarity of the IDL with reason?

(iii) Estimate the time at IDL when GMT is 12 noon?

(i) the 180th meridian (longitude) is International Date Line. 180° longitude to the east and west of Greenwich

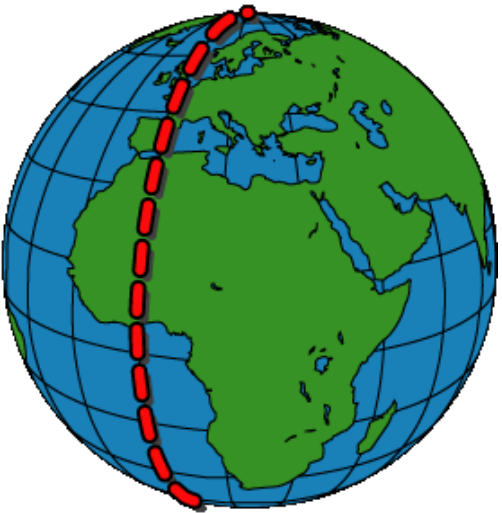
(ii) To avoid 24 hours difference adjustments have been made avoiding the land areas along the 180° longitude. It passes only through ocean (the Bering Strait in the Pacific Ocean.).The line is fluctuated.

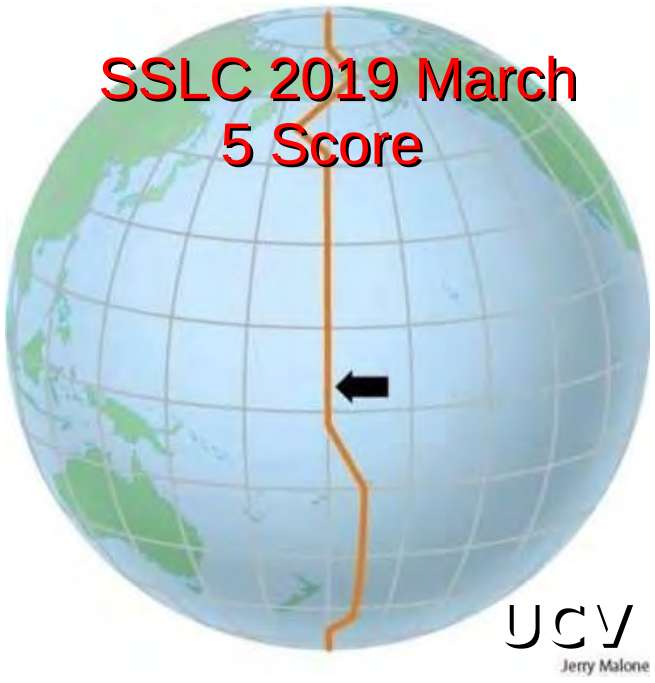
Travellers gain or loss a day on crossing this line.

(iii) Midnight 12 (180° E Next day , 180° W same day)There ends a day and begins another day

SSLC 2019 March

5 Score

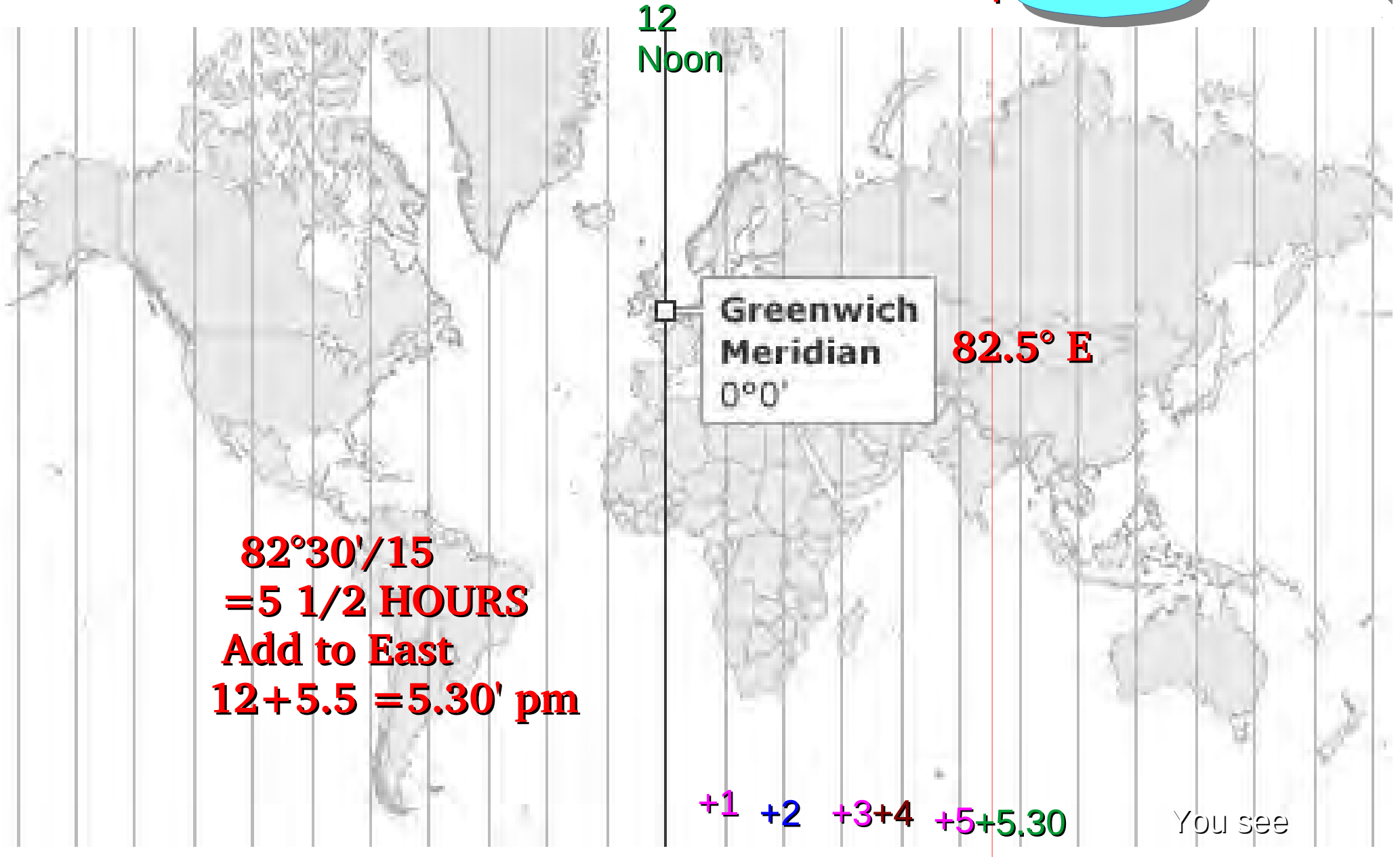




Let's calculate time

1°=4'
7.5°=30'
15°=60'/1hr

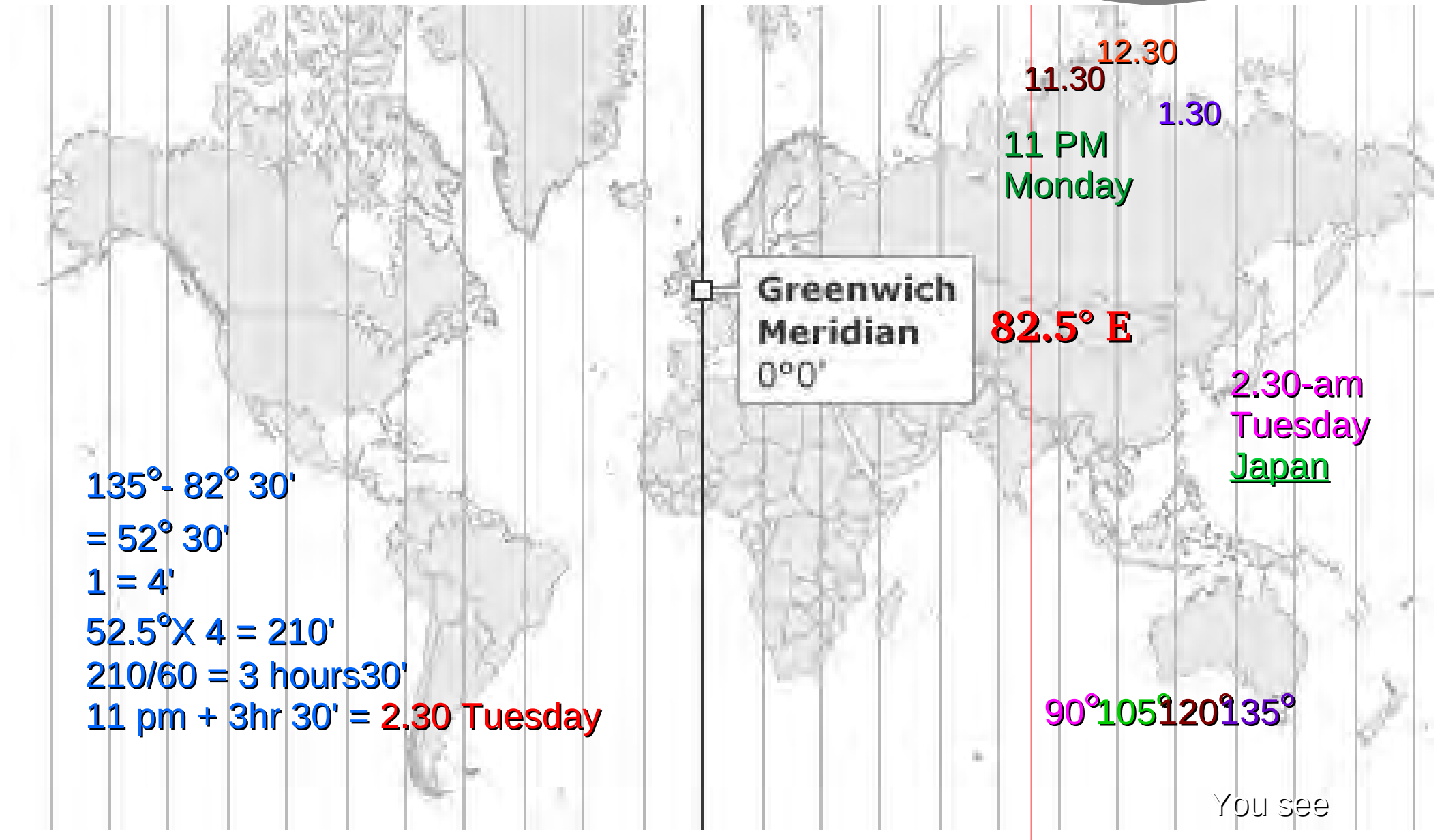
?



Let's calculate time

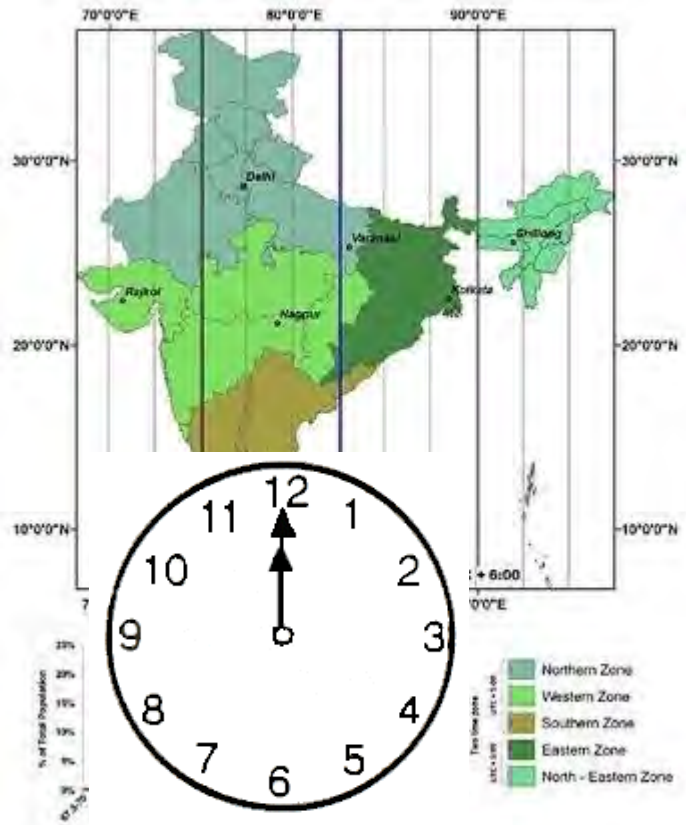
1°=4'
7.5°=30'
15°=60'/1hr

?



135°- 82° 30'
= 52° 30'
1 = 4'
52.5°X 4 = 210'
210/60 = 3 hours30'
11 pm + 3hr 30' = 2.30 Tuesday

You see


70°0'0"E
80°0'0"E
90°0'0"E
30°0'0"N
20°0'0"N
10°0'0"N
Delhi
Varanasi
Shillong
Kolkata
Raipur
Nagpur
+ 6:00
Northern Zone
Western Zone
Southern Zone
Eastern Zone
North - Eastern Zone


IST Longitude
82.5° E
JAMMU & KASHMIR
Srinagar
HIMACHAL PRADESH
Shimla
PUNJAB
UTTARANCHAL
Dehradun
HARYANA
DELHI
ARUNACHAL PRADESH
SIKKIM
UTTAR PRADESH
RAJASTHAN
Jaipur
Lucknow
Patna
BIHAR
ASSAM
Dispur
NAGALAND
MEGHALAYA
TRIPURA
MANIPUR
MIZORAM
GUJARAT
Gandhinagar
Bhopal
MADHYA PRADESH
Ranchi
JHARKHAND
WEST BENGAL
Kolkata
CHHATTISGARH
Raipur
ORISSA
MAHARASHTRA
Mumbai (Bombay)
Hyderabad
ANDHRA PRADESH
Panaji
GOA
KARNATAKA
Bengaluru
Chennai (Madras)
LAKSHADWEEP
TAMILNADU
KERALA
Port Blair
ANDMAN & NICOBAR ISLANDS


murshidabad.net
murshidabad.net
murshidabad.net
murshidabad.net


WORLD STANDARD TIME ZONES
ARCTIC OCEAN
Greenland Sea
Barents Sea
Kara Sea
Laptev Sea
East Siberian Sea
Beaufort Sea
Baffin Bay
Norwegian Sea
Hudson Bay
North Sea
Sea of Okhotsk
Bering Sea
NORTH PACIFIC OCEAN
NORTH ATLANTIC OCEAN
Black Sea
Caspian Sea
Mediterranean Sea
Sea of Japan
Gulf of Mexico
Caribbean Sea
Red Sea
Arabian Sea
Bay of Bengal
South China Sea
Philippine Sea
SOUTH PACIFIC OCEAN
SOUTH ATLANTIC OCEAN
Gulf of Guinea
INDIAN OCEAN
Coral Sea
Great Australian Bight
Tasman Sea
0 1000 2000 3000 Km
0 1000 2000 Miles
Copyright © 2013 www.mapsofworld.com
(Updated on 26th February, 2013)
Sun 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 Sun

5.5 hour

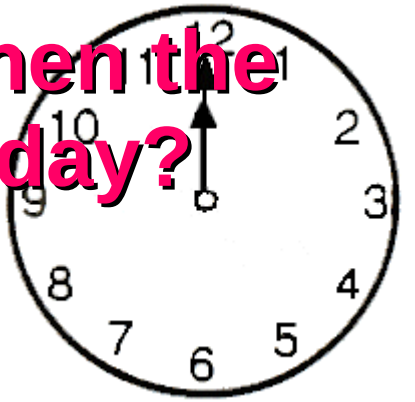
UCV

- **Solar day** is that period of day & night which is based upon local time
- **The difference between the IST and GMT**

  Standard meridian of India = 82.5 degree E

  time difference is = 82.5° X 4minute = 330 minutes

  ie 330' / 60 = 5.5 hour
- **What will be the time at Payyoli (kozhikode) when it is noon at London (England) ?**
- **What is the Greenwich Mean Time when the Indian Standard time is 2 pm on Monday?**



12

1 2

3

4

5

5.1/2 pm

Which longitude ?

B
11.30 am
Sunday

A
3.30 am

Greenwich Meridian
0°0'

Payyoli

8.30 am

10.30

9.30

11.30

1.30

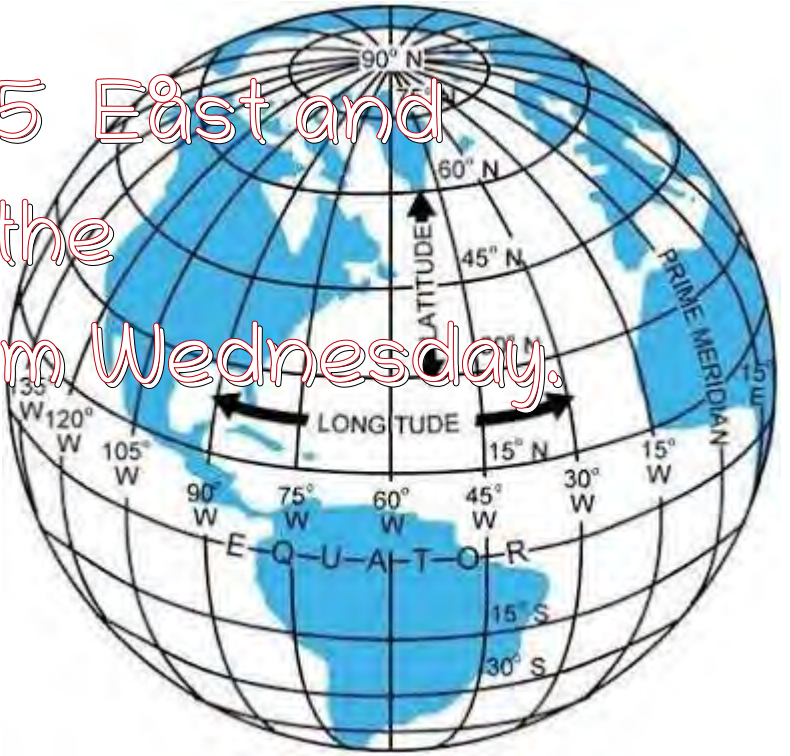
12.30

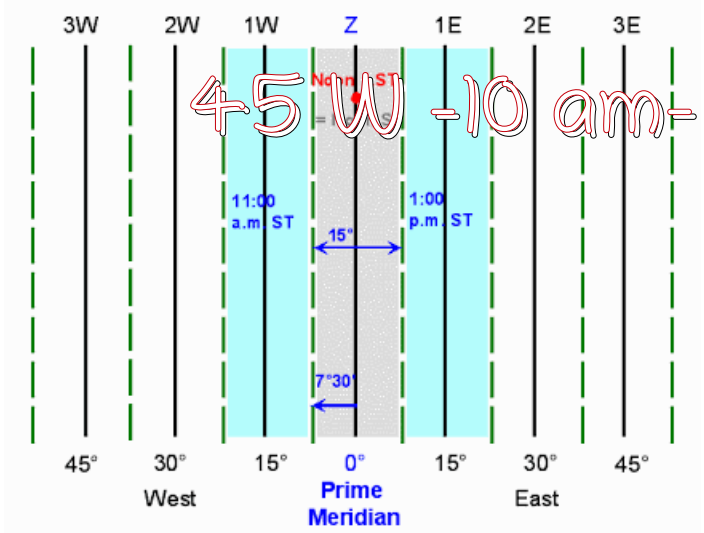
2 pm
Monday

Let's calculate time

- Determine the local time at 45 East and at 45 °West longitude when the Greenwich Mean Time is 10 am Wednesday.
- 45 E - 45/15 = 3hrs

  10 am + 3hrs = 1pm,wed





45 W -10 am- 3hrs= 7 am,wed

you see

UCV

TIME CALCULATION CHART					
TOWARDS WEST			TOWARDS EAST		
Longitude	Day	Time	Longitude	Day	Time

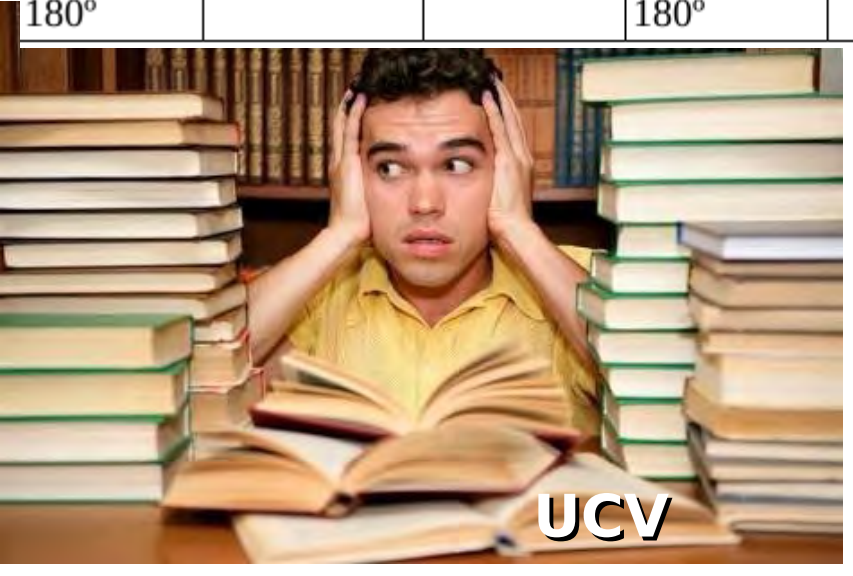
സമയനിർണയ ചാർട്ട്

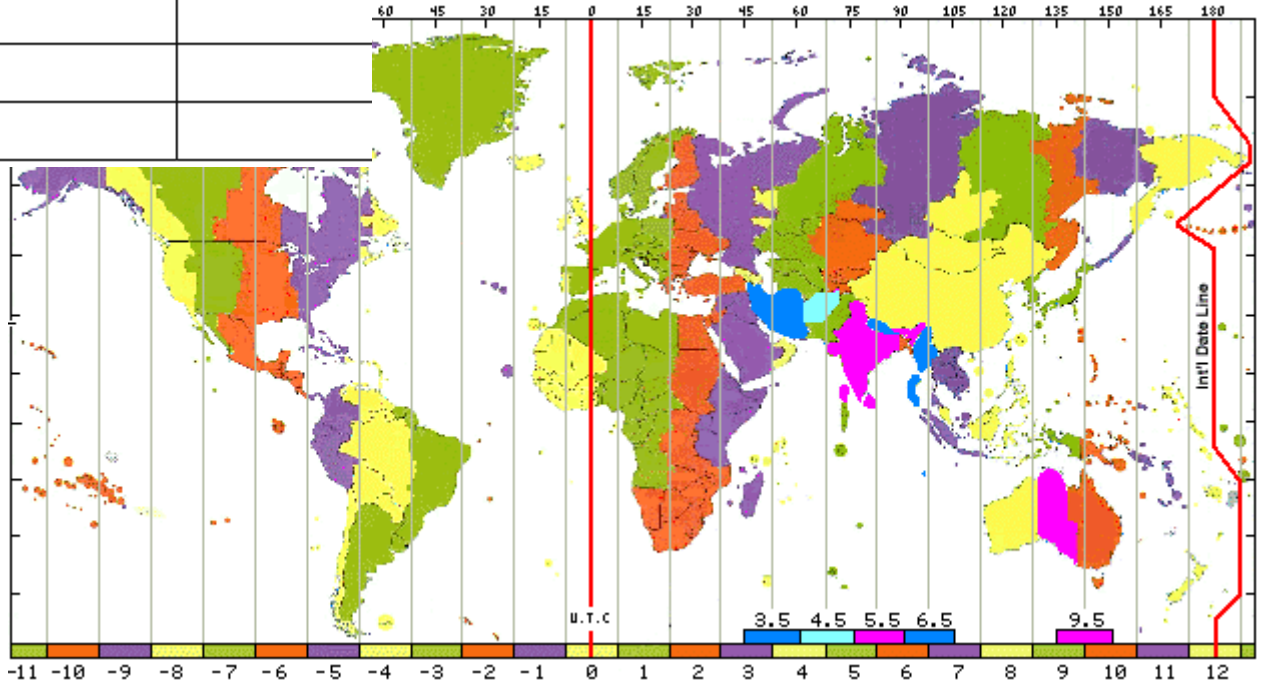
പടിഞ്ഞാറോട്ട്			കിഴക്കോട്ട്		
രേഖാംശം	ദിവസം	സമയം	രേഖാംശം	ദിവസം	സമയം
0°			0°		
15°			15°		
30°			30°		
45°			45°		
60°			60°		
75°			75°		
90°			90°		
105°			105°		
120°			120°		
135°			135°		
150°			150°		
165°			165°		
180°			180°		

Complete the following table

World Time Calculation

1.	The time required for the earth to complete one rotation • In Hours, • In Minutes,	
2.	What is angular distance of the earth when it completes one rotation	
3.	The time required for the earth to turn one degree is;	
4.	What is the change in time when we move towards west or east from a degree of longitude?	
5.	1. Is there any particular longitude based on which the time is calculated worldwide? 2. If yes, Name the longitude 3. By what name this longitude is known when it is used to calculate the time worldwide?	
6.	What is meant by the standard meridian?	
7.	Which is the standard meridian of india	
8.	What is the time difference between Indian Standard Time and Greenwich Mean Time?	
9.	The International Date Line is not a straight line Why	





- Example 1- it i 10 PM on June 21 Monday at 70degree E. What Will Be The Time AT 170 Degree E?

- **The time on June 21 Monday = 10 pm**

  the longitude at this place = 70 E

  the longitude at other place = 170 E

  The difference of the latitude = 170 – 70= 100

  The difference of time between the two places =100X4 = 400minutes(hour- 400/60=6hr 40mt

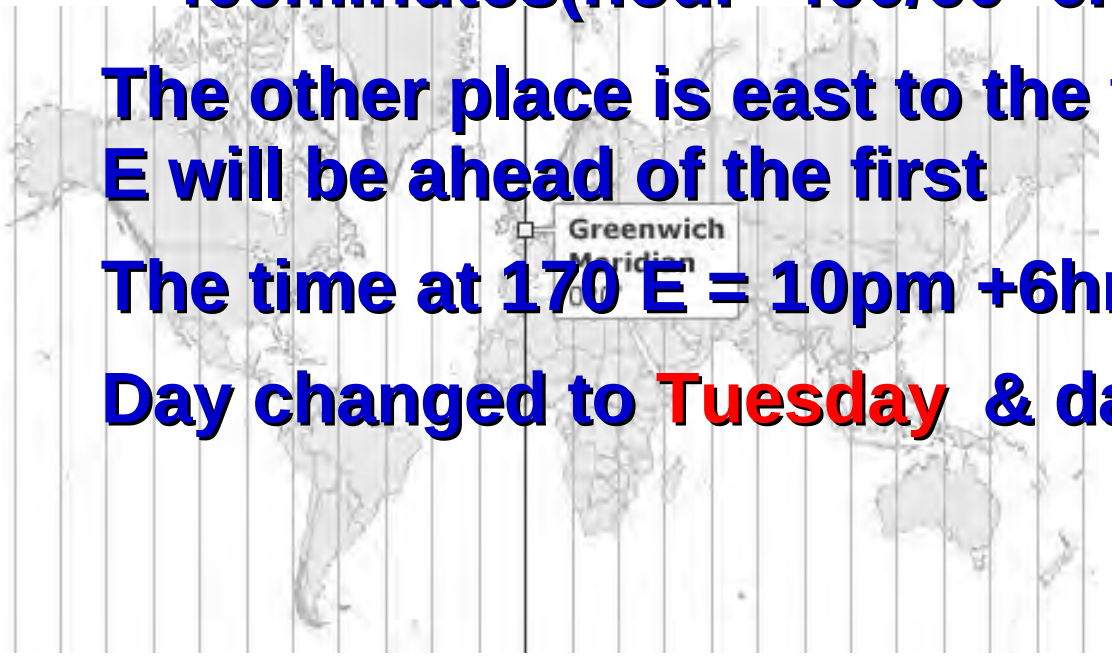
  The other place is east to the first place. The time at 170 E will be ahead of the first

  The time at 170 E = 10pm +6hrs40 mts= 4.40 AM

  Day changed to Tuesday & date June 22

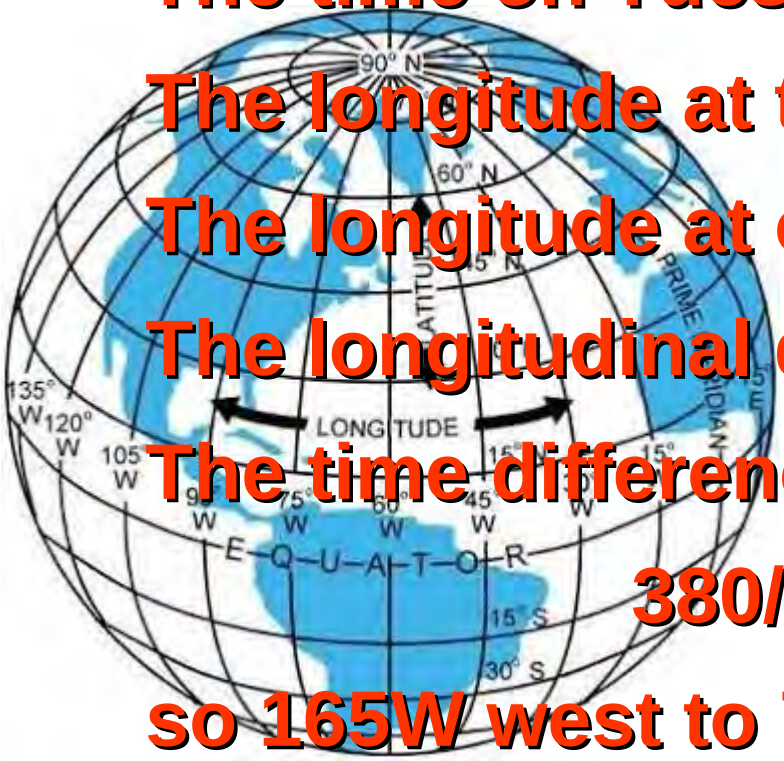
TIME CALCULATION CHART

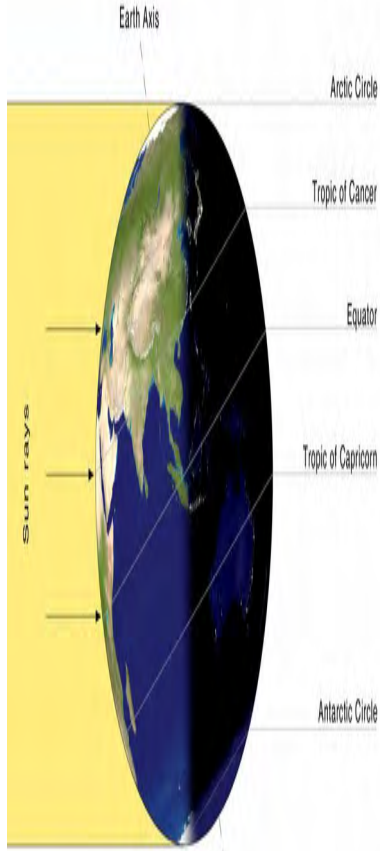
TOWARDS WEST			TOWARDS EAST		
Longitude	Day	Time	Longitude	Day	Time
0°			0°		
			15°		
30°			30°		
			45°		
60°			60°		
			75°		
90°			90°		
			120°		
135°			135°		
165°			165°		
60°			60°		



you see

- It is 4 Am at 70 degree W on Tuesday. What will <u>be the time and day on 165 W</u>
- **The time on Tuesday = 4 Am**





The longitude at the place = 70 W

The longitude at other place = 165 W

The longitudinal difference = 165 – 70= 95

The time difference = 95X4=380

380/ 60= 6hrs 20 mts

so 165W west to 70 W= (subtract) 4AM-6.20

= 9.40 PM The day is one day before

Wednesday

you see

2017 March

Distinguish between summer solstice and winter solstice 3- core

Arrange the seasons in the order of their occurrence. Describe the changes in apparent position of the sun during these seasons -5-score

Ans; winter, spring, summer, autumn

During winter (Dec 22 to Mar 21) from tropic of Capricorn to equator

.....

2018 March

What do you mean by parallelism of axis? How does it causes seasons?

The earth is tilted at an angle of 66½° from the orbital plane. If measured from the vertical plane this would be 23½°. The earth maintains this tilt throughout its revolution. This is known as the parallelism of the earth's axis. The position of the sun in relation to the earth varies (the apparent movement of the sun) The apparent movement of the sun due to the inclination of axis is the reason for the occurrence of seasons.

Score 3

What i local time? Estimate the time at the following longitude assuming the Greenwich mean time as 10 am.

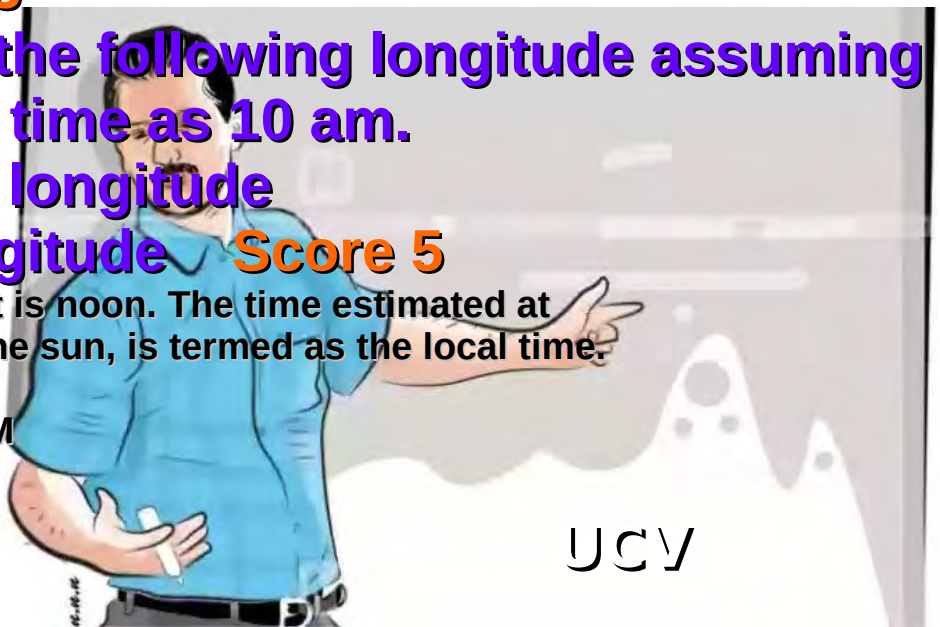
i) 45 degree East longitude

ii) 30 degree West longitude **Score 5**

a) When the sun is vertically overhead, it is noon. The time estimated at each place, based on the apex position of the sun, is termed as the local time.

i) 1 PM

ii) 8 AM



Let us assess

- **Identify the factor responsible for the occurrence of seasons from among the following:**

a. Revolution of the earth

b. Tilt of the earth's axis

c. Parallelism of the earth's axis

d. All the above

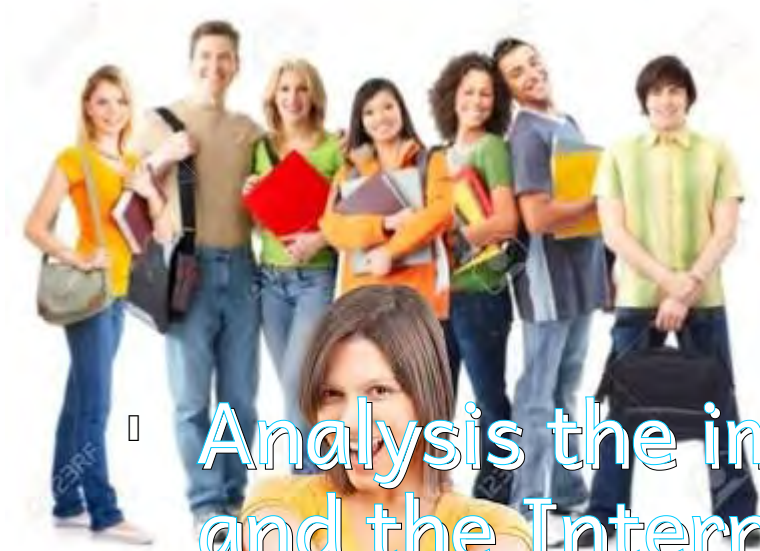
- **The sun's rays fall vertically between Tropic of Cance and Tropic of Capricorn Why?**
- **Highlight the importance of March 21, June 21, Septe 23, and December 22.**
- **Why is the International Date Line not straight unlik other longitudes?**
- **Why is there an eastward increase and westward decrease in time?**

Extended activities

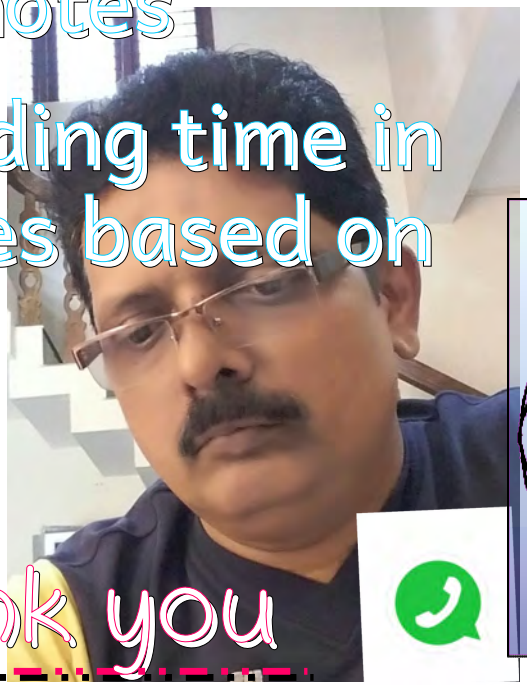
Record your observations on the changes in nature in different seasons and prepare a weather observation diary

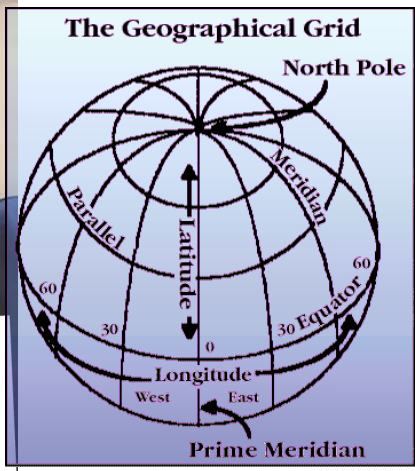
LOS:

- Analysis the factors behind the occurrence of seasons and prepare notes
- Explains the various seasons as well as the environmental and atmospheric changes in each season
- Explains the equinoxes, solstices and the differences in the length of day and night on these days
- Explains the rotation and its effects



- Analysis the importance of Greenwich line and the International Date Line in time calculation and prepare notes
- Calculates the corresponding time in INDIA and other countries based on Greenwich line





Thank you

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