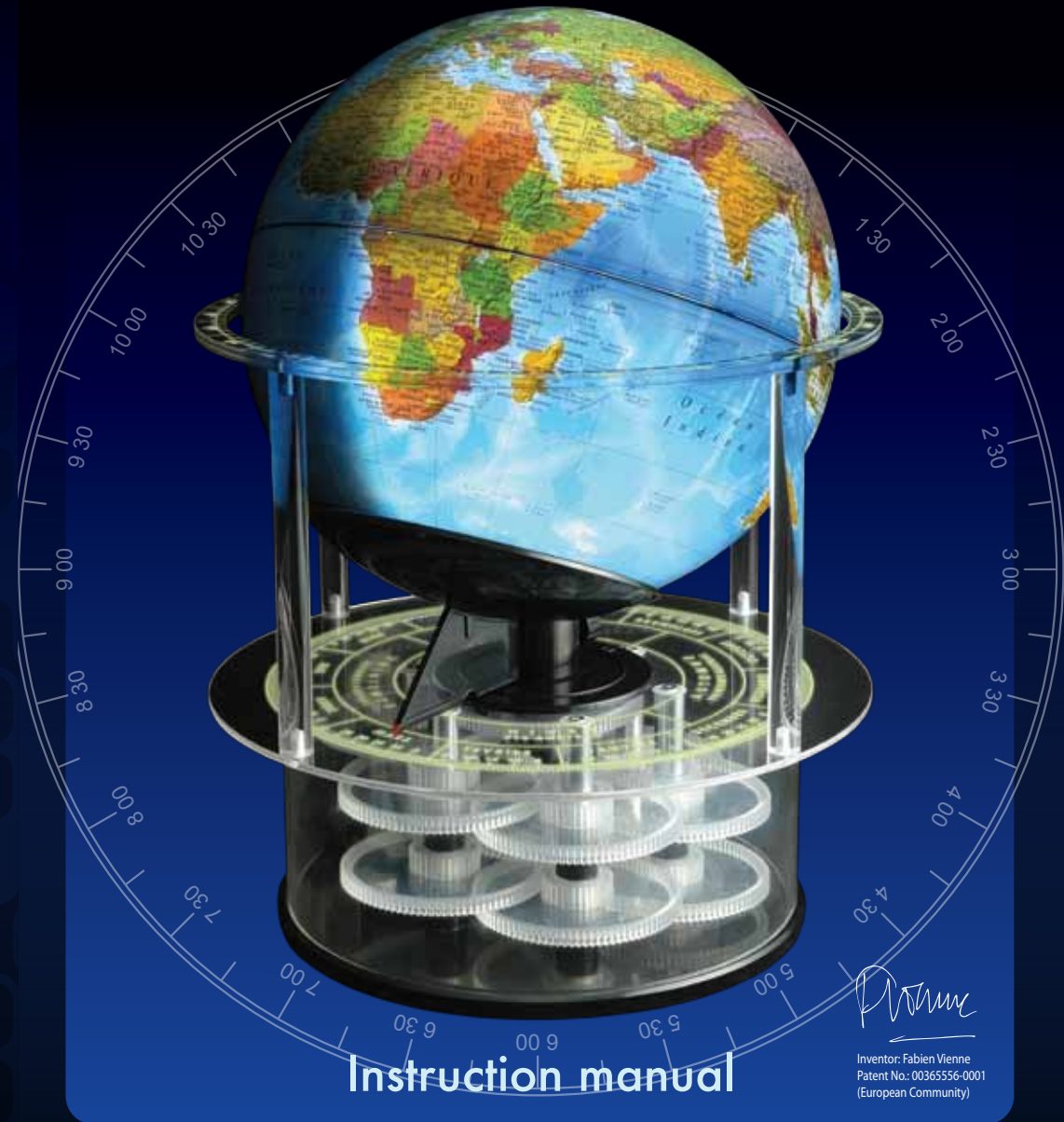
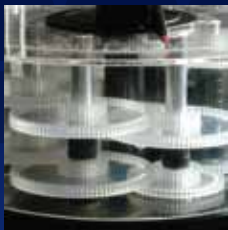


Night'n Day®

The Real Solar Time Rotating Globe



Instruction manual

Fabien Vienne

Inventor: Fabien Vienne
Patent No.: 00365556-0001
(European Community)



We hope you enjoy your **Night'n Day®**.

This is a model of the Earth that accurately shows its orientation in space with respect to the Sun at any time of day or year. Whether you live in Paris or Cape Town, **Night'n Day®** shows the way the Earth would look from space as it orbits the Sun and turns on its axis.

A precise gear and motor system turns the globe at the same rate that the real Earth turns. It also reproduces how the northern and southern hemispheres go through seasonal change.

Night'n Day® is a clock and calendar that shows the time of day and date for any location on Earth. It also demonstrates which parts of the Earth are in daylight. As the globe turns you can see where people on Earth are experiencing sunrise, sunset and twilight times.

In summer and winter, the globe shows how much the hemisphere you live in is tipped toward or away from the Sun. See for yourself how polar regions experience 24-hour day and night in different seasons.

Living on the surface of the Earth doesn't convey the interesting and complex motions that our planet undergoes. With **Night'n Day®** you can in your imagination step off the Earth and see it from space.

WARNING!

If the power cord is damaged it must be replaced by an authorized service agent. This product is not a toy, and is not intended for children under 14 years of age. Adult supervision of children is required when using/observing the globe. If the globe is disassembled follow the assembly directions in the manual in reverse order. The LED lamp and holder become hot – do not touch until they cool off. Disconnect the power cord during assembly, cleaning and any time the globe hemispheres are separated. Clean the globe's surface with a soft damp cloth. Do not put the product, or its parts into water. The gear and motor case should not be taken apart. When handling or moving the product, treat it gently.

C/UL compliance



IP40

WARNING!

The LED lamp and holder become hot during operation – do not touch until they cool off.



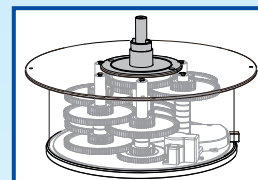
The LED lamp is a high-intensity light source – avoid looking directly at it as this may cause eye discomfort. Switch the LED lamp off when the hemispheres are separated.



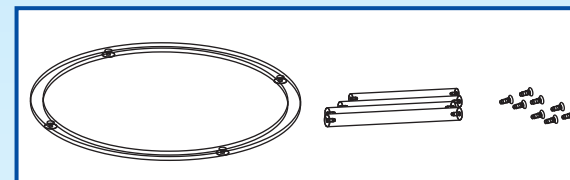
CAUTION - ELECTRICALLY OPERATED PRODUCT

Not recommended for children under 14 years of age. As with all electric products, precautions should be observed during handling and use to prevent electric shock.

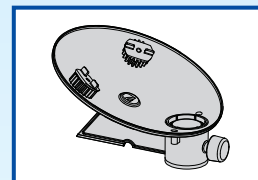
COMPONENTS:



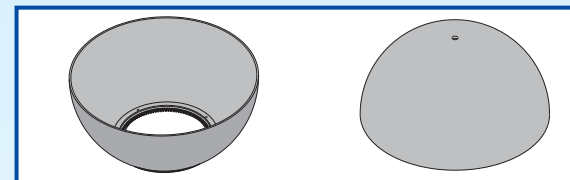
Gear and motor case and the Monthly Dial



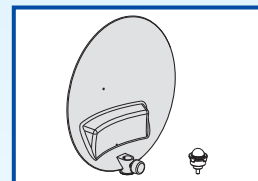
Time Ring with 4 support rods and screws



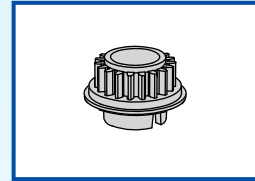
Globe support cup



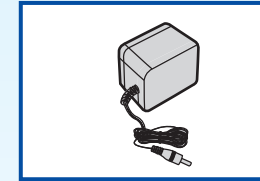
Interlocking southern and northern hemispheres



Sunshade and LED lamp



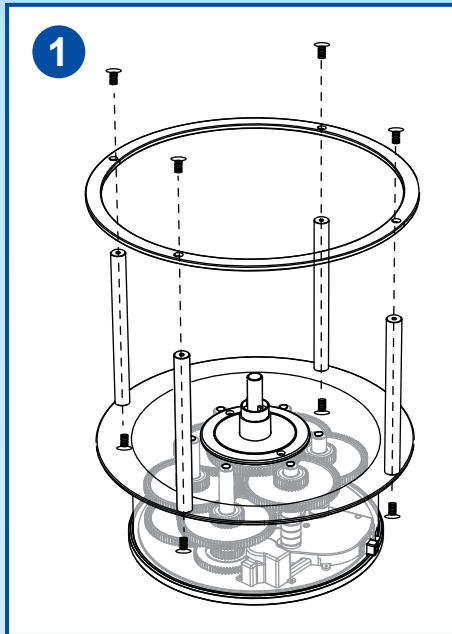
Globe crown gear/pulley



AC adaptor

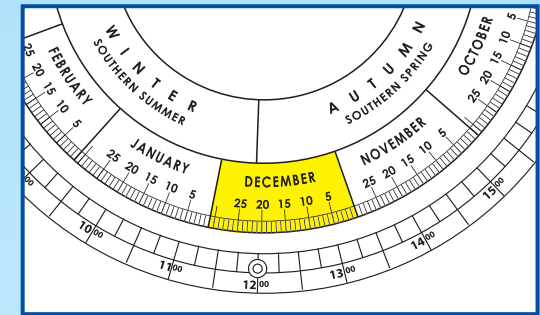
Assembling

- 1** - Attach the Time Ring to the Monthly Dial with the four support rods and screws.

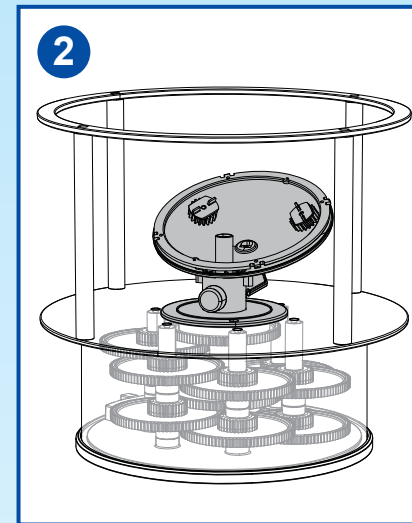


Important:

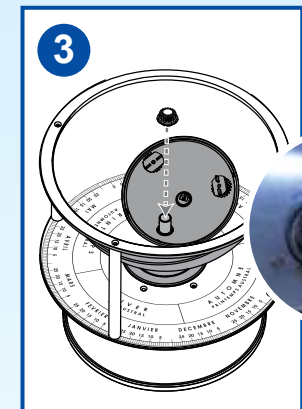
Align December 21-22 on the Monthly Dial with the 12 pm mark on the Time Ring.



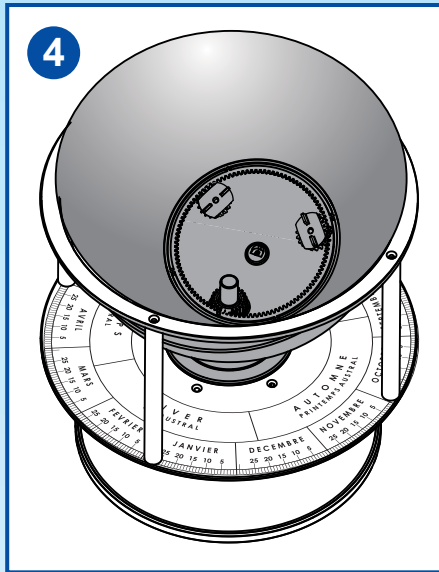
- 2** - Slip the globe support cup over the center shaft on the motor case. **Do not tighten the lock knob.** The support cup should rotate on the center shaft.



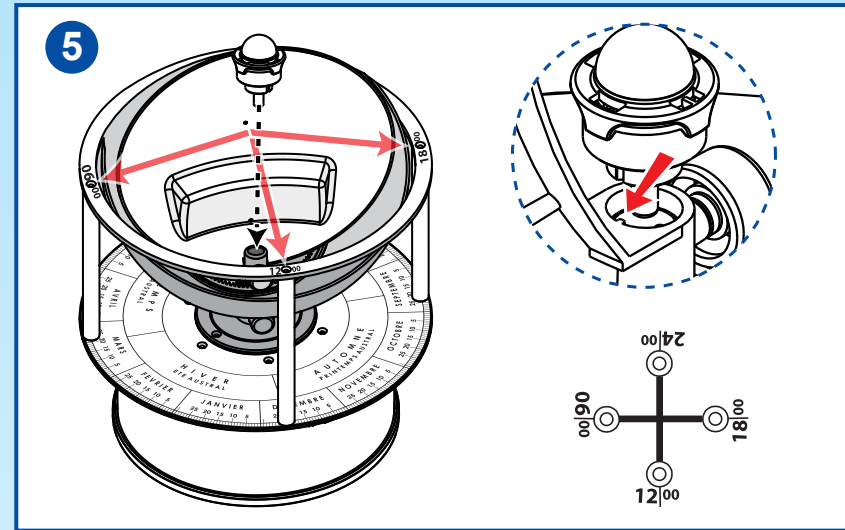
- 3** - Push the crown gear/pulley onto the center shaft. Turn the gear slowly so that the two notches on the bottom of the gear line up with and connect with the two ribs on the center shaft. When they are in alignment, you will feel the gear click into place and will no longer turn by hand.



- 4** - Attach the southern hemisphere of the globe to the support cup. The teeth on the gear around the hole on the bottom of the hemisphere should fit over the teeth on the crown gear. Gently hold the southern hemisphere and turn slowly. It should turn in the support cup.

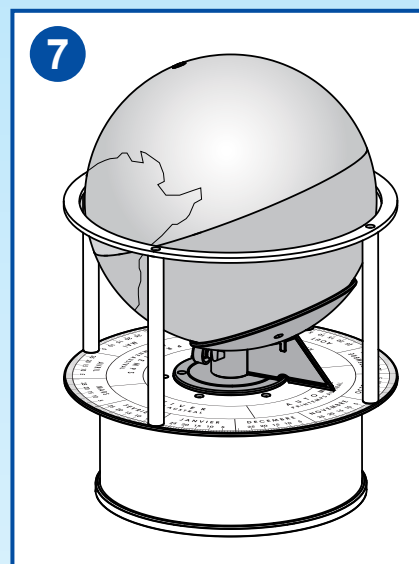


- 5** - Slide the sunshade over the central shaft. Do not tighten the lock knob. Push the LED lamp onto the central shaft. Turn the sunshade so that edges line up with 6 am and 6 pm on the Time Ring. The back of the sunshade faces midnight (24 hours) on the Time Ring. Lock the sunshade by slowly turning the lock knob.



6 - Before continuing, check the LED lamp. It is very bright. When it is on do not look directly at it. Insert the AC adaptor plug into the jack in the motor case and plug the power cord into an outlet. Push the square lamp button on the base of the motor case. The lamp should come on. If it doesn't, push the button again. If the lamp still does not light, unplug the cord, then push the lamp down into the socket – it might not be making electrical contact. Plug the cord in again and push the button. Push the button and turn off the lamp and unplug the globe.

7 - Attach the northern hemisphere to the southern hemisphere. The two halves fit together at the equator around the Earth globe. Make sure the continents and lines of longitude line up.



8 - Connect the AC adaptor to the base and plug the cord into an outlet. Turn the light on and you will see that half of the globe is lit. You will not see the globe turning since it turns at the same rate as the real Earth. If you put your ear close to the base you can hear the motor turning.



AC/DC Adaptor Specification

FOR USA/CANADA

INPUT: 120V AC 60Hz
OUTPUT: 7.5V DC 800mA

FOR EUROPE

INPUT: 230V AC 50Hz
OUTPUT: 7.5V DC 800mA

FOR UK

INPUT: 240V AC 50Hz
OUTPUT: 7.5V DC 800mA

FOR AUSTRALIA

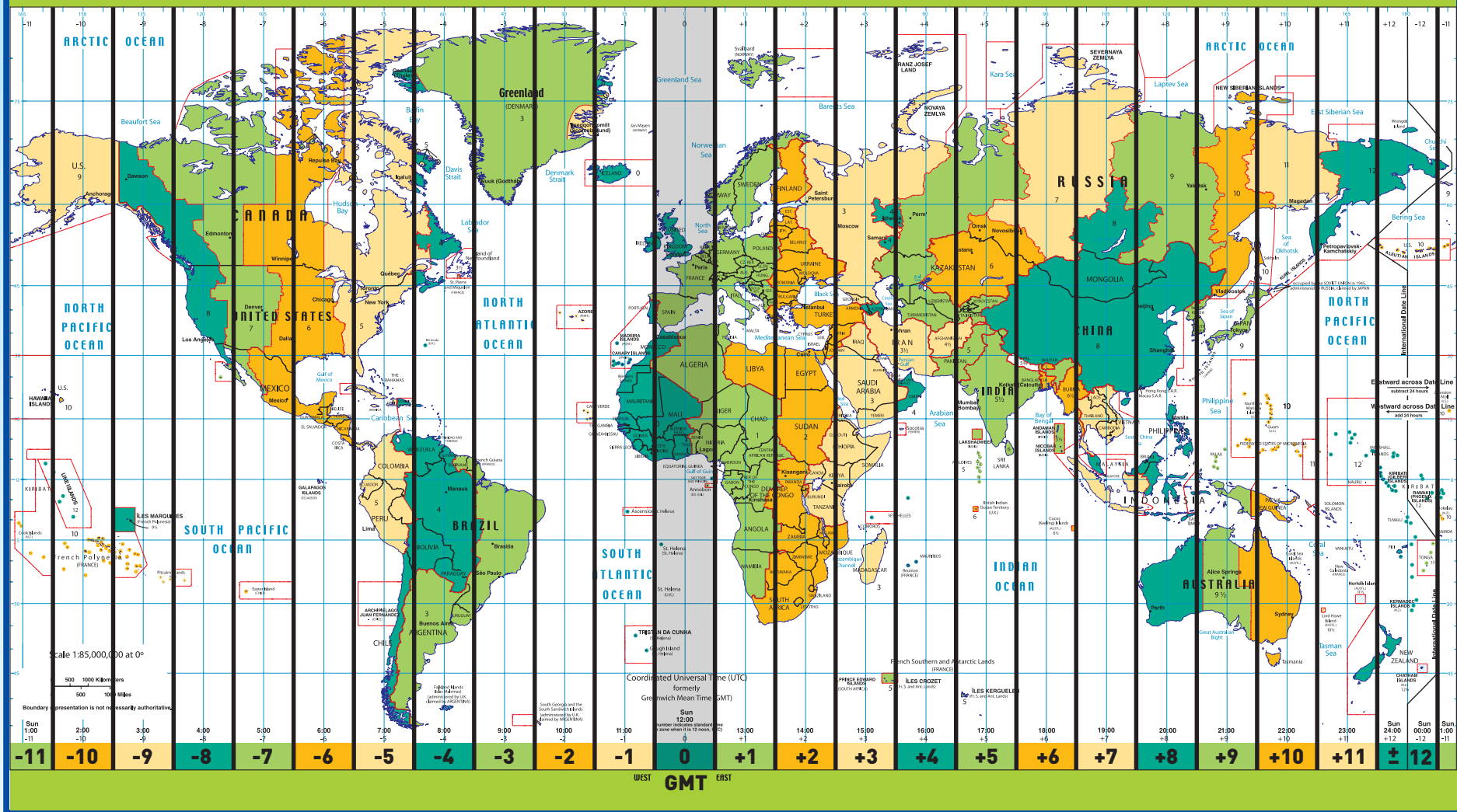
INPUT: 240V AC 50Hz
OUTPUT: 6V DC 500mA



ETL LISTED
CONFORMS TO
UL STD. 697
CERTIFIED TO CSA
STD. C22.2 NO. 173

To adjust the time, refer to your position on the time zone map and turn the globe to your position from the Greenwich meridian line

World Time Zones



For example:

If you are located in:

- Paris or London : GMT +0
- New York GMT -5
- Mexico GMT -7
- Beijing (Peking) or Hong Kong GMT +8
- Sydney GMT +10

LIST OF WORLD CITIES WITH REAL GMT / SOLAR TIME

City	Country	GMT	City	Country	GMT	City	Country	GMT	City	Country	GMT
Abidjan	Ivory Coast	+0	Damas	Syria	+2	Lima	Peru	-5	Pvongyang	North Korea	+8
Accra	Ghana	+0	Dar es Salaam	Tanzania	+3	Lisbon	Portugal	-1	Quito (capital)	Ecuador	-5
Addis Abeba (capital)	Ethiopia	+3	Delhi	India	+5	London	United Kingdom	+0	Rabat	Morocco	+0
Adélaïde	Australia	+9	Denpasar	Indonesia	+7	Los Angeles	United States	-8	Rio de Janeiro	Brazil	-3
Alexandria	Egypt	+2	Dhaka	Bangladesh	+6	Luanda	Angola	+1	Riyadh	Saudi Arabia	+3
Algiers	Algérie	+0	Djakarta	Indonesia	+7	Lusaka	Zambia	+2	Roma	Italy	+1
Almaty	Kazakhstan	+5	Doha	Qatar	+3	Lyon	France	+0	Saint-Petersburg	Russia	+2
Amsterdam	The Netherlands	0	Douala	Cameroon	+1	Madrid	Spain	+0	Samara	Russia	+3
Ankara (capital)	Turkey	+2	Dubai	United Arab Emirates	+4	Manchester-Liverpool	United Kingdom	+0	San Francisco - San José	United States	-8
Antananarivo	Madagascar	+3	Dublin	Ireland	+0	Manila	Philippina	+8	San José	Costa Rica	-6
Anvers	Belgium	+0	Erevan	Armenia	+3	Maputo	Mozambique	+2	San Juan	Puerto Rico	-4
Athens	Greece	+1	Francfort	Germany	+0	Marseille	France	+0	San Salvador	El Salvador	-6
Auckland	New Zealand	+12	Freetown	Sierra Leone	-1	Mascate	Oman	+4	Sanaa	Yemen	+3
Baghdad	Iraq	+3	Fuzhou	China	+8	Melbourne	Australia	+10	Santiago	Chili	-5
Bakou	Azerbaïdjan	+3	Gaza	Palestine	+2	Mexico	Mexico	-7	São Paulo	Brazil	-3
Bamako	Mali	-1	Glasgow	United Kingdom	+0	Milan	Italy	+1	Seoul (capital)	South Korea	+8
Bangkok (Krung Thep)	Thaïland	+7	Guatemala	Guatemala	-6	Minsk (capital)	Belarus	+2	Shanghai	China	+8
Barcelona	Spain	+0	Hanoi (capital)	Viet Nam	+7	Monrovia	Libéria	-1	Singapore	Singapore	+7
Beijing	China	+8	Harare (capital)	Zimbabwe	+2	Montevideo	Uruguay	-4	Sofia (capital)	Bulgarie	+2
Belgrad	Serbia	+1	Havana	Cuba	-5	Montreal	Canada	-5	Stockholm	Sweden	+1
Berlin	Germany	+1	Helsinki (capital)	Finland	+2	Moscow	Russia	+3	Sydney	Australia	+10
Beyrouth	Lebanon	+2	Ho Chi Minh Ville	Viet Nam	+7	Mumbai (Bombay)	India	+5	Taipei	Taiwan China	+8
Bogota	Colombia	-5	Hong Kong (Xianggang)	China	+8	Munich	Germany	+1	Tashkent	Uzbekistan	+5
Brasilia	Brazil	-3	Istanbul	Turkey	+2	Nairobi (capital)	Kenya	+2	Tbilissi	Georgia	+3
Brussels	Belgium	+0	Jerusalem	Israel	+2	Nanjing	China	+8	Tegucigalpa (capital)	Honduras	+6
Bucarest	Romania	+2	Kaboul (capital)	Afghanistan	+5	Nanning	China	+7	Tehran	Iran	+3
Budapest	Hungary	+1	Kampala	Uganda	+2	Naples	Italy	+1	Tel-Aviv	Israel	+2
Buenos Aires	Argentina	-4	Karachi	Pakistan	+4	N'Djamena (capitale)	Chad	+1	Tokyo	Japan	+9
Cairo	Egypt	+2	Kathmandu	Nepal	+6	New York	United States	-5	Toronto	Canada	-5
Canton (Guangzhou)	China	+7	Khartoum	Sudan	+2	Niznij Novgorod	Russia	+3	Tripoli	Libya	+1
Cape Town (législative capital)	South Africa	+1	Kiev	Ukraine	+2	Novosibirsk	Russia	+6	Tunis	Tunisia	+1
Caracas	Venezuela	-4	Kinshasa-Brazzaville	Congo Democratic Republic	+1	Omsk	Russia	+5	Urumqi	China	+6
Casablanca (Dar-el-Beïda)	Morocco	-1	Kolkata (Calcutta)	India	+6	Osaka-Kyoto-Kobé	Japan	+9	Vancouver	Canada	-8
Chicago	United States	-6	Koweït City	Koweït	+3	Ouagadougou (capital)	Burkina Faso	+0	Varsovie	Poland	+1
Chongqing	China	+7	Krasnojarsk	Russia	+6	Panama	Panama	-5	Vienna	Austria	+1
Colombo	Sri Lanka	+5	Kuala Lumpur	Malaysia	+7	Paris	France	+0	Washington	United States	+5
Conakry	Guinea	-1	Kunming	China	+7	Perth	Australia	+8	Xian	China	+7
Copenhagen-Malmö	Denmark	+1	La Mecque	Saudi Arabia	+3	Phnom Penh (capital)	Spain	+7	Yangon	Myanmar	+6
Cotonou	Bénin	+0	La Paz (capitale)	Bolivia	-5	Port-au-Prince	Haïti	-5	Yaounde	Cameroon	+1
Dakar	Sénégal	-1	Lagos	Nigéria	+0	Prague	Tchèque republic	+1	Zürich	Switzerland	+0

ADJUSTMENTS

Setting the date and time



1. Loosen the lock knob on the support cup.

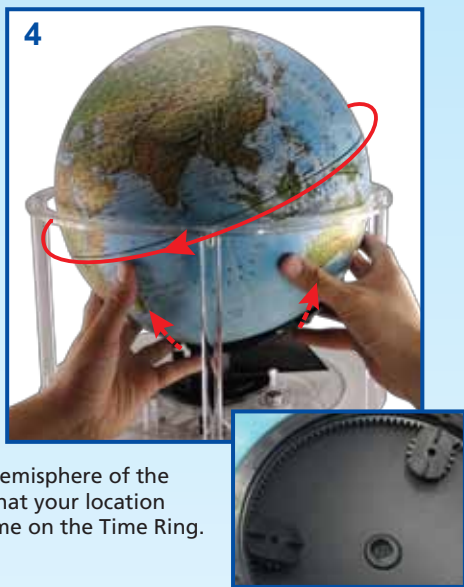


2. Rotate the globe support cup so that the pointer with red tip points at today's date.

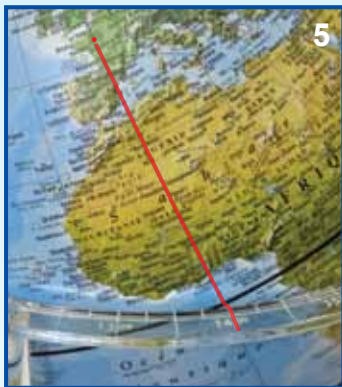


3. Tighten the lock knob on the support cup.

4. Find your current time on the Time Ring.
With both hands, lift the southern hemisphere of the globe and turn the globe slowly so that your location on Earth lines up with the current time on the Time Ring.



Note: Ensure both the locks are perpendicular to the ring.



5. To set the time as precisely as possible, the longitude line nearest your location should line up with the time on the Time Ring. Once set, your globe should only need minor adjustments every couple of months, or when the power to the globe is off.

WHAT WILL YOUR GLOBE SHOW?

The globe turns at the same rate that the actual Earth is turning. It will show the day of the year, time of day, and which parts of the Earth are in day and night.

HANDLING AND CLEANING

Do not put the globe or the motor base in water. Clean all surfaces with a slightly damp soft cloth. Paper towels may scratch the clear plastic.

When moving the globe, lift it only by holding the motor base. Do not lift it by holding the globe since it could come apart where the hemispheres join, or might damage the motor connections.

SOME TIPS ABOUT YOUR GLOBE'S OPERATION

The lamp can be turned off with the square button. This will not turn off the motor so your globe will continue to track the actual motion of the Earth.

The twilight strip on the lamp causes the line between day and night to be slightly fuzzy, the way it is on the real Earth. The sunshade, which does not move, causes the day and night effect by blocking the lamp. As your globe turns, locations move into and out of the night side just as they do on Earth.

The line that divides the lit and unlit halves of the Earth is called the terminator. When you are outside and see the Sun setting or rising, the terminator is at your location. You can see the moon's terminator when it is in the sky.

Places that are on the same longitude line have the same solar time. For example, find San Francisco and the longitude line closest to there. Look north along the line until you come to Portland, Oregon. These are both at about the same longitude. So if it is 8:00 am in San Francisco, it is 8:00 am in Portland.

The Time Ring is marked with hours and half hours. Estimating the correct time to about 10 minutes is possible. Remember to correct for Daylight Savings Time if it is kept in your area. Because the Earth's speed in its orbit around the Sun changes as the year goes by, the solar time on your globe may be off from clock time by up to 10 to 15 minutes. This effect is called the Equation of Time.

SEASONS AND DATES

The Earth turns once on its axis in 24 hours with respect to the Sun. This is the day. The movement is called rotation.

The Earth is also moving in its orbit around the Sun. This movement is called revolution and one complete revolution around the Sun is the definition of the year.

The Earth takes 365.24 days to orbit the Sun once. The 0.24 days (approximately one quarter of a day) is why we have leap years almost every four years. After four years that quarter day adds up to one day. Calendars have whole days, not halves or quarters, so three of four years have 365 days, and one, leap year has 366.

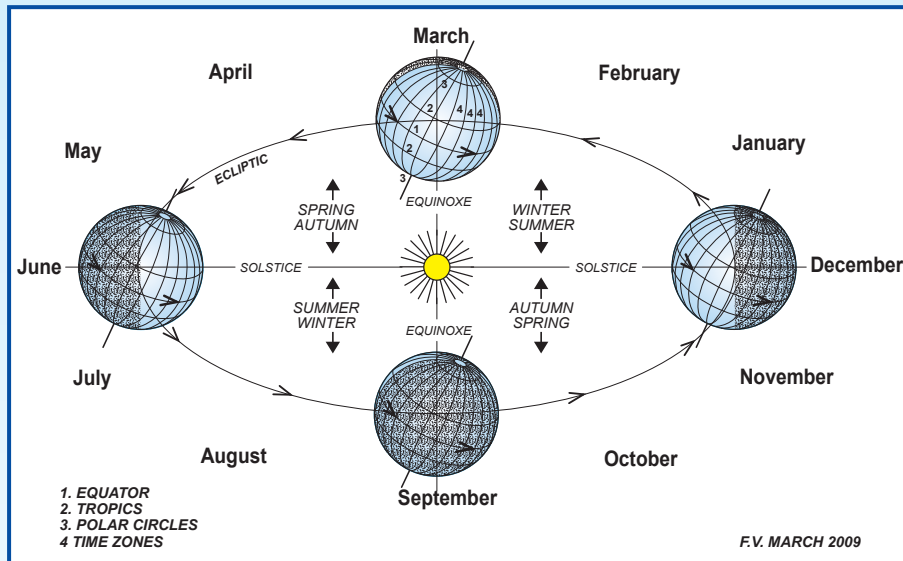
Because the extra bit is not exactly 0.25 days, leap years are not necessarily every four years. If a year is divisible by four it is a leap year. If it is a century year (1800, 1900, 2000 etc.) it is a leap year only if it can be evenly divided by 400. So 2000 was a leap year and the year 1900 was not.

The axis of the globe is tilted by 23.5° from being vertical. This is the same as the actual planet. This angle is called the Obliquity of the Ecliptic.

The Earth's tilt is always in the same direction. This results in the axis of the Earth pointing to the same place in the northern and southern skies. In the northern skies, the star Polaris is in line with the axis, which is why it appears to stay in the same place during the night as the Earth turns.

The tilt of the Earth is also what causes seasons. When the northern hemisphere is tipped toward the Sun, summer happens. The southern hemisphere would then be tipped away from the Sun, so winter occurs there. The seasons flip when six months later the northern half of the Earth is pointed away from the Sun, and the southern half pointed toward the Sun.

ROTATION AND TRANSLATION OF EARTH AROUND THE SUN FROM SPACE VIEW



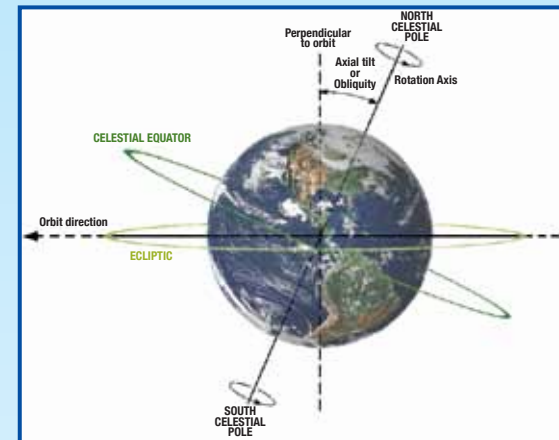
GLOSSARY

DAY

The time it takes for the Earth to make one rotation on its axis with respect to the Sun. The solar day = 24 hours. When the day is referenced against the stars, the star day or sidereal day is 23 hours 56 minutes.

ECLIPTIC

An imaginary line that the Sun traces against the sky as the year passes. As the Earth moves, or revolves around the Sun, our orbital motion makes the Sun appear to move against the stars.

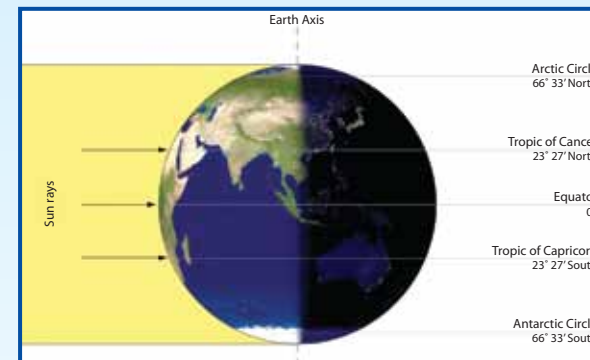


EQUATOR

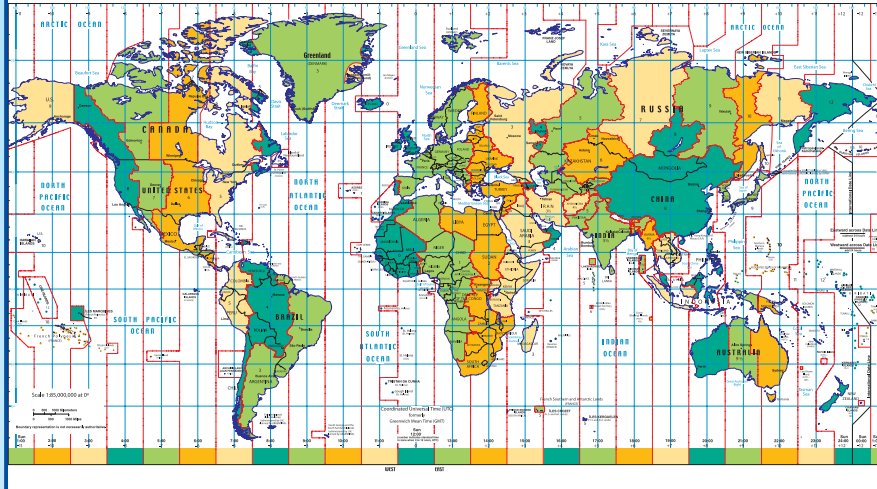
The line that divides the northern and southern hemispheres. It is halfway between the two poles and its latitude = 0° . The Earth is approximately 8,000 miles in diameter and the equator (or circumference of the Earth) is about 25,000 statute miles. The Earth's rotational speed at the equator is slightly more than 1,000 miles per hour.

EQUINOX

The two times of the year when the poles of the Earth are neither tipped toward nor away from the Sun. Day and night have the same length for all locations non the Earth at the equinoxes (equi = equal, nox = night). The equinoxes occur on March 21st – 22nd and September 22nd – 23rd.



World Time Zones

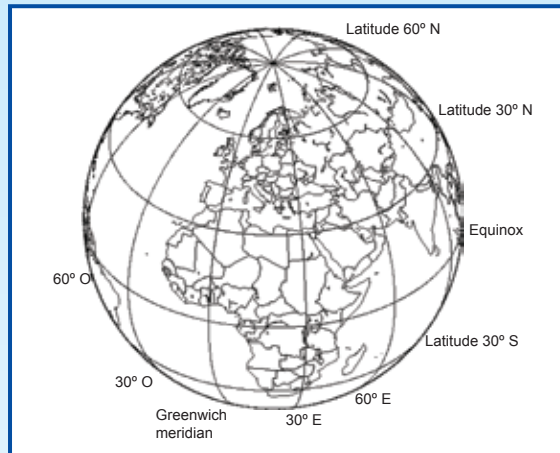


HOURL

An hour is $\frac{1}{24}$ th of a day or 60 minutes long. In an hour, the Earth turns 15° in longitude. Each 15° segment is one time zone.

LATITUDE

The angular distance of a location from the equator to the North or South Pole. The equator has latitude = 0° . The North Pole has latitude = $+90^\circ$ and the South Pole is at -90° . A point halfway between the equator and the North Pole has latitude of $+45^\circ$.



LONGITUDE

The angular distance east or west from the zero longitude meridian (at Greenwich). Longitude goes from 0° to $+180^\circ$ as one heads east of Greenwich, and 0° to -180° going west of Greenwich.

Meridians

Half circles that go around the Earth drawn from pole to pole. There are 24 meridians, and the spaces between them are the hourly time zones. The meridian at Greenwich (0° longitude) is called the Prime Meridian. The meridian at 180° is the International Date Line.

PARALLELS

Circles drawn around the Earth parallel to the equator. Parallels represent lines of latitude. The parallel at Beijing is at latitude $+40^\circ$ and goes around the Earth north of and parallel to the equator. The parallel at Jakarta is at latitude of -6° and is drawn parallel to and south of the equator.

POLAR CIRCLES

The parallels at latitude $+66.5^\circ$ and -66.5° are the Arctic and Antarctic Circles. Areas north of the Arctic Circle experience 24-hour daylight in summer and 24-hour night in winter. Areas south of the Antarctic Circle also see 24-hour day and night in their respective summer and winter seasons.

SOLSTICE

The time of year when the Earth is at its maximum inclination toward or away from the Sun. Each hemisphere has a summer solstice (tipped toward) and winter solstice (tipped away). These occur on June 22nd – 23rd and December 22nd – 23rd. June 22nd – 23rd is the first day of summer in the northern hemisphere, and the first day of winter in the southern hemisphere. December 22nd – 23rd is the first day of winter in the north and first day of summer in the south.

SUBSOLAR POINT

Point on the Earth where the Sun is shining directly overhead. This is also the point on the Earth directly in line with the Sun and the center of the Earth. Only locations on the Earth between latitude $+23.5^\circ$ and -23.5° can have the Sun directly overhead.

TIME ZONE

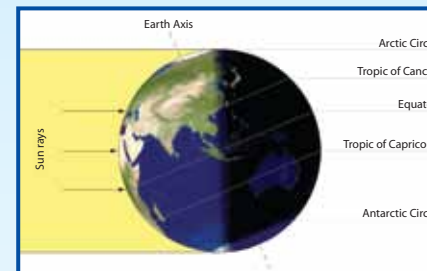
The segment between two meridians separated by 15° . For example, from 0° (Prime Meridian) to $+15^\circ$ longitude is the first time zone. Each of these segments is $\frac{1}{24}$ of the Earth's circumference, hence each represents a one hour time zone.

TROPICS

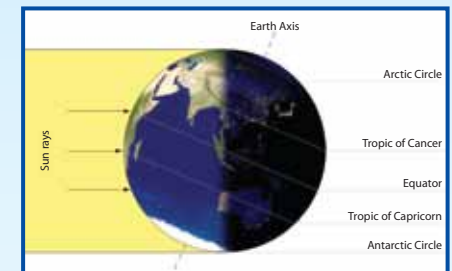
Area on Earth between the two parallels at latitude $+23.5^\circ$ and -23.5° . The northern tropic is the Tropic of Cancer and the southern is the Tropic of Capricorn. The tropics region is the only place where the Sun can be directly overhead during the year.

YEAR

The time for the Earth to orbit the Sun once, or to make one complete revolution around the Sun. The year = 365.2425 days or 365 days and 5.8 hours. Since the year is not an even 365 days, the extra 5.8 hours add up to almost one day after four years. That is the origin of a leap year of 366 days.



June 22nd – June 23rd: Summer begins in the northern hemisphere when the Sun is directly over the Tropic of Cancer. The northern hemisphere now gets more sunlight than at any other time of year. At this time, the southern hemisphere has its first day of winter.



December 22nd – June 23rd: Summer begins in the southern hemisphere when the Sun is directly over the Tropic of Capricorn. The northern hemisphere begins winter and has the shortest daylight period.