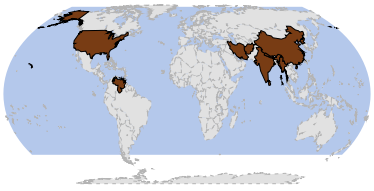
JigsawGeo Teaching Resources

Time Zones

Free printable geography activities for grades 3-8

A digital companion app - JigsawGeo from squishLogic

Download on the App Store



Want to explore geography digitally? Try JigsawGeo for iPhone and iPad.

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Take Geography Beyond the Worksheet

Enjoying these free printable activities? There's a digital way to explore them, too.

JigsawGeo turns the maps in this packet into interactive puzzles for iPhone and iPad. Assemble Time Zones region by region, explore borders and flags, and learn geography at your own pace - at home or in the classroom. Six difficulty levels, from Traveler to Cartographer, let the app grow with your students from grade 2 through grade 8.

JigsawGeo - Interactive geography for curious minds.

Download on the App Store

Scan to learn more or download JigsawGeo.

Teacher Guide: How Time Zones Work

Earth turns all the way around, 360 degrees, once every 24 hours - so every hour it turns 15 degrees. That is why the world is divided into time zones roughly 15 degrees of longitude wide: **one hour equals 15 degrees, and one degree equals 4 minutes.** Every country picks a standard meridian - a line of longitude its clocks are based on - and rounds to a convenient offset from Greenwich, England (0 degrees, UTC).

Most countries round to a whole hour. Six do not:
- Iran (Tehran): UTC+3:30
- Afghanistan (Kabul): UTC+4:30
- India (New Delhi): UTC+5:30
- Sri Lanka (Colombo): UTC+5:30
- Nepal (Kathmandu): UTC+5:45
- Myanmar (Naypyidaw): UTC+6:30

Each of these sits closer to a half-hour (or, for Nepal, a quarter-hour) line of longitude than to a whole-hour one, so their clocks split the difference.

China takes the opposite approach. The country is wide enough to span five natural sun-time bands, from UTC+5 in the far west to UTC+9 in the east - but every clock in China is set to Beijing Time, UTC+8. In the far west, that means the sun does not reach its highest point until mid-afternoon by the clock.

The United States shows the opposite lesson again: it really does use several zones. Six real clocks span the country and its territories, from Atlantic Time in Puerto Rico to Hawaii-Aleutian Time - a four and a half hour spread from coast to coast.

A line of longitude does not always follow a border. A time zone boundary can cut through the middle of a large country, so part of a state or province keeps the neighboring zone's time instead of its own capital's.

Once off-hour: two more countries kept half-hour clocks for a few years, then went back to whole hours:
- Venezuela (Caracas): UTC-4:30 from 2007 to 2016
- North Korea (Pyongyang): UTC+8:30 from 2015 to 2018

Beyond these six: other places bend the whole-hour rule too, for example:
- Newfoundland, Canada: UTC-3:30
- Central Australia: UTC+9:30
- Eucla, Australia: UTC+8:45
- Chatham Islands, New Zealand: UTC+12:45

Where Does UTC+0 Come From?

Latitude has a natural zero line: the equator, halfway between the poles. Longitude has no such natural starting point - any line from pole to pole could have been chosen as "zero." For a long time, countries just picked their own: French maps measured from Paris, American maps from Washington, and sailors from different nations argued over whose charts were right.

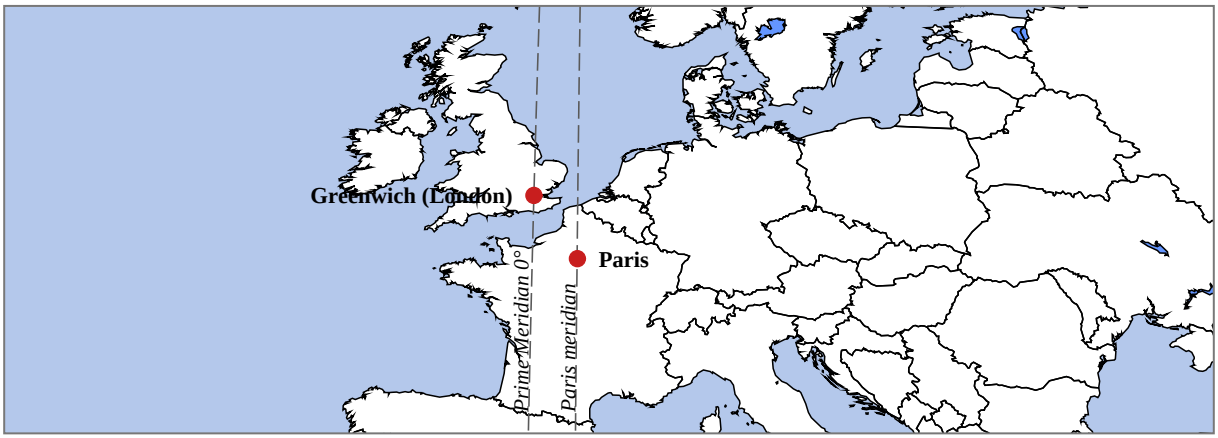
The 1884 meeting that settled it. In October 1884, representatives from 25 nations met in Washington, D.C. for the International Meridian Conference, to agree on one shared zero line for the whole world.

Why Greenwich won. The conference picked the line running through the Royal Observatory in Greenwich, England - not because Greenwich was scientifically special, but because it was already the practical standard: about 72% of the world's shipping already used British nautical charts built around it. Making it official meant most of the world's sailors never had to redraw a single chart. France abstained from the vote and kept using its own Paris meridian on French maps for decades afterward, before eventually switching to Greenwich too.

The Prime Meridian today. Zero degrees longitude is called the Prime Meridian, and it still runs through Greenwich - visitors can stand on a line painted into the ground there, one foot in the Eastern Hemisphere and one foot in the Western Hemisphere.

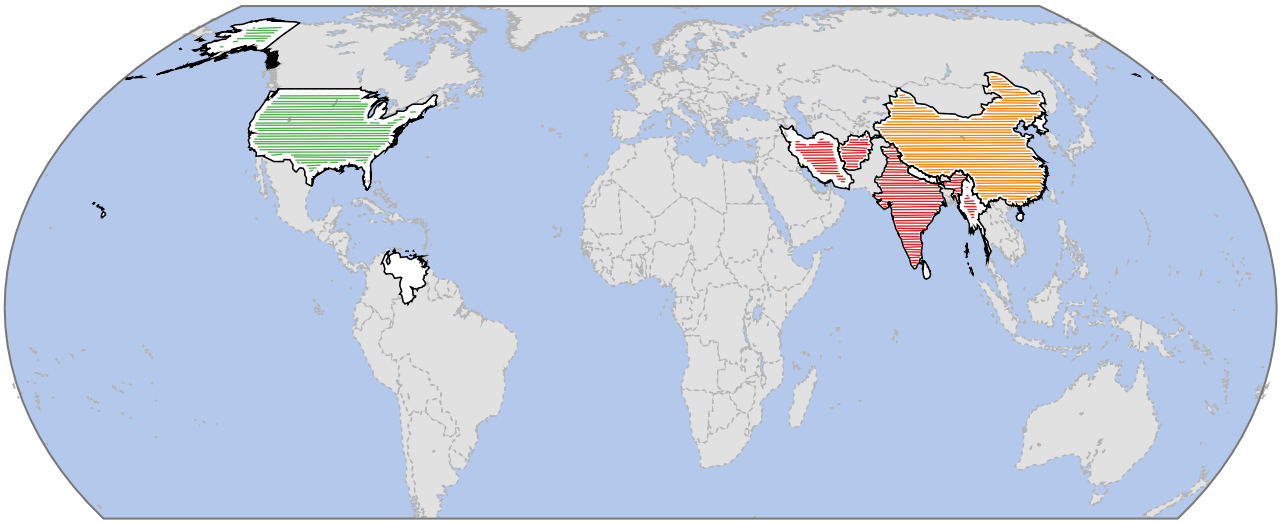
How UTC actually keeps time now. Modern UTC no longer depends on watching the sun cross the sky over Greenwich. Instead, a worldwide network of atomic clocks - each counting the vibrations of cesium atoms billions of times a second - keeps time far more precisely than Earth's own rotation does. Scientists occasionally add a single "leap second" to UTC to keep it lined up with the Earth's slightly irregular spin. The older name "GMT" (Greenwich Mean Time) comes from the sun-watching era and still gets used interchangeably with UTC in everyday speech, even though UTC is the modern, official standard.

Every offset in this whole packet - Iran's +3:30, Nepal's +5:45, every US time zone - is measured as a distance from this one shared line, agreed on in a room in Washington, D.C. over 140 years ago.



Greenwich sits on the River Thames in London. Dashed lines: the Prime Meridian (0°) and, just east of it, the Paris meridian.

World Time Zone Overview

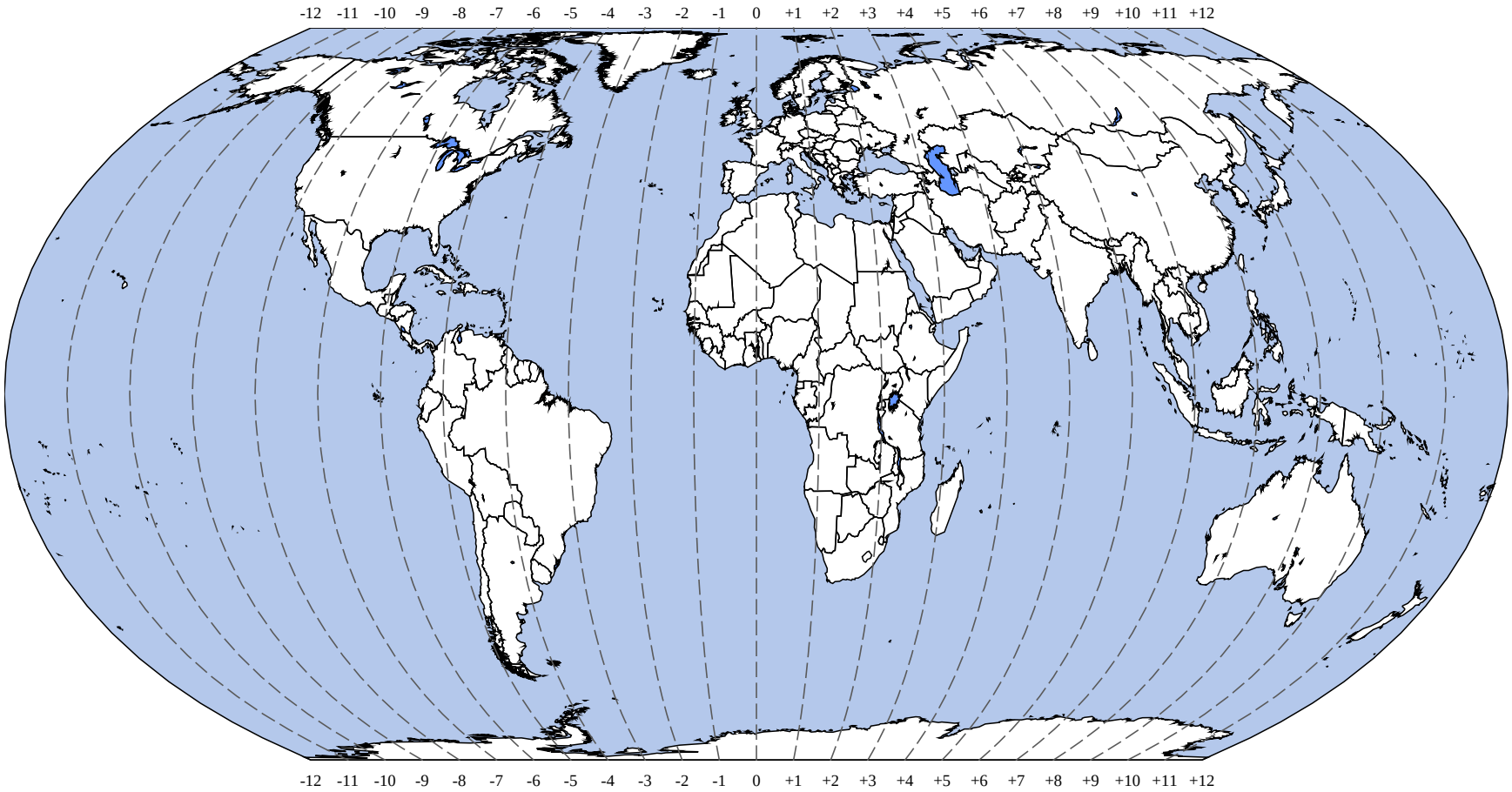


Iran, Afghanistan, India, Sri Lanka, Nepal, Myanmar: not a whole hour from UTC

China: one clock for a country five zones wide

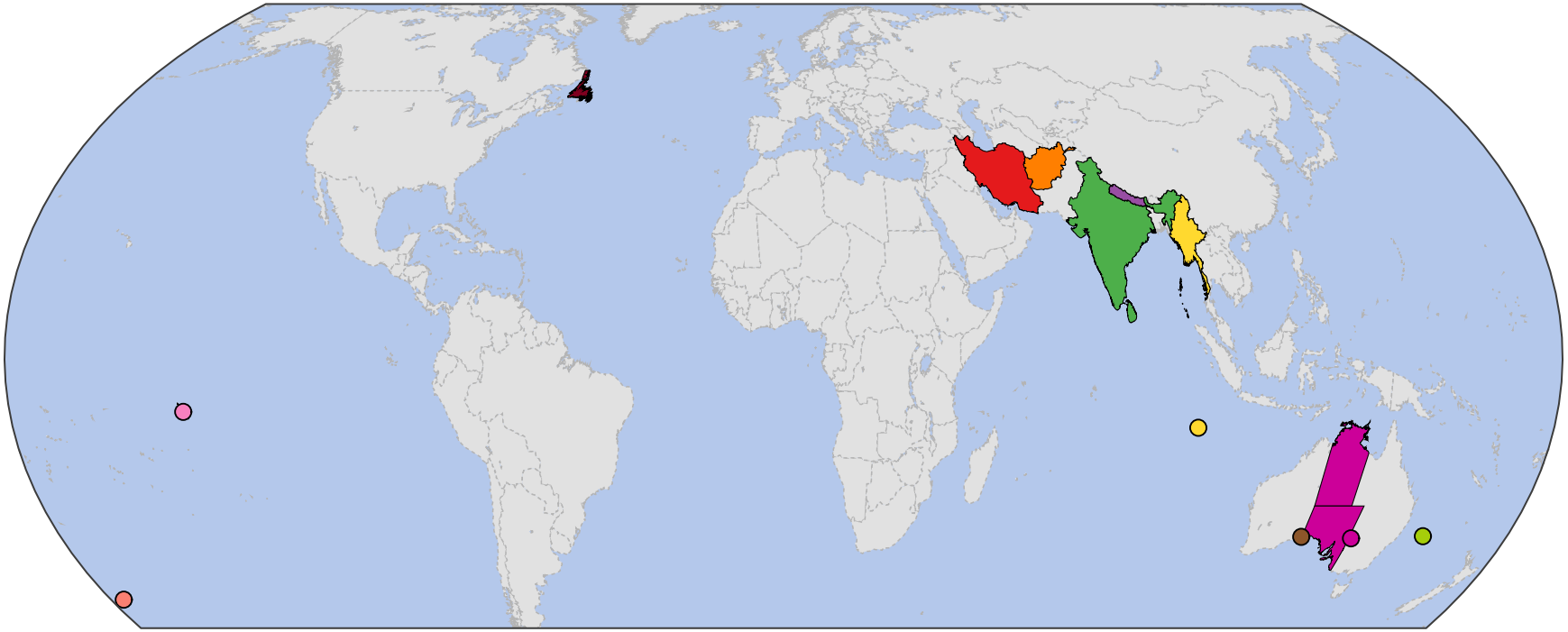
United States: six real clocks coast to coast

World Time Zone Map



Each dashed line is the sun-time meridian for one whole hour from UTC, 15 degrees apart. A country's clocks usually follow the line closest to it - but not always.

Off-Hour Time Zones Around the World



UTC-9:30
French Polynesia: Marquesas Islands

UTC-3:30
Canada: Newfoundland (island), Labrador (southeast coast)

UTC+3:30
Iran

UTC+4:30
Afghanistan

UTC+5:30
India; Sri Lanka

UTC+5:45
Nepal

UTC+6:30
Myanmar; Australia: Cocos (Keeling) Islands

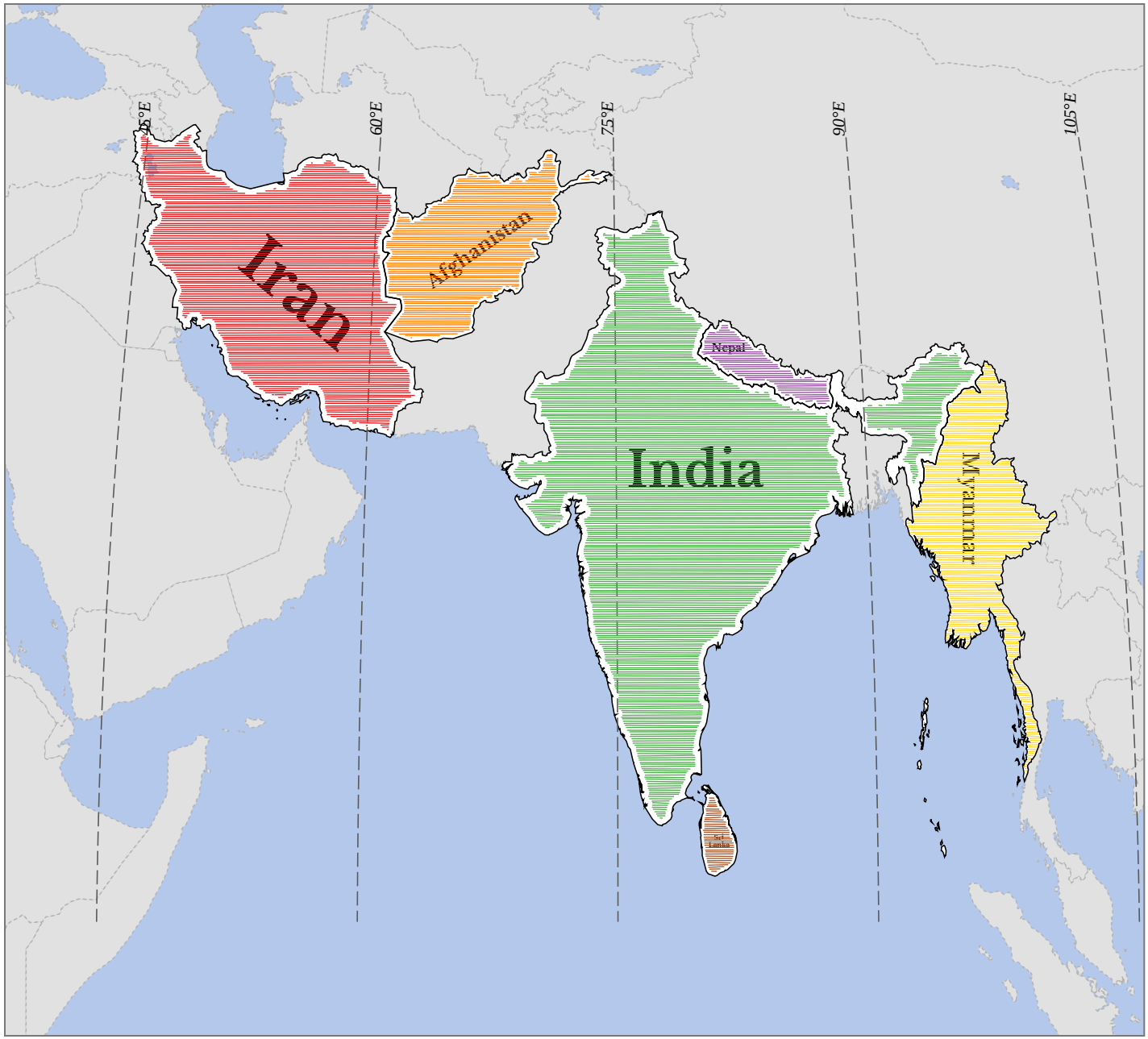
UTC+8:45
Australia: Eucla (Western Australia)

UTC+9:30
Australia: Northern Territory, South Australia, Broken Hill (New South Wales)

UTC+10:30
Australia: Lord Howe Island (New South Wales)

UTC+12:45
New Zealand: Chatham Islands

Off-Hour Countries: Time Zone Map

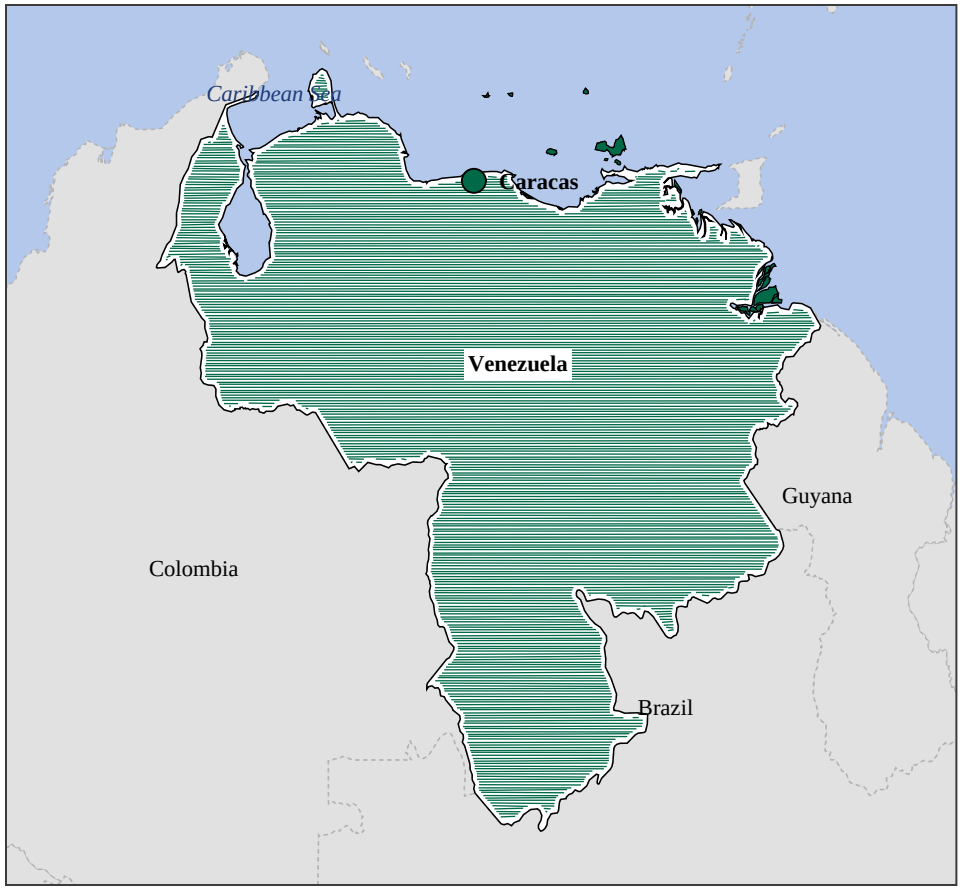


- Iran
  UTC+3:30
- Afghanistan
  UTC+4:30
- India
  UTC+5:30
- Sri Lanka
  UTC+5:30
- Nepal
  UTC+5:45
- Myanmar
  UTC+6:30

Off-Hour Countries: Color It In

- ☐ Iran
  UTC+3:30
- ☐ Afghanistan
  UTC+4:30
- ☐ India
  UTC+5:30
- ☐ Sri Lanka
  UTC+5:30
- ☐ Nepal
  UTC+5:45
- ☐ Myanmar
  UTC+6:30

Once Off-Hour: Venezuela and North Korea



Venezuela
UTC-4:30 from 2007 to 2016
Back to UTC-4:00 in 2016

North Korea
UTC+8:30 from 2015 to 2018
Back to UTC+9:00 in 2018

Venezuela kept its clocks a half hour off from 2007 until 2016, and North Korea did the same from 2015 until 2018. Both are back on whole-hour time zones now. A country can change its time zone, so a time zone map is only right for the year it was made.

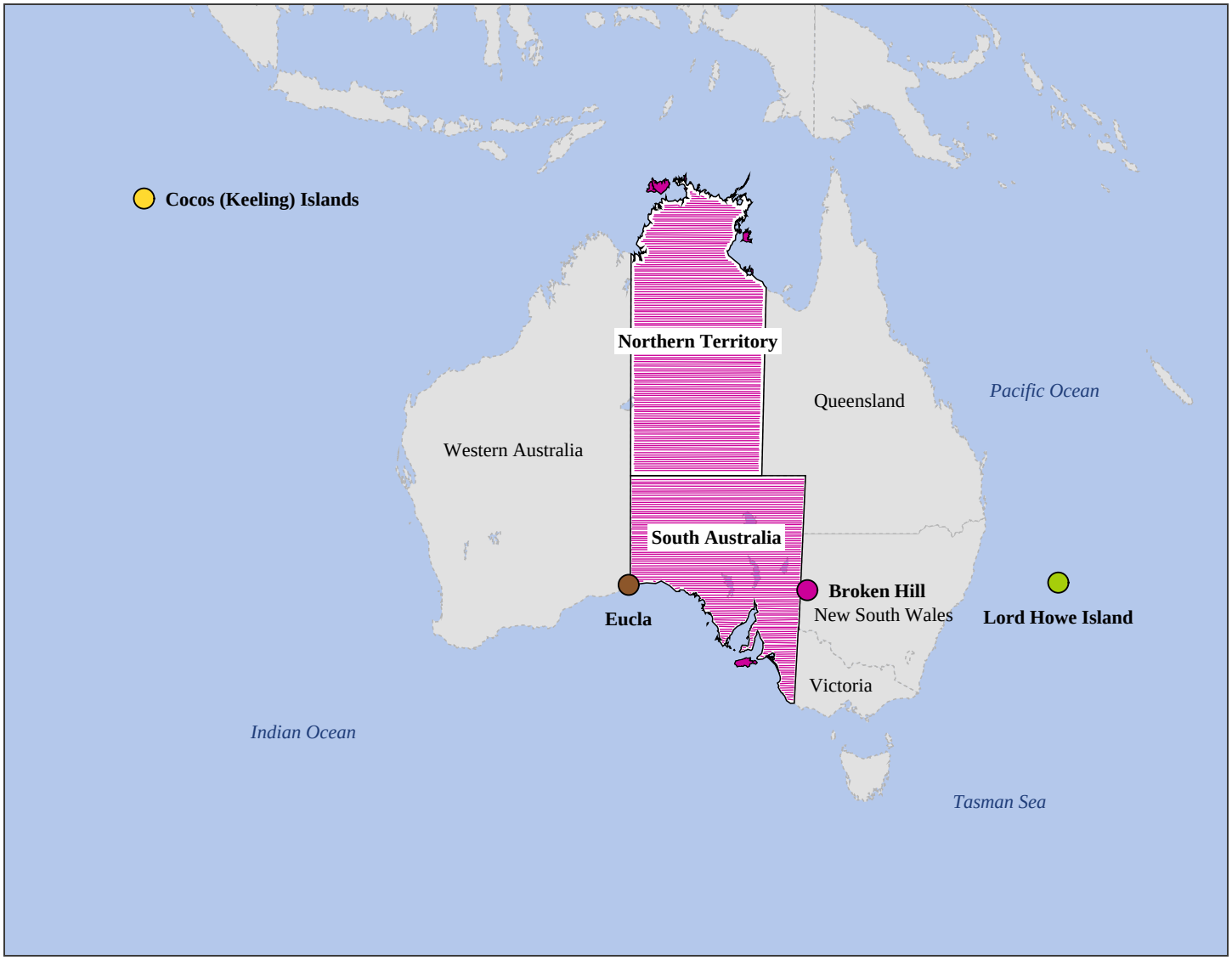
Once Off-Hour: Venezuela and North Korea (Color It In)

☐ **Venezuela**
UTC-4:30 from 2007 to 2016
Back to UTC-4:00 in 2016

☐ **North Korea**
UTC+8:30 from 2015 to 2018
Back to UTC+9:00 in 2018

Venezuela kept its clocks a half hour off from 2007 until 2016, and North Korea did the same from 2015 until 2018. Both are back on whole-hour time zones now. A country can change its time zone, so a time zone map is only right for the year it was made.

Off-Hour States and Territories: Australia



Northern Territory
UTC+9:30

South Australia
UTC+9:30
UTC+10:30 in daylight time

Broken Hill (New South Wales)
UTC+9:30
UTC+10:30 in daylight time

Eucla (Western Australia)
UTC+8:45

Lord Howe Island (New South Wales)
UTC+10:30
UTC+11:00 in daylight time

Cocos (Keeling) Islands
UTC+6:30

In summer, South Australia and Broken Hill move their clocks one hour ahead. Lord Howe Island moves them only 30 minutes. The Northern Territory, Eucla, and the Cocos Islands keep the same time all year. Broken Hill is in New South Wales but keeps South Australia's time.

Off-Hour States and Territories: Australia (Color It In)

☐ **Northern Territory**
UTC+9:30

☐ **South Australia**
UTC+9:30
UTC+10:30 in daylight time

☐ **Broken Hill (New South Wales)**
UTC+9:30
UTC+10:30 in daylight time

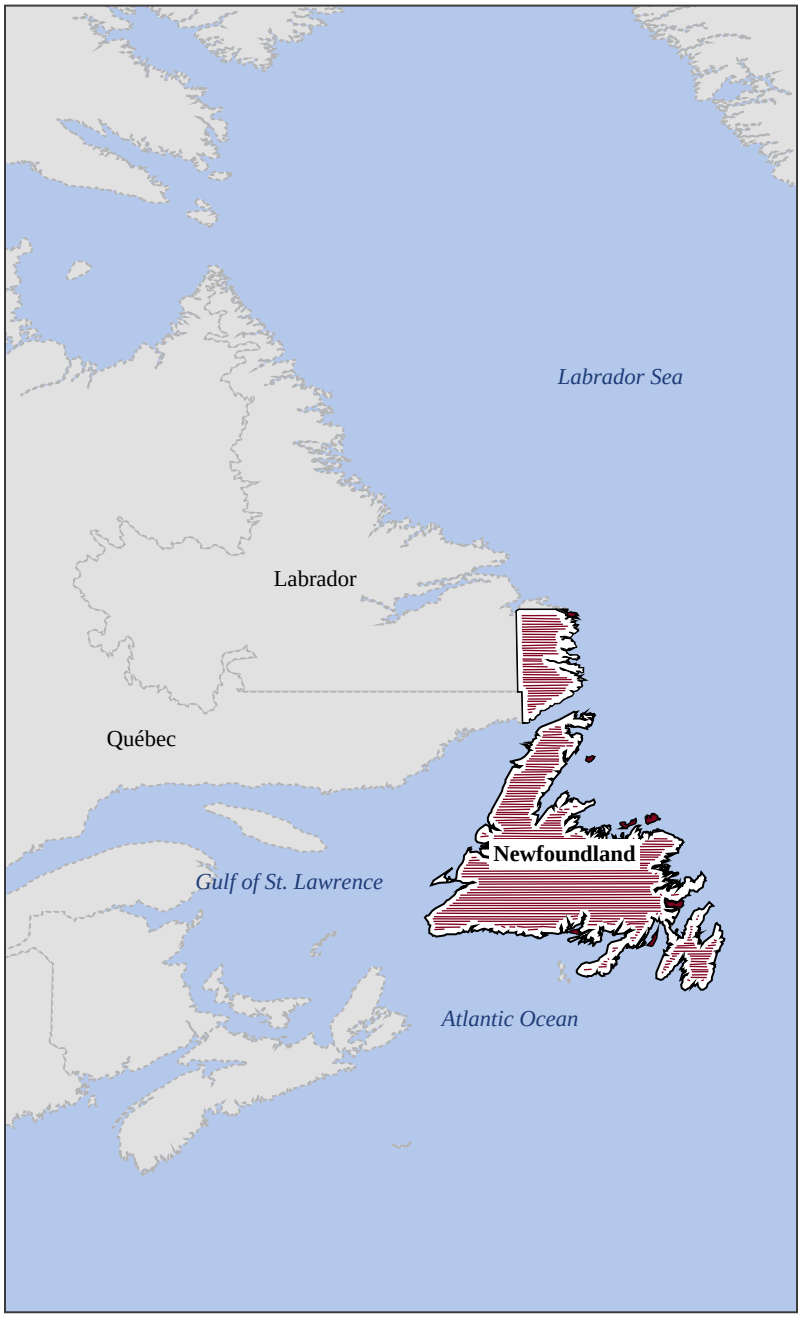
☐ **Eucla (Western Australia)**
UTC+8:45

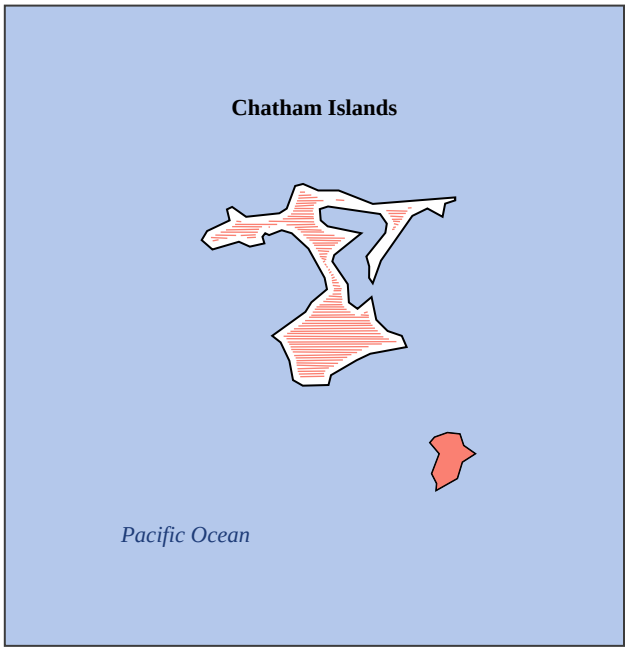
☐ **Lord Howe Island (New South Wales)**
UTC+10:30
UTC+11:00 in daylight time

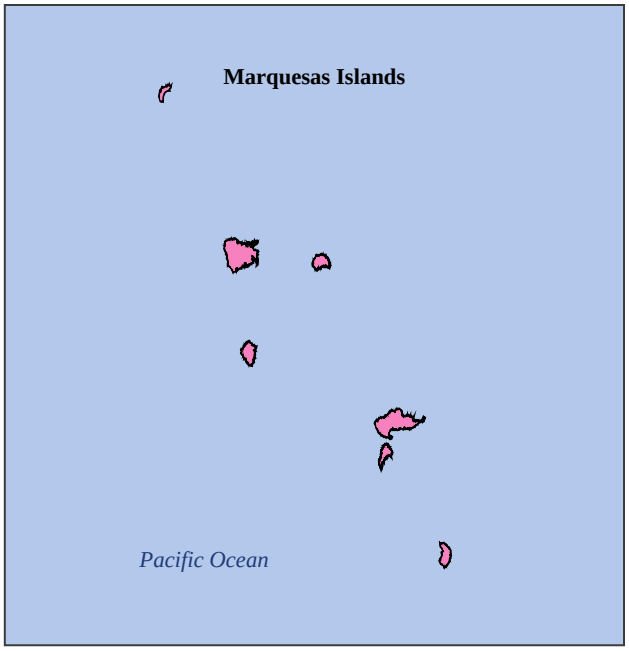
☐ **Cocos (Keeling) Islands**
UTC+6:30

In summer, South Australia and Broken Hill move their clocks one hour ahead. Lord Howe Island moves them only 30 minutes. The Northern Territory, Eucla, and the Cocos Islands keep the same time all year. Broken Hill is in New South Wales but keeps South Australia's time.

Off-Hour Provinces and Islands: Canada and the Pacific







Newfoundland (island)
UTC-3:30
UTC-2:30 in daylight time

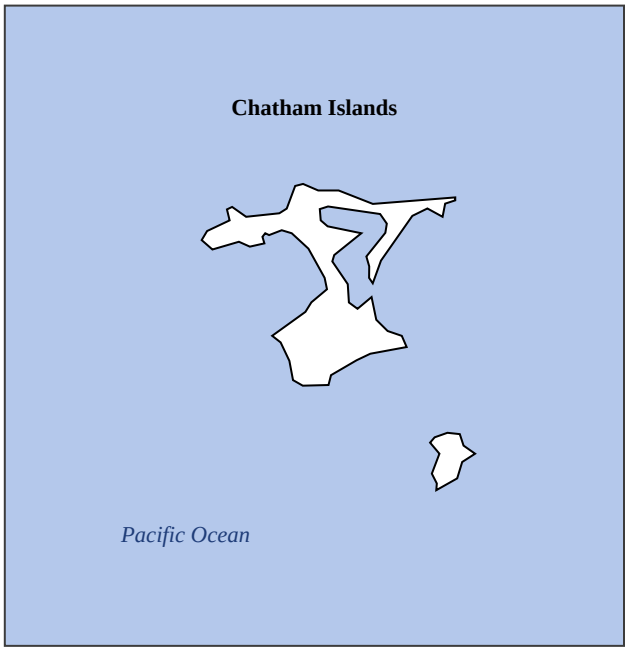
Labrador (southeast coast)
UTC-3:30
UTC-2:30 in daylight time

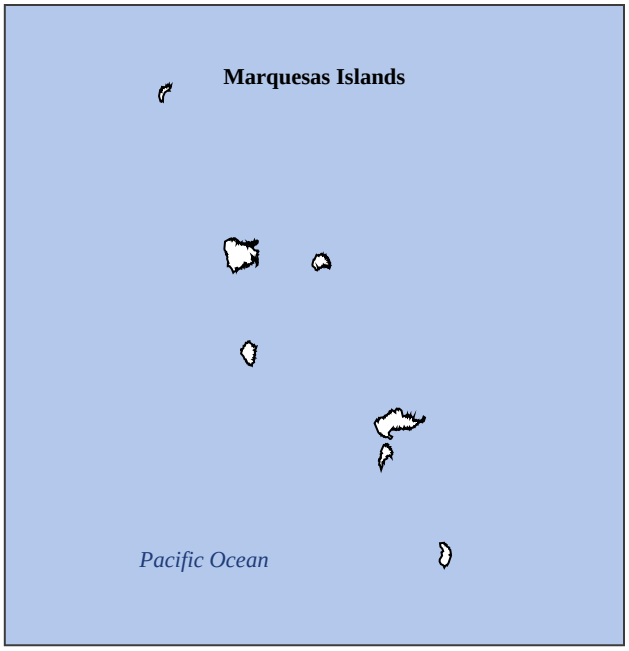
Chatham Islands
UTC+12:45
UTC+13:45 in daylight time

Marquesas Islands
UTC-9:30

In summer, Newfoundland and the Chatham Islands move their clocks one hour ahead. The Marquesas Islands keep the same time all year. The southeast coast of Labrador uses Newfoundland time too; its shaded strip here, from the Québec border to about Black Tickle, is approximate because the clock follows communities, not a line on the map.

Off-Hour Provinces and Islands: Canada and the Pacific (Color It In)





☐ **Newfoundland (island)**
UTC-3:30
UTC-2:30 in daylight time

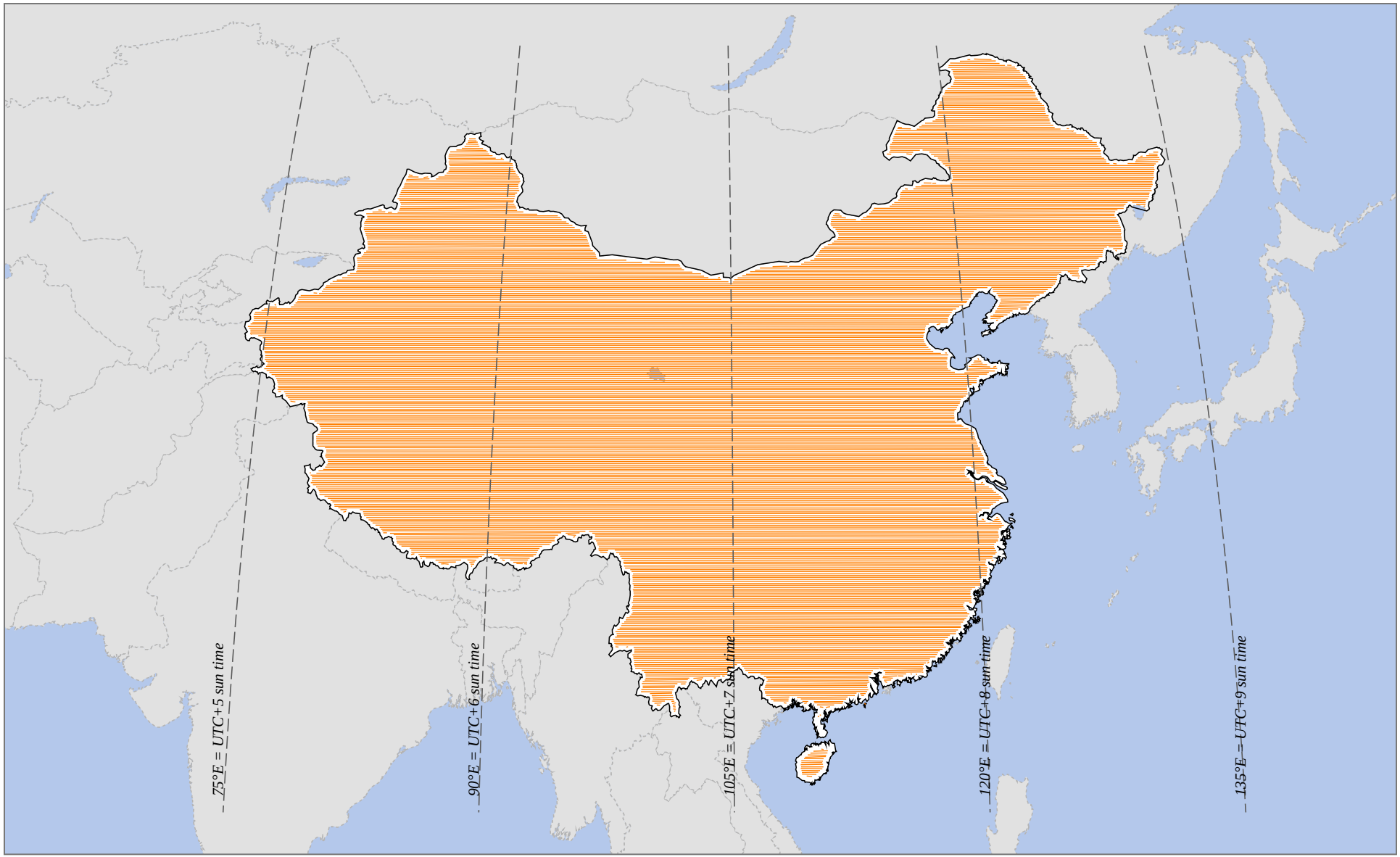
☐ **Labrador (southeast coast)**
UTC-3:30
UTC-2:30 in daylight time

☐ **Chatham Islands**
UTC+12:45
UTC+13:45 in daylight time

☐ **Marquesas Islands**
UTC-9:30

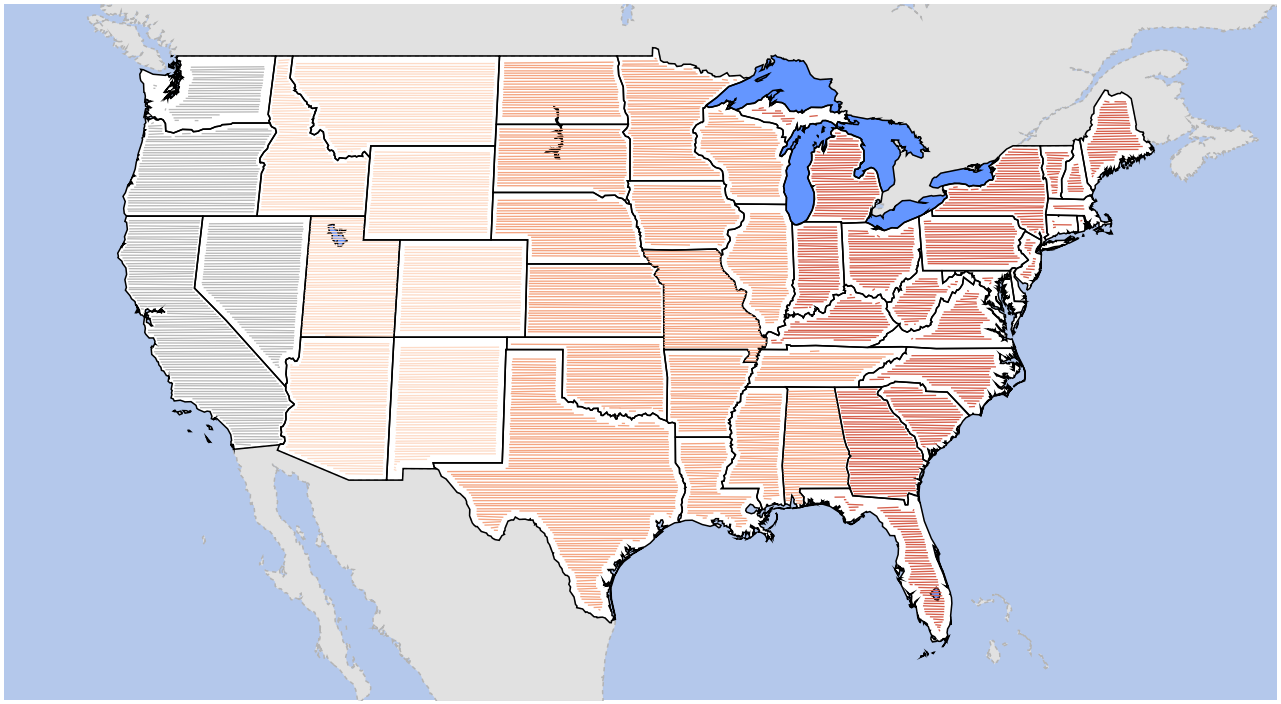
In summer, Newfoundland and the Chatham Islands move their clocks one hour ahead. The Marquesas Islands keep the same time all year. The southeast coast of Labrador uses Newfoundland time too; its shaded strip here, from the Québec border to about Black Tickle, is approximate because the clock follows communities, not a line on the map.

China: One Country, One Clock

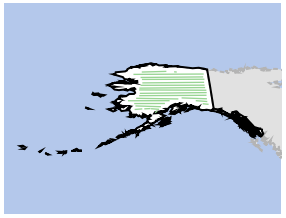


Every clock in China is set to Beijing Time: UTC+8.

United States: Six Time Zones



- Eastern: UTC-5:00
- Central: UTC-6:00
- Mountain: UTC-7:00
- Pacific: UTC-8:00
- Alaska: UTC-9:00
- Hawaii-Aleutian: UTC-10:00
- Atlantic (Puerto Rico): UTC-4:00



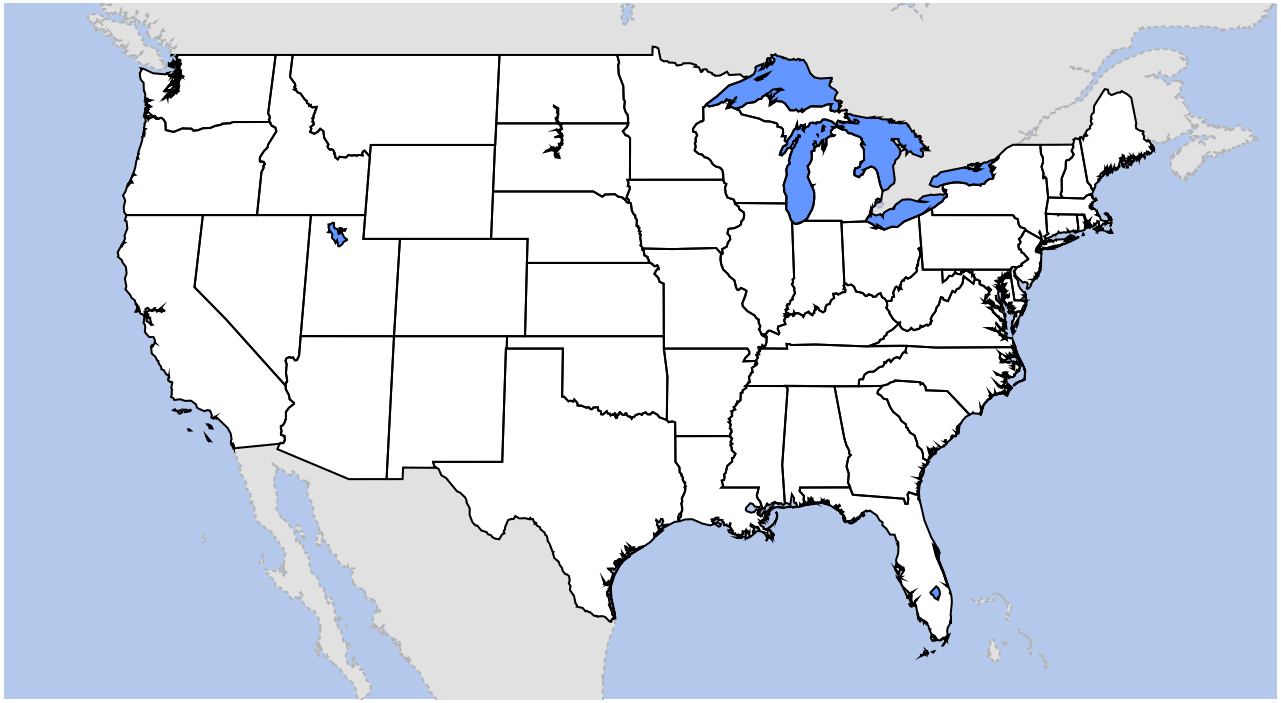
Alaska - not to scale

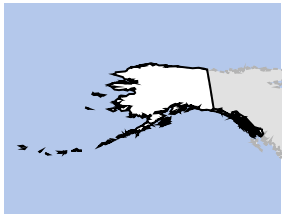
Hawaii - not to scale

Puerto Rico - not to scale

United States: Color It In

- [ ] Eastern: UTC-5:00
- [ ] Central: UTC-6:00
- [ ] Mountain: UTC-7:00
- [ ] Pacific: UTC-8:00
- [ ] Alaska: UTC-9:00
- [ ] Hawaii-Aleutian: UTC-10:00
- [ ] Atlantic (Puerto Rico): UTC-4:00



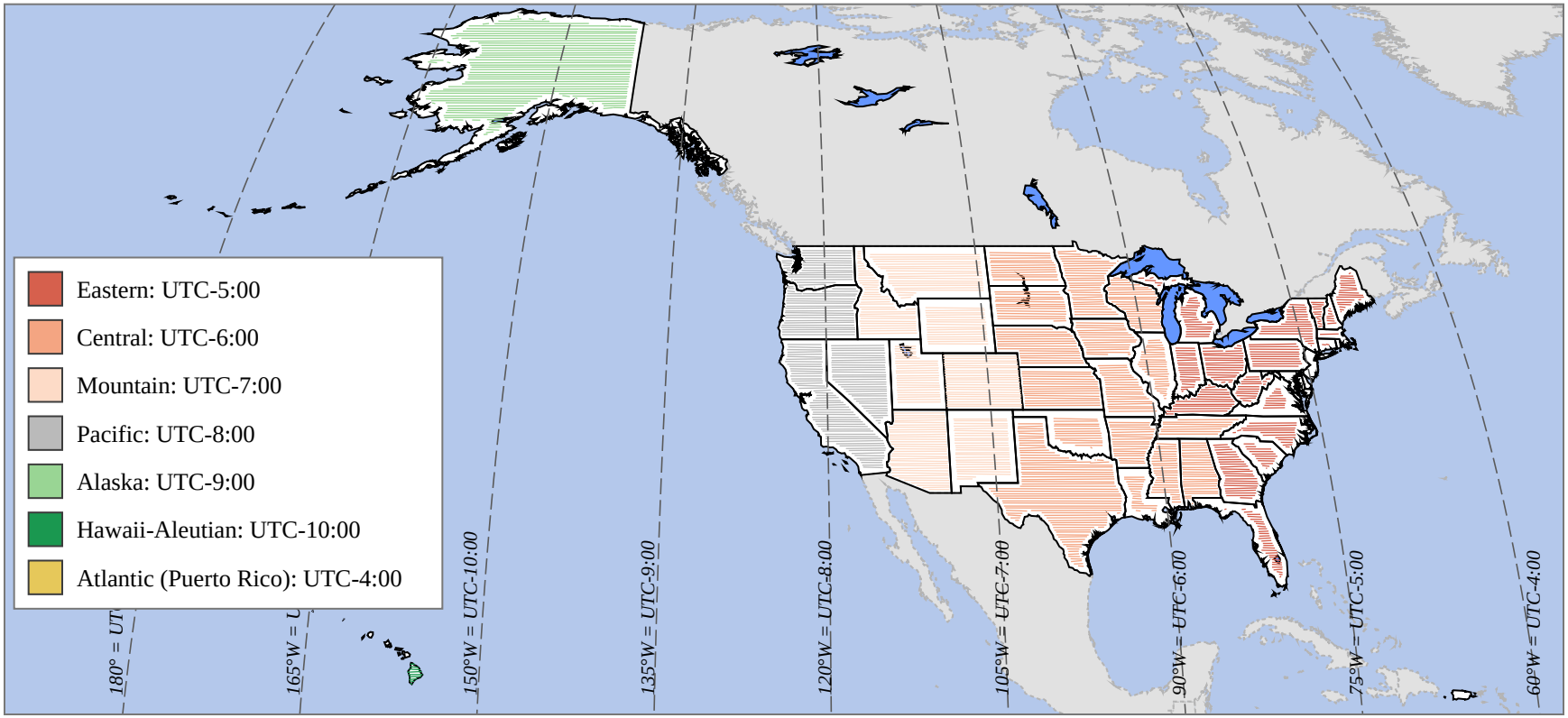


Alaska - not to scale

Hawaii - not to scale

Puerto Rico - not to scale

United States: Alaska and Hawaii to Scale



Longitude to Clock: South Asia and China

Instructions: Multiply the standard meridian by 4 minutes per degree, then convert the result to hours and minutes.

Place	Meridian	× 4 min/deg	= Offset from UTC
Iran	____	____	____
Afghanistan	____	____	____
India	____	____	____
Sri Lanka	____	____	____
Nepal	____	____	____
Myanmar	____	____	____
China	____	____	____

Longitude to Clock: South Asia and China Answer Key

Instructions: Multiply the standard meridian by 4 minutes per degree, then convert the result to hours and minutes.

Place	Meridian	× 4 min/deg	= Offset from UTC
Iran	52.5°	210 min	UTC+3:30
Afghanistan	67.5°	270 min	UTC+4:30
India	82.5°	330 min	UTC+5:30
Sri Lanka	82.5°	330 min	UTC+5:30
Nepal	86.25°	345 min	UTC+5:45
Myanmar	97.5°	390 min	UTC+6:30
China	120°	480 min	UTC+8:00

Longitude to Clock: United States Time Zones

Instructions: Multiply the standard meridian by 4 minutes per degree, then convert the result to hours and minutes.

Place	Meridian	× 4 min/deg	= Offset from UTC
Eastern Time	____	____	____
Central Time	____	____	____
Mountain Time	____	____	____
Pacific Time	____	____	____
Alaska Time	____	____	____
Hawaii-Aleutian Time	____	____	____

Longitude to Clock: United States Time Zones Answer Key

Instructions: Multiply the standard meridian by 4 minutes per degree, then convert the result to hours and minutes.

Place	Meridian	× 4 min/deg	= Offset from UTC
Eastern Time	-75°	-300 min	UTC-5:00
Central Time	-90°	-360 min	UTC-6:00
Mountain Time	-105°	-420 min	UTC-7:00
Pacific Time	-120°	-480 min	UTC-8:00
Alaska Time	-135°	-540 min	UTC-9:00
Hawaii-Aleutian Time	-150°	-600 min	UTC-10:00

Crossing the International Date Line

The International Date Line runs (with some zigzags to keep island nations on one calendar) near 180 degrees longitude - the far side of the world from the Prime Meridian. Crossing it changes the CALENDAR DATE, not the clock time: travel WEST across it and the date jumps forward one day; travel EAST across it and the date jumps back one day.

1. A cargo ship crosses the International Date Line traveling WEST (from Honolulu toward Tokyo). The crew crosses the line at 9:00 PM on a Thursday. What day and time is it on the ship the moment after they cross?

2. American Samoa (UTC-11) and Samoa (UTC+13) are neighboring island nations, separated by the International Date Line. When it is 9:00 AM on Monday in American Samoa, what day and time is it in Samoa, just a short plane ride away?

3. A flight leaves Auckland, New Zealand (UTC+12) at 1:00 AM on a Sunday and lands in Los Angeles (UTC-8) 11 hours later. What day and time does it land?

4. True or False, with a one-sentence explanation: Flying EAST across the International Date Line moves the calendar forward to tomorrow.

Crossing the International Date Line Answer Key

1. A cargo ship crosses the International Date Line traveling WEST (from Honolulu toward Tokyo). The crew crosses the line at 9:00 PM on a Thursday. What day and time is it on the ship the moment after they cross?

9:00 PM Friday - crossing westward adds one day. The clock time doesn't change, only the date.

2. American Samoa (UTC-11) and Samoa (UTC+13) are neighboring island nations, separated by the International Date Line. When it is 9:00 AM on Monday in American Samoa, what day and time is it in Samoa, just a short plane ride away?

9:00 AM Tuesday - the exact same clock time, but the next calendar day.

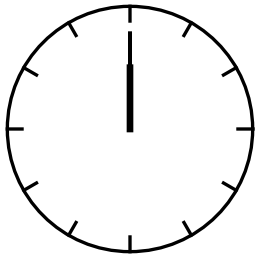
3. A flight leaves Auckland, New Zealand (UTC+12) at 1:00 AM on a Sunday and lands in Los Angeles (UTC-8) 11 hours later. What day and time does it land?

4:00 PM Saturday - the day BEFORE it left, even though the flight took 11 hours.

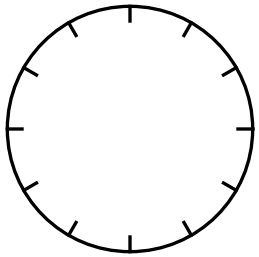
4. True or False, with a one-sentence explanation: Flying EAST across the International Date Line moves the calendar forward to tomorrow.

False - flying east across the date line moves the calendar BACK one day (you repeat part of the day you were just in). Flying west moves it forward.

It Is Noon in London

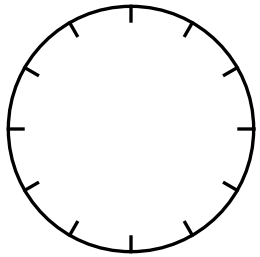


London



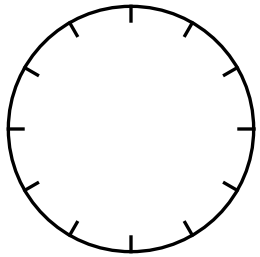
Paris

____ : ____



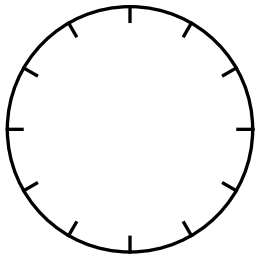
Tehran

____ : ____



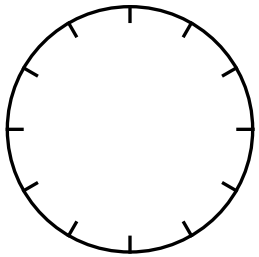
Kabul

____ : ____



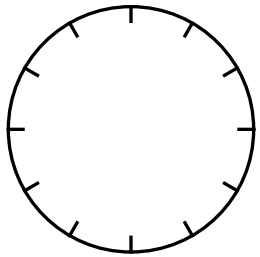
New Delhi

____ : ____



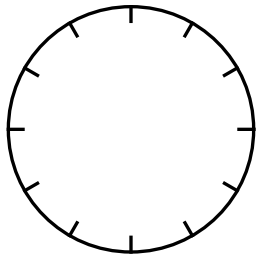
Colombo

____ : ____



Kathmandu

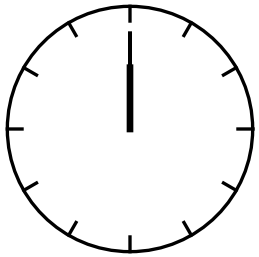
____ : ____



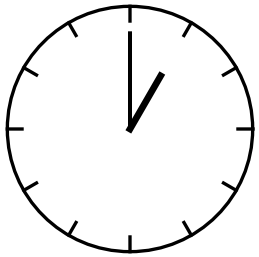
Beijing

____ : ____

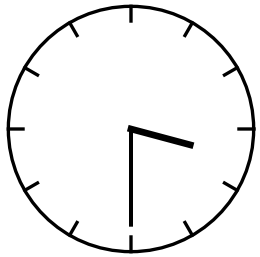
It Is Noon in London Answer Key



London



Paris



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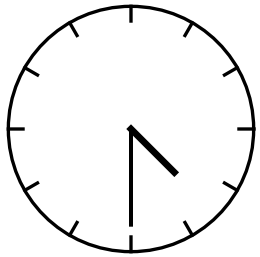
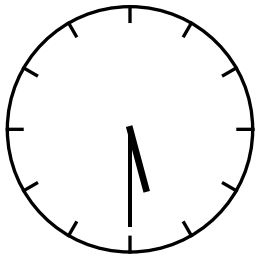
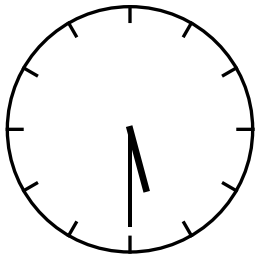


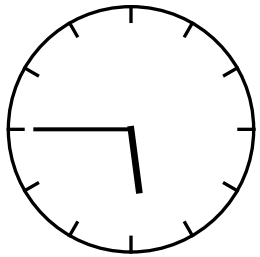
Kabul



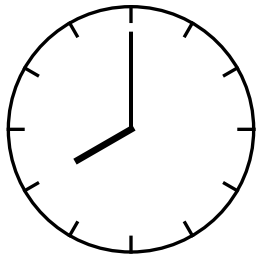
New Delhi



Colombo

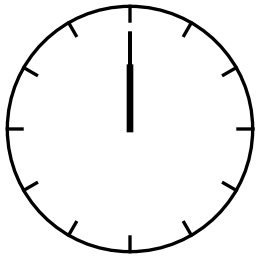


Kathmandu

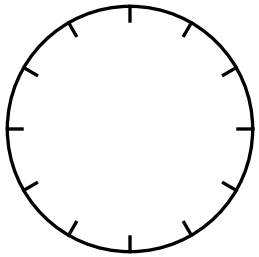


Beijing

It Is Noon in New York City

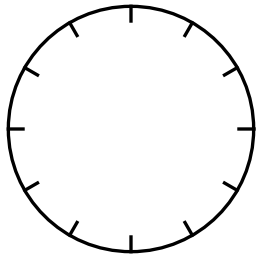


New York City



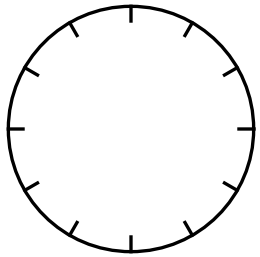
Chicago

____ : ____



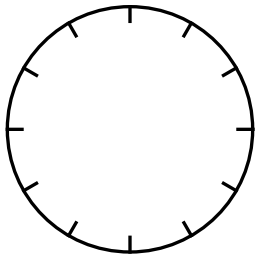
Denver

____ : ____



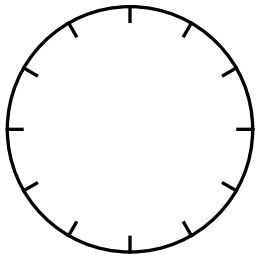
Los Angeles

____ : ____



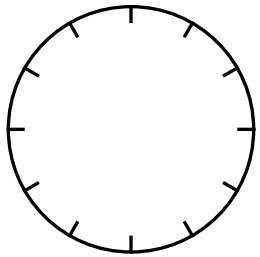
Anchorage

____ : ____



Honolulu

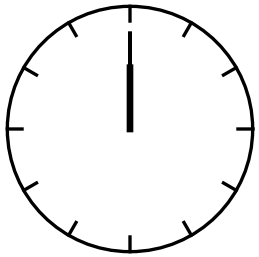
____ : ____



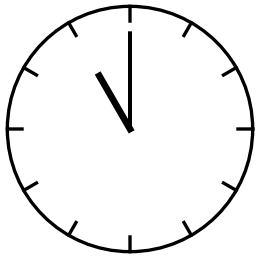
London

____ : ____

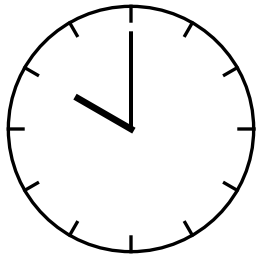
It Is Noon in New York City Answer Key



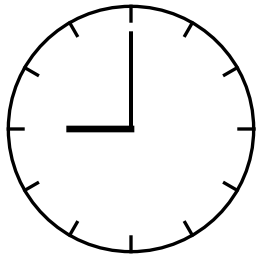
New York City



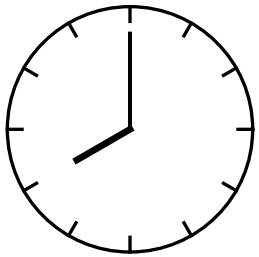
Chicago



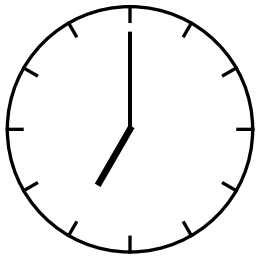
Denver



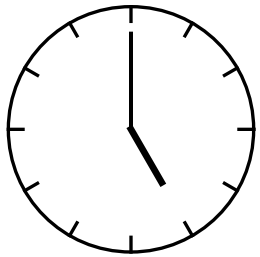
Los Angeles



Anchorage



Honolulu



London

Schedule a Call

People who live far apart have to do a little math before they can talk in real time. Use each city's UTC offset to figure out what time it is for the other person - and whether that's actually a reasonable time to expect them to answer!

1. Your cousin lives in Tokyo (UTC+9). You live in Chicago (UTC-6). It is 8:00 PM on Thursday for you in Chicago. What day and time is it for your cousin?

2. You want to video call a friend in London (UTC+0). It is 7:00 PM on Tuesday in New York (UTC-5). What time is it in London right then - and is that a good time to call, or the middle of the night?

3. Your project team has people in Nairobi (UTC+3), Mumbai (UTC+5:30), and Los Angeles (UTC-8). Your Nairobi teammate is only free after 4:00 PM her time. What is the EARLIEST matching local time for your Los Angeles teammate?

4. In one sentence, explain why it's hard to find a single meeting time that works well for teammates in Los Angeles, Nairobi, and Mumbai all in the same week.

Schedule a Call Answer Key

1. Your cousin lives in Tokyo (UTC+9). You live in Chicago (UTC-6). It is 8:00 PM on Thursday for you in Chicago. What day and time is it for your cousin?

11:00 AM Friday in Tokyo.

2. You want to video call a friend in London (UTC+0). It is 7:00 PM on Tuesday in New York (UTC-5). What time is it in London right then - and is that a good time to call, or the middle of the night?

12:00 AM (midnight) Wednesday in London - the middle of the night, a bad time to call.

3. Your project team has people in Nairobi (UTC+3), Mumbai (UTC+5:30), and Los Angeles (UTC-8). Your Nairobi teammate is only free after 4:00 PM her time. What is the EARLIEST matching local time for your Los Angeles teammate?

5:00 AM in Los Angeles - hard on the West Coast teammate!

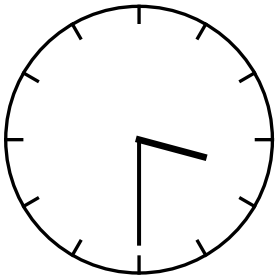
4. In one sentence, explain why it's hard to find a single meeting time that works well for teammates in Los Angeles, Nairobi, and Mumbai all in the same week.

Open response - look for an explanation that the three cities' work-day hours barely overlap because they are so far apart in longitude.

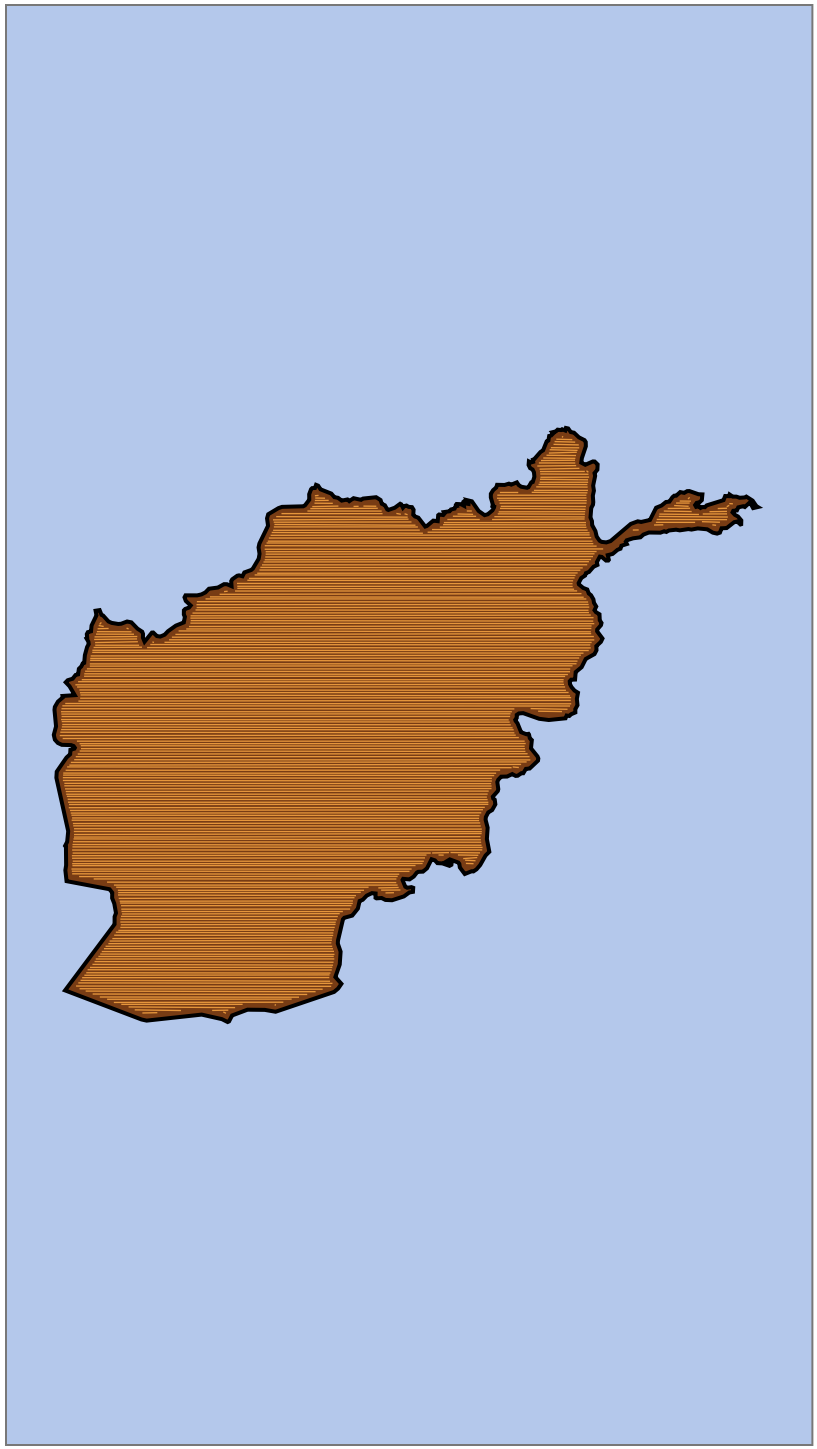
Iran

Capital: Tehran
Time zone: UTC+3:30
Standard meridian: 52.5° (E)
Adopted: 1935

Iran is home to Mount Damavand, the tallest volcano in Asia.



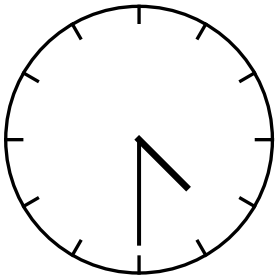
**When it is noon in London,
it is 3:30 PM in Tehran**



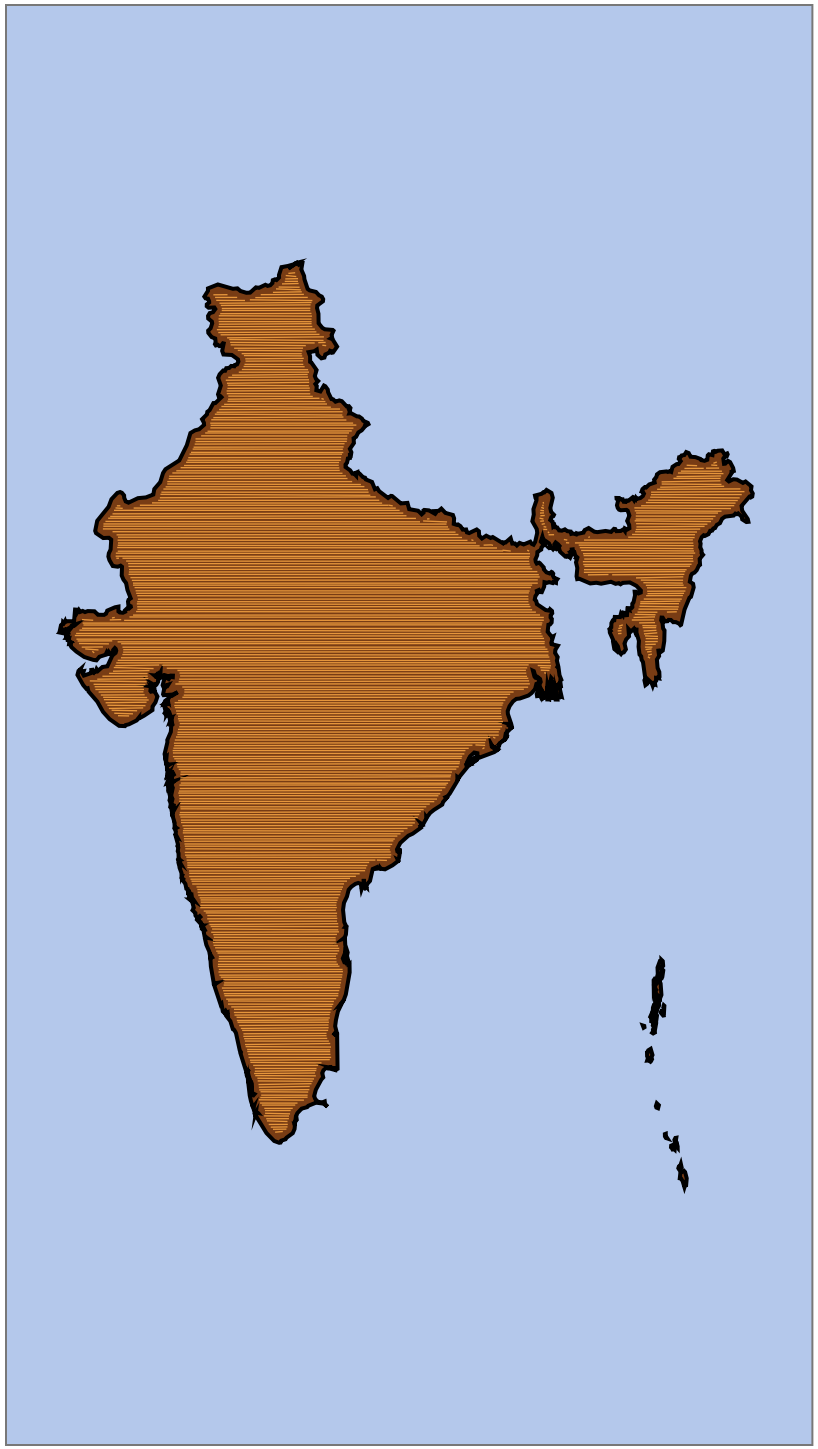
Afghanistan

Capital: Kabul
Time zone: UTC+4:30
Standard meridian: 67.5° (E)
Adopted: 1945

Afghanistan is a mountainous, landlocked country crossed by the ancient Silk Road trade routes.



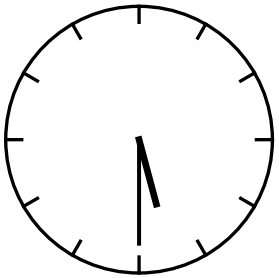
When it is noon in London, it is 4:30 PM in Kabul



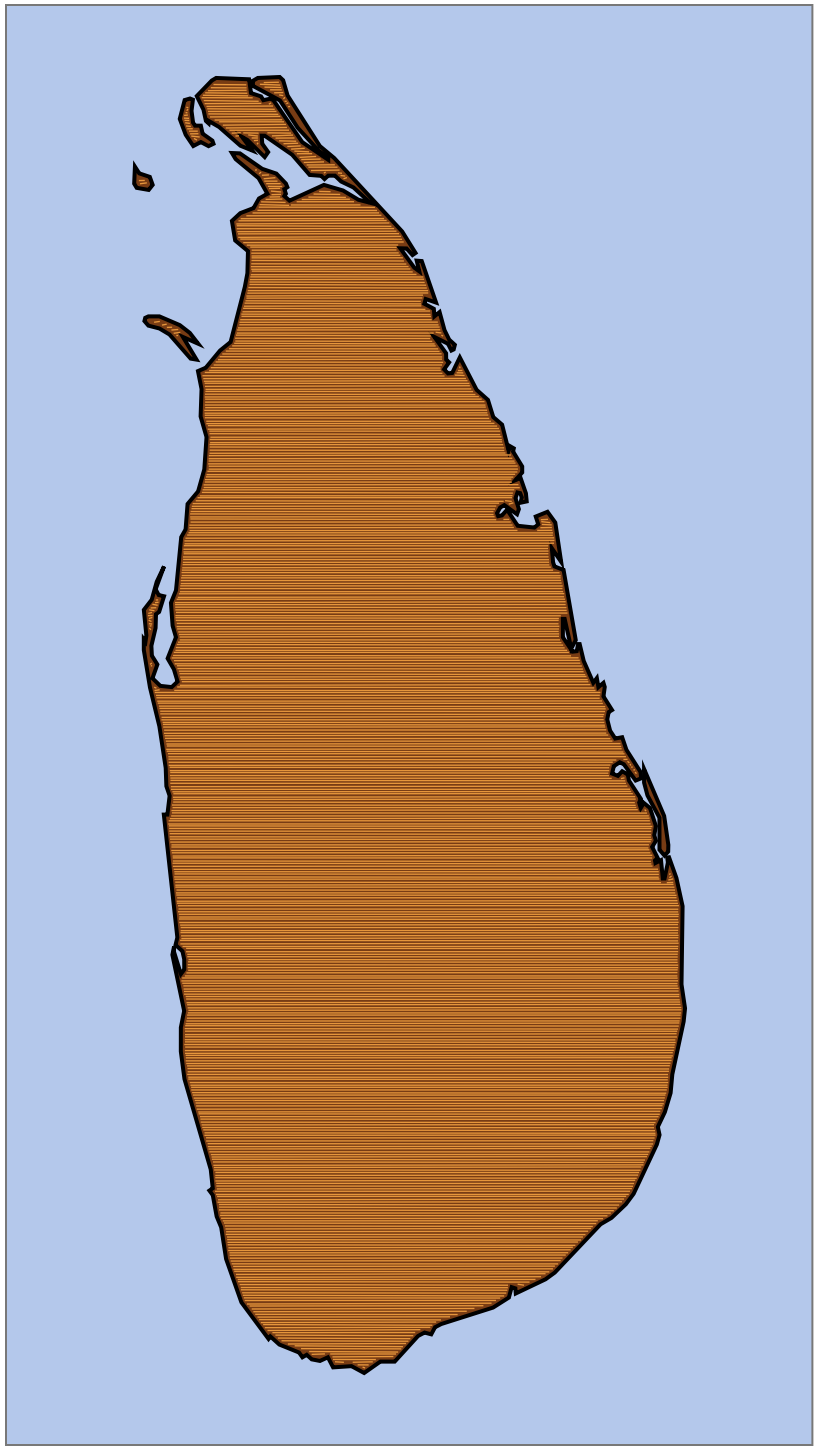
India

Capital: New Delhi
Time zone: UTC+5:30
Standard meridian: 82.5° (E)
Adopted: 1906 (under British rule, and kept after independence in 1947)

India is the most populous country in the world, home to well over a billion people.



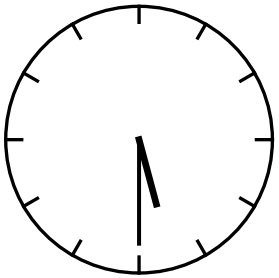
When it is noon in London, it is 5:30 PM in New Delhi



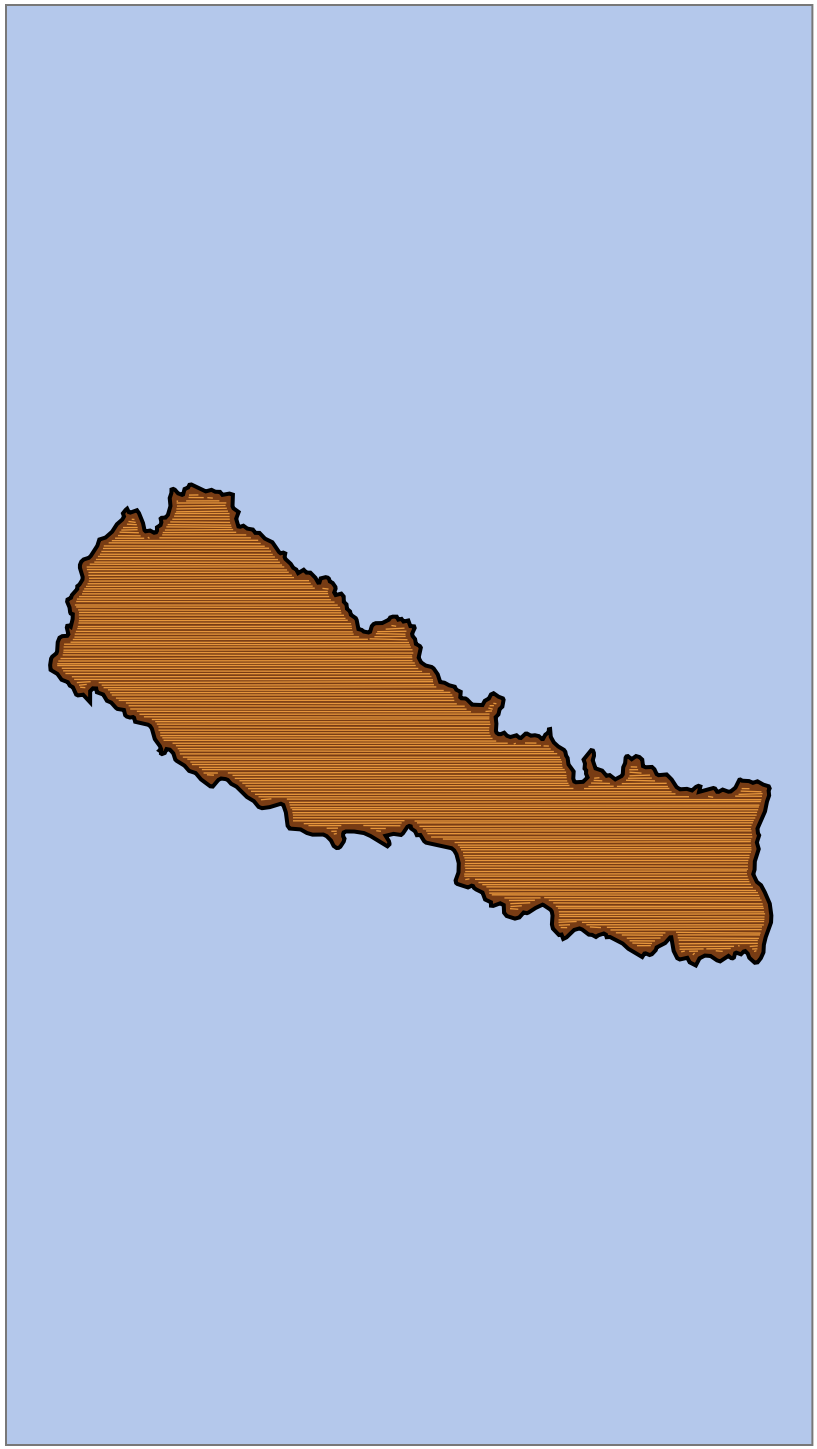
Sri Lanka

Capital: Colombo
Time zone: UTC+5:30
Standard meridian: 82.5° (E)
Adopted: 1906 (switched to UTC+6 in 1996, then came back in 2006)

Sri Lanka is an island nation famous for its tea plantations and ancient royal cities.



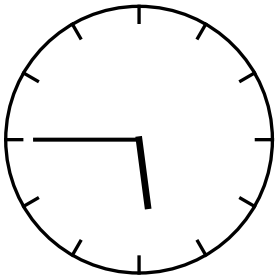
When it is noon in London, it is 5:30 PM in Colombo



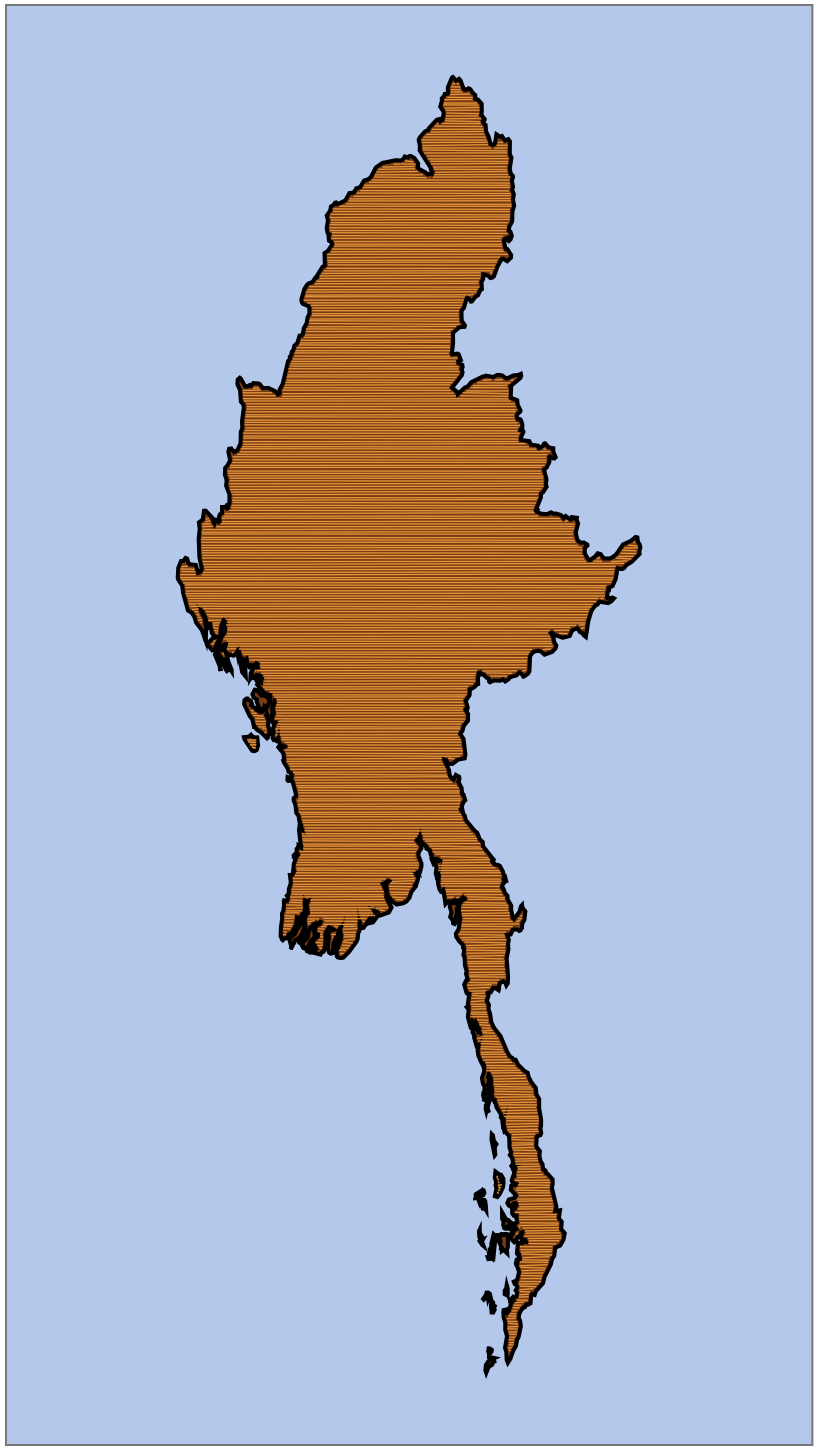
Nepal

Capital: Kathmandu
Time zone: UTC+5:45
Standard meridian: 86.25° (E)
Adopted: 1986 (before that it shared India's UTC+5:30)

Nepal is home to Mount Everest, the tallest mountain on Earth.



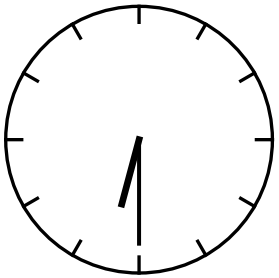
**When it is noon in London,
it is 5:45 PM in Kathmandu**



Myanmar

Capital: Naypyidaw
Time zone: UTC+6:30
Standard meridian: 97.5° (E)
Adopted: 1920

Myanmar has thousands of ancient Buddhist temples in the city of Bagan.

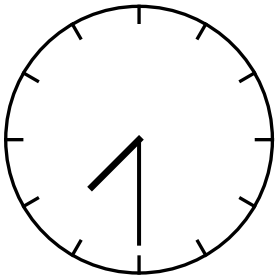


When it is noon in London, it is 6:30 PM in Naypyidaw

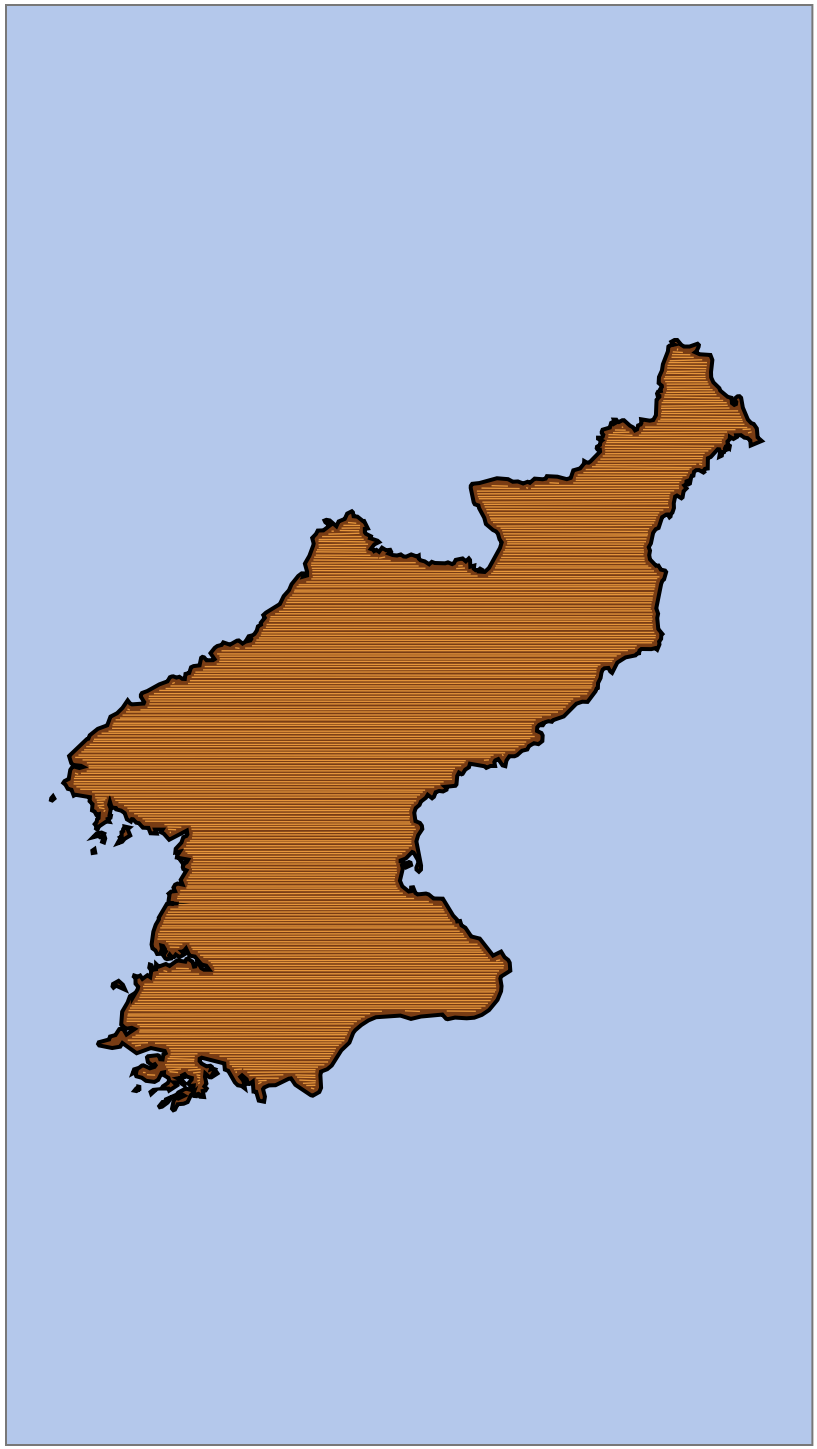
Venezuela

Capital: Caracas
Time zone: UTC-4:30 from 2007 to 2016
Standard meridian: 67.5° (W)
Adopted: 2007
Back on the hour: 2016 (UTC-4:00)

Venezuela is home to Angel Falls, the tallest waterfall in the world.



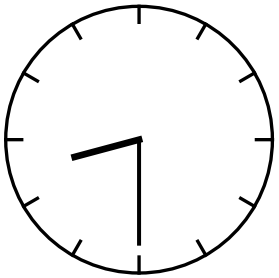
When it was noon in London, it was 7:30 AM in Caracas



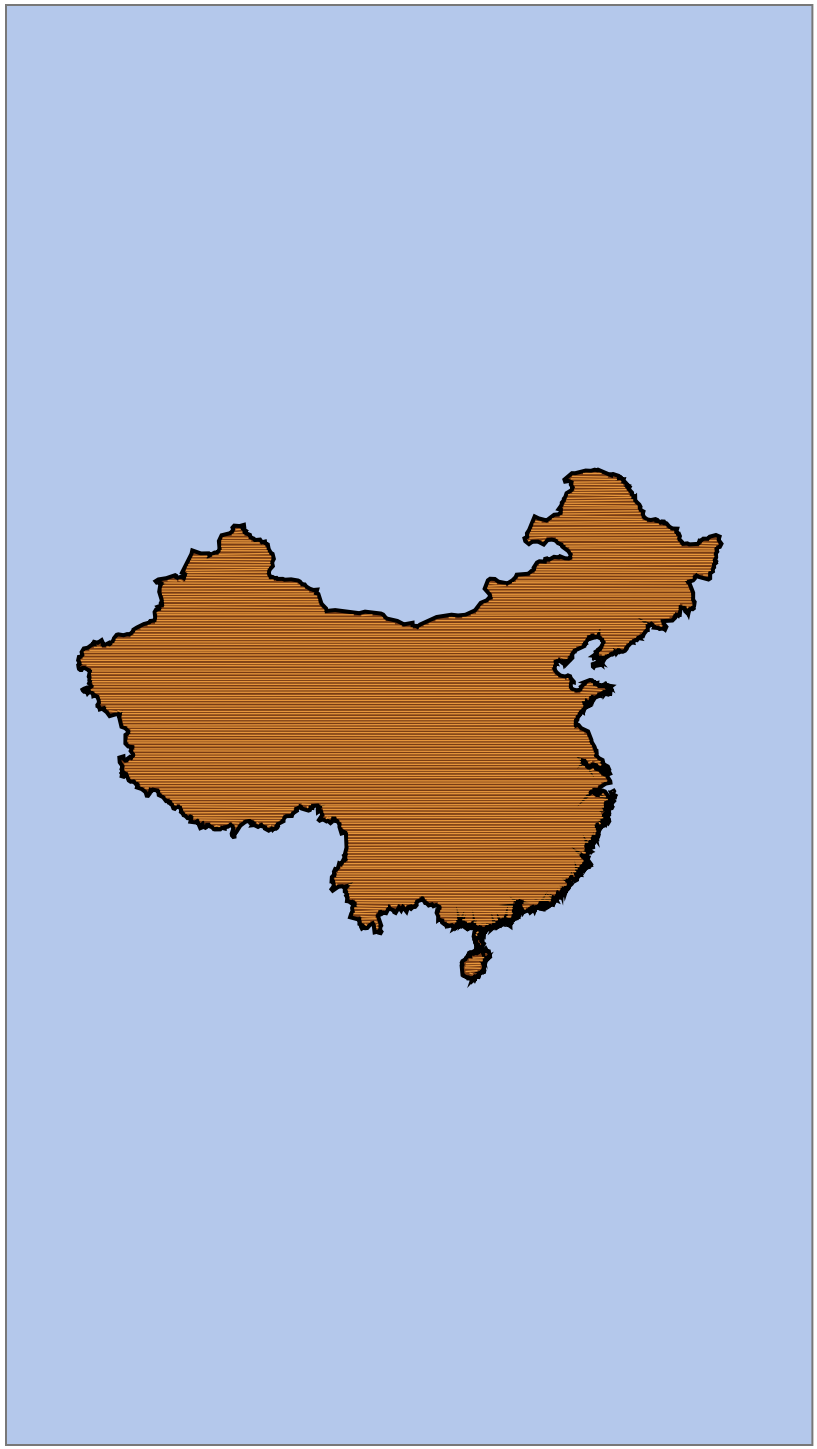
North Korea

Capital: Pyongyang
Time zone: UTC+8:30 from 2015 to 2018
Standard meridian: 127.5° (E)
Adopted: 2015 (30 minutes behind its neighbor South Korea)
Back on the hour: 2018 (UTC+9:00)

Mount Paektu, a volcano with a lake in its crater, is North Korea's highest mountain.



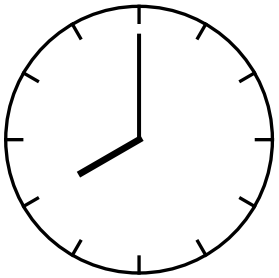
When it was noon in London, it was 8:30 PM in Pyongyang



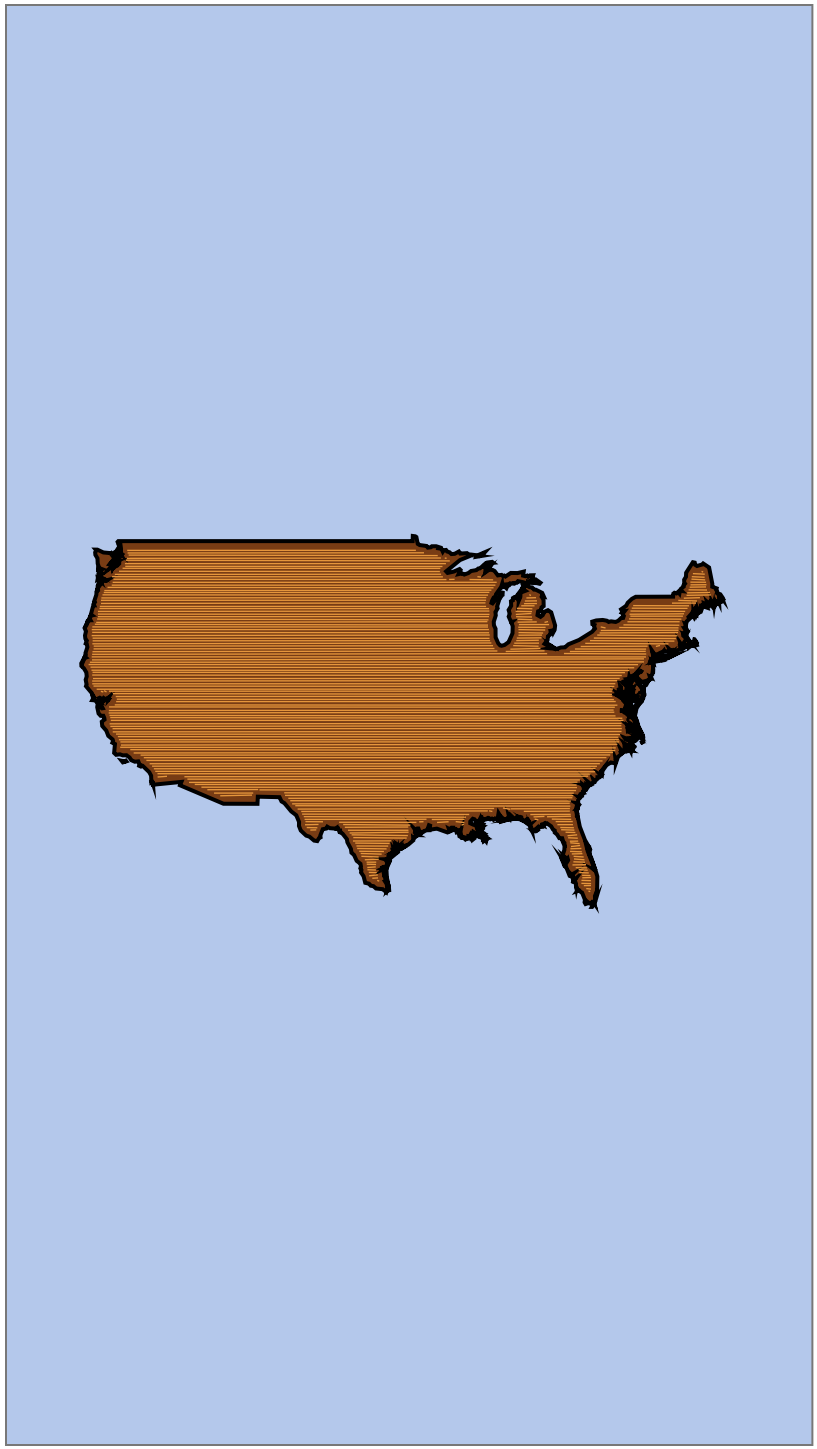
China

Capital: Beijing
Time zone: UTC+8:00
Standard meridian: 120° (E)
Adopted: 1949 (replacing five separate zones set up in 1912)

China stretches as wide as five natural time zones, but every clock in the country is set to Beijing Time.



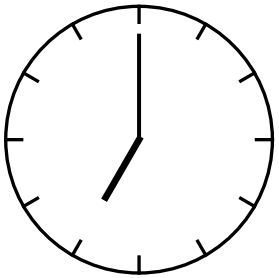
When it is noon in London, it is 8:00 PM in Beijing



United States of America

Capital: Washington, D.C.
Time zone: UTC-5:00
Standard meridian: 75° (W)
Adopted: 1883 (set up by the railroads; made federal law in 1918)

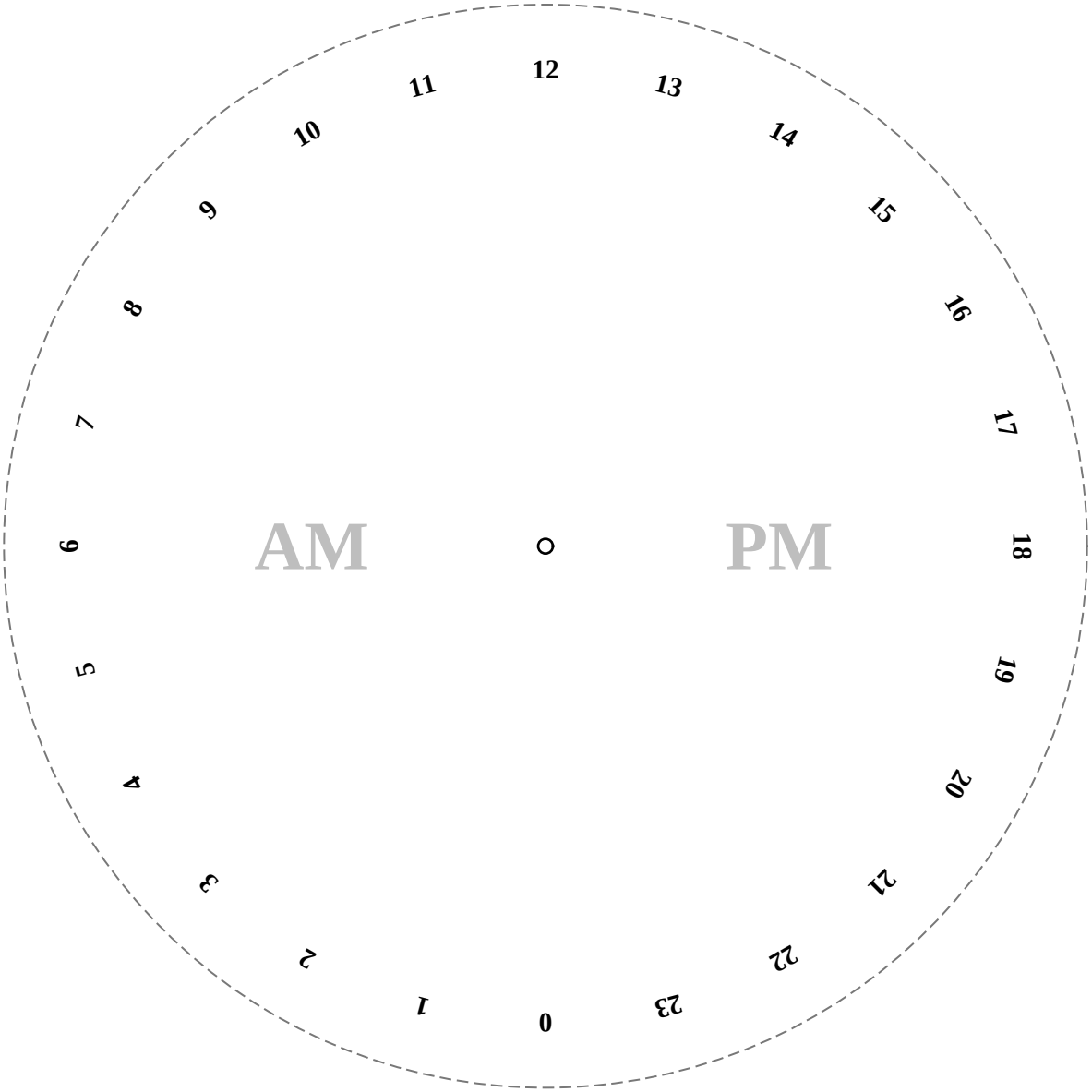
The United States is so wide that when it's breakfast time on the East Coast, it's still the middle of the night in Hawaii.



When it is noon in London,
it is 7:00 AM in Washington, D.C.

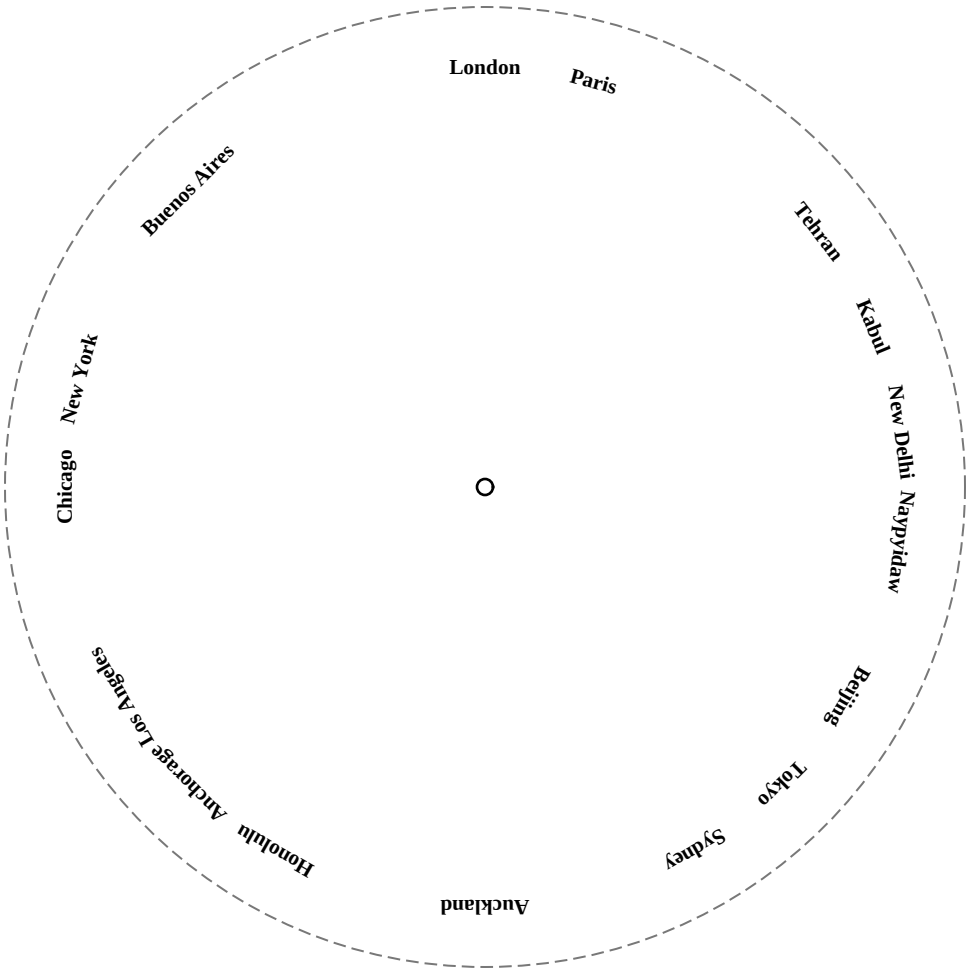
Paper Time Zone Wheel: Hour Disc

How to build it: (1) Cut out both dashed circles - the hour disc below, and the cities disc on the next page. (2) Carefully poke a small hole through the center dot of each circle. (3) Stack the cities disc ON TOP of the hour disc, holes lined up, and push a brass paper fastener through both. (4) Spin the cities disc until the one city whose time you already know sits next to its matching hour on the disc below. Every other city now shows its own correct time, all at once.



Paper Time Zone Wheel: Cities Disc

Cut out this disc and stack it on top of the hour disc from the previous page - see the instructions there.



China
Beijing

Canada
Ottawa

Australia
Canberra

Afghanistan
Kabul

Nepal
Kathmandu

Myanmar
Yangon

Iran
Tehran

India
New Delhi

Venezuela
Caracas

United States of America
Washington D.C.

Sri Lanka
Sri Jayawardenapura

North Korea
Pyongyang

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