Global Travel & Tourism Partnership

GTTPSA

South Africa

TOURISM LEARNING AND TEACHING SUPPORT MATERIALS

UNDERSTANDING TIME ZONES

This teaching resource is brought to you by:

NBI
NATIONAL BUSINESS INITIATIVE

The GTTP SA is managed by:

KUNDIZA
TRAINING AND CONSULTING

Introduction

This teaching guide has been sponsored by the National Business Initiative (NBI). It will provide you, the educator, with information and tools to assist and enhance your teaching methods. This Learning and Teaching resource will assist you to teach your learners about time zones and related topics.

Learner activities and case studies are included as part of this resource to help learners better understand the concepts of global time. Learners can do these activities individually or in groups or pairs.

Topic: Understanding Times Zones
Grade: 12
Duration: Approximately 1 week

This teaching and learning resource provides you with information and ideas to teach the following topics:

- World time zones
- UTC (formerly GMT) and the International Date Line (IDL)
- Latitude and Longitude - locating cities using latitude and longitude
- The use of the 24-hour clock
- Daylight Saving Time (DST) – why this is used and the impact of DST on travel planning.
- Jet Lag – symptoms, causes and prevention.
- Time Zones calculations (direct and through case studies)

At the end of these lessons the learner should be able to demonstrate an understanding of …

1. Time zones
2. Daylight Saving Time (DST)
3. Jet lag
4. The impact that the above have on travel planning and travelling

Contents

1 Terminology

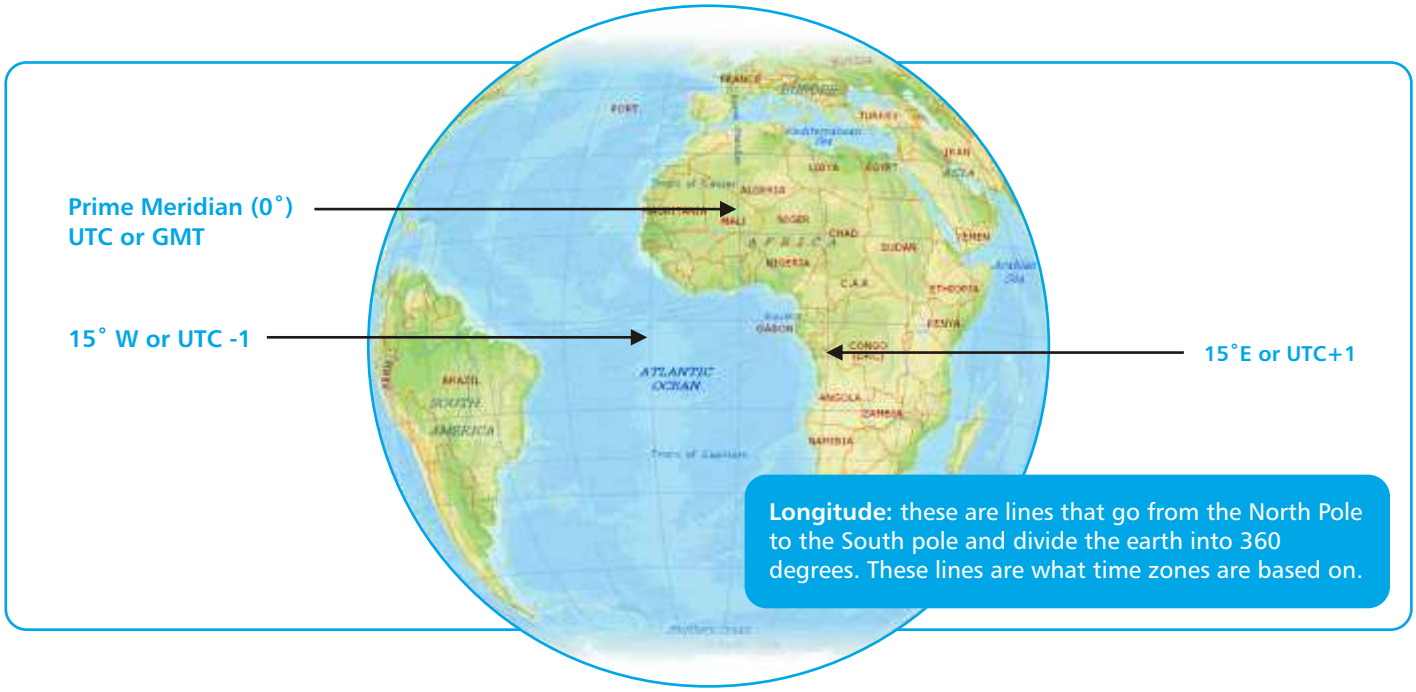
Time zones	Daylight Saving Time
Local time	British Summer Time
Standard time	International Date Line
Imaginary lines	Northern Hemisphere
Meridian	Southern Hemisphere
Rotate	South Pole
Prime Meridian	24 hour clock
Coordinated Universal Time	Coordinates
Longitude	Jet lag
Latitude	Dehydration
Greenwich Mean Time	Deep Vein Thrombosis
North Pole	Long haul flights

2 Time Zones

A time zone is a region of the Earth that has adopted the same standard time, usually referred to as the **local time**. Time zones are indicated as imaginary lines that run from north to south down the globe.

As the earth rotates on its axis (from **west** to **east**), half of the planet experiences day, and the other half experiences night. It is therefore understandable that all places on earth cannot have the same time.

In 1884, delegates from 25 countries met and agreed to divide the world into time zones. If you draw a line from the North Pole



Longitude: these are lines that go from the North Pole to the South pole and divide the earth into 360 degrees. These lines are what time zones are based on.

to the South Pole and back to the North Pole, you draw a full circle. The delegates divided the 360 degrees of the circle into 24 zones. Each of the time zones represents 15 degrees (15°) longitude, or the distance that the earth rotates in one hour.

They decided to start counting from Greenwich (pronounced GREN-itch), England, which is 0 degrees longitude or the **Prime Meridian** (0°). The 0° longitude is an imaginary line that goes from the North Pole to the South Pole. Until recently, this base zone was called **Greenwich Mean Time** or GMT as the line went through the city of Greenwich in England.

Coordinated Universal Time

Until fairly recently, time zones were based on Greenwich Mean Time (GMT, also called UT1), the time at longitude 0° (the Prime Meridian).

Greenwich Mean Time is not 100% accurate as it is based on the time that the earth takes to rotate in a day, and there is a slight (1 second) inconsistency in how long this takes.

In January 1972, however, a new time system called **Coordinated Universal Time** (UTC) was introduced instead of GMT. UTC, like Greenwich Mean Time, is set at 0 degrees longitude on the prime meridian.

Coordinated Universal Time is a time scale that combines Greenwich Mean Time, which is slightly inaccurate, with highly accurate atomic time.

South African Time:
South African time is GMT +2 hours – so if it is 12h00 in the UK, it is 14h00 (2pm) in South Africa.

UTC is coordinated in Paris by the International Bureau of Weights and Measures.

With the implementation of UTC, nations began to use it in the definition of their time zones instead of GMT. As of 2005, most but not all nations had altered the definition of local time in this way (though many media outlets fail to make a distinction between GMT and UTC).

As one travels west from UTC, the time becomes earlier; as one travels east, the time becomes later.

To indicate time ahead of UTC, use "+", e.g. a country 30°E will be 2 hours ahead of UTC, therefore UTC +2. To indicate time behind UTC, use "-", e.g. a country 30°W will be 2 hours behind of UTC, therefore UTC -2.

ALL PLACES WEST OF UTC WILL BE EARLIER (subtract time)													ALL PLACES EAST OF UTC WILL BE LATER (add time)											
-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	UTC	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12
180° W	165° W	150° W	135° W	120° W	105° W	90° W	75° W	60° W	45° W	30° W	15° W		15° E	30° E	45° E	60° E	75° E	90° E	105° E	120° E	135° E	150° E	165° E	180° E

The hours a country is ahead of or behind UTC is called the **Standard Time** (local time) for that specific country.

Time Zones

Time zone lines are not straight lines. The imaginary lines that divide time zones sometimes curve or form angles that go around some smaller countries to ensure that the entire country has the same time zone. Can you imagine the confusion if Cape Town had to have one time and Johannesburg another? The lines are drawn along the borders of a country so that it includes the country as a whole. For example, some lines curve around the Pacific Island groups so that island countries that cover relatively small areas will not have different time zones.

The **International Date Line** usually follows the 180° meridian. Travelling west across this imaginary line, you add one day. Travelling east, you subtract one day.

International Date Line:

The International Date Line is at 180 degrees of longitude. The date is different on either side of this imaginary line located in the Pacific Ocean.

The meridians are traditionally counted from the meridian of the observatory of Greenwich, in England, which is called the zero meridian. The logical place for changing the date is 12 hours, or 180°, from Greenwich. Luckily, the 180th meridian runs mostly through the open Pacific Ocean. The Date Line makes a zigzag in the north to incorporate the eastern tip of Siberia into the Siberian time system and then another one to incorporate a number of islands into the Hawaii-Aleutian time zone. In the south there is a similar zigzag to connect a number of British-owned islands to the New Zealand time system.

Otherwise, the Date Line is the same as 180° from Greenwich. At points to the east of the Date Line the calendar is one day earlier than at points to the west of it.

A traveller going eastward across the Date Line from one island to another would not have to reset his watch because he would stay inside the time zone, but it would be the same time of the previous day!

Because of size, some countries span across more than one time zone. In the United States of America, there are four time zones: Eastern, Central, Mountain, and Pacific. Each time zone varies by one hour, so when it is 7 p.m. in the Eastern time zone, it is 6 p.m. in the Central time zone, 5 p.m. in the Mountain time zone, and 4 p.m. in the Pacific time zone.

3 What is Latitude and Longitude?

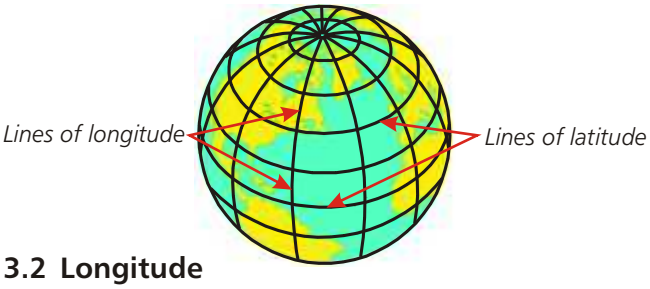
3.1 Latitude

The equator divides the planet into a Northern Hemisphere and a Southern Hemisphere, and has a latitude of 0°.
Latitude gives the location of a place on Earth north or south of the equator. Lines of Latitude are the horizontal lines shown running east-to-west on maps.

Technically, latitude is an angular measurement in degrees (marked with °) ranging from 0° at the equator (low latitude) to 90° at the poles (90° N for the North Pole or 90° S for the South Pole; high latitude).

Lines of latitude look straight and horizontal in the projection below, but they are actually circular with different radii. All locations with the same latitude are collectively referred to as a circle of latitude.

Latitude: lines of latitude go around the earth, with the Equator being the line in the middle that divides the earth into the North and South Hemispheres. The Equator is also the longest line of latitude as it stretches around the widest part of the planet. The lines north and south get shorter and shorter toward the Poles.



3.2 Longitude

Lines of longitude appear curved and vertical in this projection, but are actually halves of great circles. Unlike latitude, which has the equator as a natural starting position, there is no natural starting position for longitude. Therefore, a reference meridian had to be chosen. In 1884, the International Meridian Conference adopted the Greenwich meridian as the universal prime meridian or zero point of longitude.

4 The 24-Hour Clock

The 24-hour clock eliminates confusion between morning time and afternoon time. Airline schedules use the 24-hour clock to state times of departure and arrival. When one works with time zones and calculates time differences between countries, it is important to be familiar with the 24-hour clock. The 24-hour clock and its equivalent a.m. and p.m. times are as follows.

01:00	1.a.m. (early hours of the morning)
07:00	7 a.m. (morning)
12:00	12 noon (midday)
13:00	1 p.m.
19:00	7 p.m. (evening)
23:59	One minute to midnight
00:00	12 midnight
00:01	One minute past midnight

By using the 24-hour clock you can eliminate mistakes or uncertainty as to whether you mean a.m. or p.m.

Tip – to calculate times after 12 midday on the 24-hour clock, remember that any time after midday is the same time plus 12. So, if it is 4 o'clock, then add 4 and 12 and it gives you 16h00. If it is 7 o'clock at night, then add 7 and 12, and it is 19h00!

4.1 Current World Time

Time and Date	City	UTC
9:10 PM - Tue, Apr 13	Johannesburg	+2:00
3:10 AM - Wed, Apr 14	Perth	+8:00
4:10 AM - Wed, Apr 14	Tokyo	+9:00
8:10 PM - Tue, Apr 13	London	+1:00
3:10 PM - Tue, Apr 13	New York City	–4:00

Time Zone Calculations: Examples

Example 1

To determine the time and day in different time zones, follow these easy steps:

1. Locate a place for which you already know the time and day on a time zone map.
2. Locate the place for which you wish to know the time and the day of the week.
3. Count the time zones between the two places.
4. Calculate the time by either adding or subtracting an hour for each time zone, depending on whether you are moving east or west.
5. If you have crossed The International Date Line, identify the day.

Example 2

Question: it is 09:00 in South Africa. What time and day will it be in New York?

STEP 1: Identify the time zones of the countries in question

- Use the time zone map to identify the time zones
- South Africa = +2 ; USA/New York is = -5
- Use the coordinates to identify the time zones
- Divide the coordinates by 15 °
- South Africa = 30 °E = 30/15 = 2 USA/New York = 75 °W = 75/15 = 5

STEP 2: Determine the time difference between the two countries

Different methods to use:

- Use the time zone map: Put a finger on the time zone for SA (+2) and move until you reach the time zone for USA/New York (-5), as your finger moves, you count the number of time zones that you cross.
- Draw a number line to represent all the time zones and count the timelines from one country to the next.
- Use this simple rule of the signs (+ / -) to determine the time difference:
  If the signs are the same (both plus (+) or both minus (-) you **subtract** the smaller number from the biggest one i.e. South Africa + 2 , and Bangkok +7, Time difference will be 05hours. If they are one plus (+) and the other one minus (-) you **add** the time zones together i.e.
  South Africa = +2
  USA/New York = - 5
  Time difference = 7 hours

Step 3: Determine the direction of travel to see if you should add the time difference or subtract the time difference, to determine actual time

- Always start from the known country (SA) to the unknown country (USA/New York)
- If you move forward/to the right/east from known to unknown, you will add the time difference
- If you move backward/to left/west from known to unknown, you will subtract the time difference

Different methods to use:

- If you move from SA (known) to USA/New York (unknown), you are travelling backwards/to the left therefore you will subtract the time.
- On the Time Zone Map: finger on +2 and move to -5, at every time zone that you cross you subtract one hour.
- On 24 hr clock: start at known time and move backwards while counting 7 hrs
- Mathematically: subtract 7 from 9 to determine actual time

Solution

South Africa = +2
USA/New York = – 5
Time difference = 7 hours
(known time – time difference = actual time)
09:00 – 7hrs = 02:00
It will be 02:00 on the same day

4.2 Flying Time

- If you want to determine the arrival time you must add the flying time to the answer obtained after step 3.
- If you want to determine the departure time you must subtract from the answer obtained after step 3

Flying Time Calculation: Examples

Example 1:

- James Ndlovu from South Africa will be departing on a business trip to Rio de Janeiro on 21 March 2009 at 08:00 and his flight will last for fourteen hours. What will the time and date be when he arrives in Rio de Janeiro?

Instruction 1: Complete steps 1 – 3
South Africa = +2
Rio de Janeiro = - 3
Time difference = 5hrs
08:00 – 5hrs = 03:00
Instruction 2: Add the flying time
03:00 + 14 hrs flying time = 17:00 on 21 March 2009

More Examples

1. Mr Govender and his wife, from Johannesburg want to visit family in Perth. They will be departing on Thursday 22 June 2009 at 14:00. The flying time is eleven and a half hours. Calculate the time and date of arrival.

2. A flight leaves Cape Town for Paris, France on 23 November at 15:20. The flight duration is 10 hours and 10 minutes. Calculate the time and date when the plane lands in Paris.
3. An executive from Cape Town arrives in Sydney, Australia at 14:30 on 14 May 2009 for a meeting. The flying time was 23 hours. At what time and date did his flight depart from SA?

Learner Activity 1: Calculations

During the 2009 FIFA Confederations Cup, soccer spectators from Washington (-5 UTC) and Tokyo (+9 UTC) flew to South Africa (OR Tambo International Airport) to attend the official opening of the soccer extravaganza (spectacular). The official time for the opening in the Ellis Park Soccer Stadium in Gauteng was 17:00 (local time) on 14 June 2009. The visitors from Washington and Tokyo landed in South Africa three hours before the official opening

1. Calculate the departure time and the date in Washington if the flying time was 15 hours.

(4)

2. Calculate the departure time and the date in Tokyo if the flying time was 18 hours.

(4)

3. At the time of their arrival in South Africa, one of the spectators from Tokyo decided to phone his friend in Berlin (UTC+1). Calculate the time at which the phone call was received in Berlin.

(2)

5 Daylight Saving Time (DST)

Daylight Savings Time (DST) is the practice of moving clocks ahead usually, but not always, by one hour. Daylight saving time is most often implemented in the spring and ends in late autumn. DST is also known as *summer time* in some locations.

The benefit of daylight saving time is that by moving the clock ahead by one hour, sunset will happen later in the day thus creating more daylight for people to take advantage of. By having more daylight later in the day the theory is that less energy will be used for lighting, more people will go shopping after work because it is still daylight, people will have more recreation time later into the night and so on.

When daylight saving time ends and the clocks are moved back to the original time, the time is then referred to as **Standard Time.**

Most time zones have abbreviations. By looking at the abbreviation you can often tell if the time is based on standard time or daylight saving time. Example: PST stands for Pacific Standard Time while PDT stands for Pacific Daylight Time.

While the above rule is often accurate, like all good rules, there are exceptions. Since some regions prefer to use the term Summer Time, the S in the abbreviation can sometimes refer to Summer rather than Standard. Example: CET stands for Central Europe Time while CEST stands for Central Europe Summer Time.

Different regions around the world follow different rules as to when daylight saving time begins and ends. The rules are, for the most part, established well in advance but some countries start and end their daylight saving time with less than one week's notice.

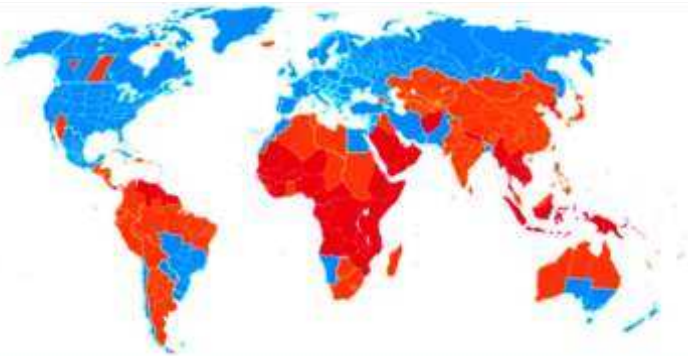
There are numerous factors that can impact when daylight saving time begins and ends. Some of the factors are:

- The **latitude** of location.
- Religious holidays (**Ramadan - Islamic countries**) or festivals (**Carnival - Brazil**).
- Whether the location is in the northern (**North America, Europe**, etc) or southern (**Australia, New Zealand**, etc) hemisphere.

Remember that when it is summer in the **northern hemisphere**, it is winter in the **southern hemisphere** and vice versa.

Example:
The Prime Meridian runs through Greenwich, which is in the UK. The standard time in the UK is therefore GMT +0. The standard time in South Africa is GMT+2. This means that the UK is 2 hours behind our time.

In the Northern Hemisphere summer time, the UK switches to daylight saving time . This means that in NH summer, the UK is only one hour behind South Africa. However, in NH winter, the UK is again 2 hours behind us because they go back to their normal standard time which is GMT +0.



DST used
DST no longer used
DST never used

Did you know:
South Africa used DST briefly during World War II?

The chart below gives the starting and ending dates along with other information about daylight saving time rules for major regions around the world.

Region	Start Date (2010)	Start Time	End Date (2010)	End Time
Europe	28 March	02:00	31 October	02:00
Mexico	14 March	02:00	7 November	02:00
North America: USA	14 March	02:00	7 November	02:00
South America: Argentina	17 October	02:00	20 March	02:00
South America: Brazil	17 October	00:00	20 February	00:00
South America: Chile	10 October	00:00	27 March	00:00
Australia	3 October	02:00	3 April	02:00
New Zealand	26 September	02:00	3 April	02:00

Learner Activity 2: Time Calculations

1. Determine the time in the following cities if it is 12:00 in Johannesburg. Do not consider DST.

   New York
   Perth
   Cairo
   Tokyo
   Los Angeles
   Paris
   Rio de Janeiro
   Nairobi
   London
   Beijing

2. Determine the time zone for countries along the following lines of longitude:

120° W	
135° E	
60 ° E	
75 ° W	
75 ° E	

3. Determine the day, date and time in South Africa if it is: (do not consider DST)

Time	City	Day	Date
07:00	Alaska	Wednesday	13 August
06:00	Moscow	Saturday	10 May
17:00	Dallas	Monday	1 November
24:00	Tokyo	Sunday	26 December
04:00	Sydney	Thursday	22 February
18:00	Rio de Janeiro	Friday	3 July

6 Jet Lag

Many tourists who arrive in South Africa are suffering from a condition known as jet lag. It is important that everyone in the tourism industry knows what this is so that we can be sympathetic when dealing with visitors who are suffering from it.

Jet lag is a sleep disorder that occurs when the body's biological clock does not correspond to local time. This happens when travelling around the world across different time zones.

To explain this, we need to understand that we all have a biological body clock that regulates our body processes on a 24-hour cycle. These processes include temperature, hormones, digestion, heart rate, blood pressure and brain states. This changing rate of activity over each 24-hour period is called the circadian rhythm ('circadian' means approximately one day). Jet lag therefore disrupts this rhythm, and can lead to all sorts of symptoms as these basic body processes are upset.

For example, the time in a tourists' home country is 4 in the morning, and the place they arrived at and are staying is 2 in the afternoon. They will then be very tired as they are used to being asleep at that time of day. Their body clock tells them that it is the early hours of the morning, and needs to sleep and therefore they are very tired. However, according to local time, they still have a long time to go before they can go to sleep in the evening. This will make them very tired, irritable and they may also have other physical and emotional side effects.

When travelling across a number of time zones, the body clock will be out of synchronisation with the destination time, as it experiences daylight and darkness different to the rhythms to which it has grown accustomed. The body's natural pattern is upset, as the rhythms that dictate times for eating, sleeping, hormone regulation and body temperature variations no longer correspond to the time of day where they are. This difference between the time at the place of origin, and the time at the place of arrival, is known as jet lag.

The speed at which the body adjusts to the new schedule depends on the individual; some people may require several days to adjust to a new time zone, while others adjust quickly and easily.

Crossing one or two time zones does not typically cause jet lag. The condition is not linked to the length of flight, but to the transmeridian (east-west) distance travelled. A ten-hour flight from Europe to southern Africa does not cause jet lag, as travel is primarily north-south, and the time stays much the same between place of departure and place of arrival. However, a five hour flight from the west to the east coast of the United States may well result in jet lag as it crosses a number of time zones.

There is no cure for jet lag, but its effects can be reduced with careful planning.

What Causes Jet Lag?

Crossing time zones – The main, but not the only cause of jet lag, is crossing time zones. Children under three don't seem to suffer jet lag as badly as they are more adaptive and less set in their ways. Adults who adjust easily to changes of routine also seem less susceptible to jet lag. People who have a fixed daily routine are often the worst affected.

Jet Lag debates

East or west – There is much debate about whether it is better to fly eastward or westward. It may be largely a matter of personal preference, but there is some evidence that flying westwards causes less jet lag than flying eastwards.

Night or day flight – Most travellers think daytime flights cause less jet lag.

Sleeping pills – Some people use sleeping tablets to try to alleviate jet lag. This is a dangerous approach as sleeping pills induce a comatose state with little or no natural body movement, and it is well known that prolonged immobility during flight can lead to fatal blood clots (DVT - deep vein thrombosis).

Causes of Jet Lag	Reduce Jet Lag
Your pre-flight condition: Anyone who is over-tired, excited, stressed, nervous, or hung-over before a long flight, is likely to get jet lag.	**Pre-flight:** This is one of the most important aspects of combating jet lag. Ensure you are not stressed-out with excitement or worry, and not tired or hangover from a function the night before. Get plenty of exercise in the days prior to departure and try to avoid sickness such as the flu, colds and so on. If you have a cold, flying will probably make it worse – ideally you should delay the trip. Get a good night's sleep just prior to departure.
Dry atmosphere: The air aboard passenger jet aircraft is dry. The change can be striking to people who normally live in more humid conditions. The dryness can cause headaches, dry skin and dry nasal and throat membranes, creating the conditions for catching colds, coughs, sore throats or the flu.	**Drinking fluids:** The dry air in aircraft causes dehydration. Drinking plenty of non-alcoholic fluids such as water counters this. Coffee, tea, alcoholic drinks and fruit juices are not recommended. Water is what your body wants.
Alcohol: The impact of alcohol on the body is two to three times more potent when flying. One glass of wine in-flight has the effect of two to three glasses on the ground. Add this to the other problems mentioned here, and you can get off the plane with a huge hangover that simply compounds the effects of jet lag.	**Alcohol:** not only is alcohol useless in combating dehydration, but has a markedly greater intoxicating effect when drunk in an aircraft than it does at ground level. Drink water instead - not tea, coffee or any other drinks.

Causes of Jet Lag	Reduce Jet Lag
Food and drink: Airline coffee and tea have a higher than usual caffeine content and are abrasive on the stomach. Orange juice is also abrasive if you are not used to it. If you don't normally drink really strong coffee, tea or orange juice, don't try it while flying.	**Food and drink:** Passengers should not eat too much of the meals as this can make them uncomfortable as they cannot walk around to settle a meal. Also go easy on the frequent meals served in-flight. You don't need them, and sitting in a cramped position puts extra pressure on your stomach. Also beware of risky foods served on some airlines in certain parts of the world, including salads and cold meat and fish. According to WHO, 50% of international travellers get stomach problems, so dietary care is important while flying.
Cabin pressure: Cruising at high altitudes, the aircraft is pressurized. This pressure may result in leg swelling, tiredness and lethargy.	**Showers:** During extended stopovers on a long haul flight, showers are sometimes available. A shower not only freshens you up but gets the muscles and circulation going again and makes you feel much better for the rest of the flight.
Stale air: Providing a constant supply of fresh air in the cabin costs the airlines money, and some airlines provide more than others. The air supply in business and first-class is often better than in economy class. A lack of good air helps make you tired and irritable and can cause headaches.	
Lack of exercise: this is one of the worst aspects of long haul flying. It makes the flight uncomfortable and sets you up for a longer period of jet lag afterwards. Do stretching exercises in your seat, especially for the legs, and if possible go for walks up and down the aisle. If you have a spare seat next to you, try to get your feet up. Get off the plane whenever possible at stopovers and do some exercises (don't worry what others think).	**Exercise:** Get as much exercise as you can. Walking up and down the aisle, standing for spells, and doing small twisting and stretching exercises in your seat all help to reduce discomfort, especially swelling of legs and feet. Get off the plane if possible at stopovers, and do some exercises or take a walk. This also helps to reduce the possibility of blood clots and associated trauma.
Lack of Sleep: it is uncomfortable and difficult to sleep sitting upright in a crowded aircraft. Lack of sleep can also contribute to jet lag.	**Sleeping aids:** Blindfolds, ear plugs, neck rests and blow-up pillows are all useful in helping you get quality sleep while flying. Kick your shoes off to ease pressure on the feet (some airlines provide soft sock-like slippers, and many experienced travellers carry their own).

6.1 Symptoms of Jet lag

Fatigue and disorientation: Becoming tired and disoriented for days after arriving. Other symptoms include lack of concentration and motivation, especially for any activity that requires some effort or skill, like driving, reading, or discussing a business deal.

Interrupted sleep: Crossing time zones can cause you to wake up during the night or make it difficult to get to sleep. You then end up trying to get to sleep during the day. Your built-in circadian rhythms have been disturbed. And it can take many days to readjust to the new time zone. In fact, NASA estimates that you'll need one day for every one-hour time zone crossed to get back to your normal rhythm and energy levels. So a five hour time difference means that you'll need five days to get back to normal.

Confusion and fuzziness: For example, having to go back to check two or three times to see if your hotel room was left locked or unlocked. That is typical of the effects reported by flight crews suffering from jet lag. And that is not good if you're on a business trip.

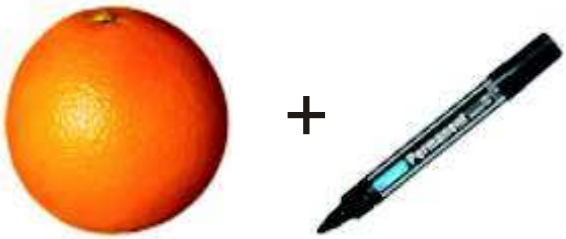
Getting angry or upset: "Losing it" is a symptom reported by flight crews, who regularly travel on long haul flights and suffer from jet lag. This also explains why long distance flights can get very tedious toward the end. Going through customs and immigration, then getting to your hotel can seem like a real challenge. Hotel receptionists must understand how travellers feel after long hard flights, and that they may be very irritable when they check in. They need to be treated gently, quickly and with sympathy.

Uncomfortable legs and feet: Swollen limbs can be extremely uncomfortable. In some cases, it could actually prevent you from wearing your normal shoes for up to 24 hours after you land.

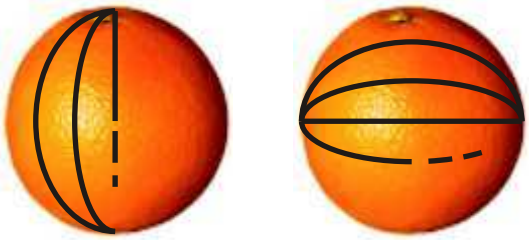
7 Ideas Box

Teaching the Concepts

1. Make your own globe



Ask learners to bring an orange and a permanent marker.



Learners have to draw the longitude lines and the latitude lines on the orange. They also have to indicate the poles and the UTC (GMT)

2. Demonstrate time zones

Bring a balloon and a torch to class.
Or use a globe of the earth if you have one – this works best because you can point out places on it.

Shine the torch on the one side of the balloon while turning the balloon anticlockwise to show how the earth rotates

Use a ball or balloon and a torch, and explain that midday is when the sun is directly above us...so not all places in the world are midday at the same time because the sun cannot reach them. Point to a place on the balloon that is dark so that learners can see it is night time there, but it is day time where the torch is shining. Point to a not-so-light place on the ball, and learner will understand it is still day time, but because the sun is not directly above it, it is not midday, and so it is a different time to the first place.

3. World Clocks

Ask learners to make their own clocks (ones where the learners can manipulate the hands). Have 12 learners stand in a semi-circle (representing one half of the globe), holding the clocks in front of them. Make one learner the 0° line (UTC). Assign degrees, and subsequently a time to this learner and all other learners and have all the other learners adjust their clocks by an hour from the person next to them. Have the rest of the class helping out by volunteering answers to what time of day it should be for each zone.

Continue the activity by having a learner in the class suggest a new time for any learner in the semi-circle and have everyone in the semi-circle adjust their clocks accordingly. You can do a lot with this, like have a learner go on a "trip" across more than one time zone, skip over a few time zones and determine what time it will be when he/she arrives at the new destination. Make the connections between the zones and assign a day and date to a learner. The class must now determine the day and date of other time zones.

8 Answers and Solutions

Learner Activity 1: Calculations

Time of Official Opening 17:00 (14/06/2009) **Arrival Time** 17:00 - 3 hrs = 14:00✓14/06/09 14:00 - 15 hrs (travelling time)= 23:00✓(13/06/2009 - SAST) **Time difference** SA +2 Washington -5 +2 + -5 =7 hrs ∴ Washington is 7 hours behind S.A. 23:00 - 7 hrs = 16:00✓(17:00 if DST is used) 13 June 2009✓ (Award full marks if learners have given the correct answer only without showing their calculations)	(4)
Time of Official Opening 17:00 (14/06/2009) **Arrival Time** 17:00 - 3 hrs = 14:00✓14/06/09 14:00 - 18 hrs (travelling time)= 20:00✓ (13/06/2009 - SAST) SA+2 Tokyo +9 +2 - +9 = 7 hrs ∴ Tokyo is 7 hours ahead of S.A. 20:00 + 7 hrs = 03:00✓(4:00 if DST is used) 14 June 2009✓ (Award full marks if learners have given the correct answer only without showing their calculations)	(4)
Time in South Africa = 14:00 Time difference = +1 hr =14:00 -1✓ =13:00✓ (14:00 if DST was used) (Award full marks if learners have given the correct answer only without showing their calculations)	(2)

Learner Activity 2: Time Calculations

1. Determine the time in the following cities if it is 12:00 in Johannesburg (+2). Do not consider DST.

Region	Time Zone	Time Earlier or Later	Time in that City
New York	-5	7 h earlier	05:00
Perth	+8	6 h later	18:00
Cairo	+2	0	12:00
Tokyo	+9	7 h later	19:00
Los Angeles	-8	10 h earlier	02:00
Paris	+1	1h earlier	11:00
Rio de Janeiro	-3	5 h earlier	07:00
Nairobi	+3	1 h later	13:00
London	0	2 h earlier	10:00
Beijing	+8	6 h later	18:00

2. Determine the time zone for countries along the following lines of longitude:

120° W	**UTC - 8**
135° E	**UTC +9**
60 ° E	**UTC +4**
75 ° W	**UTC - 5**
75 ° E	**UTC +5**

3. Determine the day, date and time in South Africa if it is: (do not consider DST)

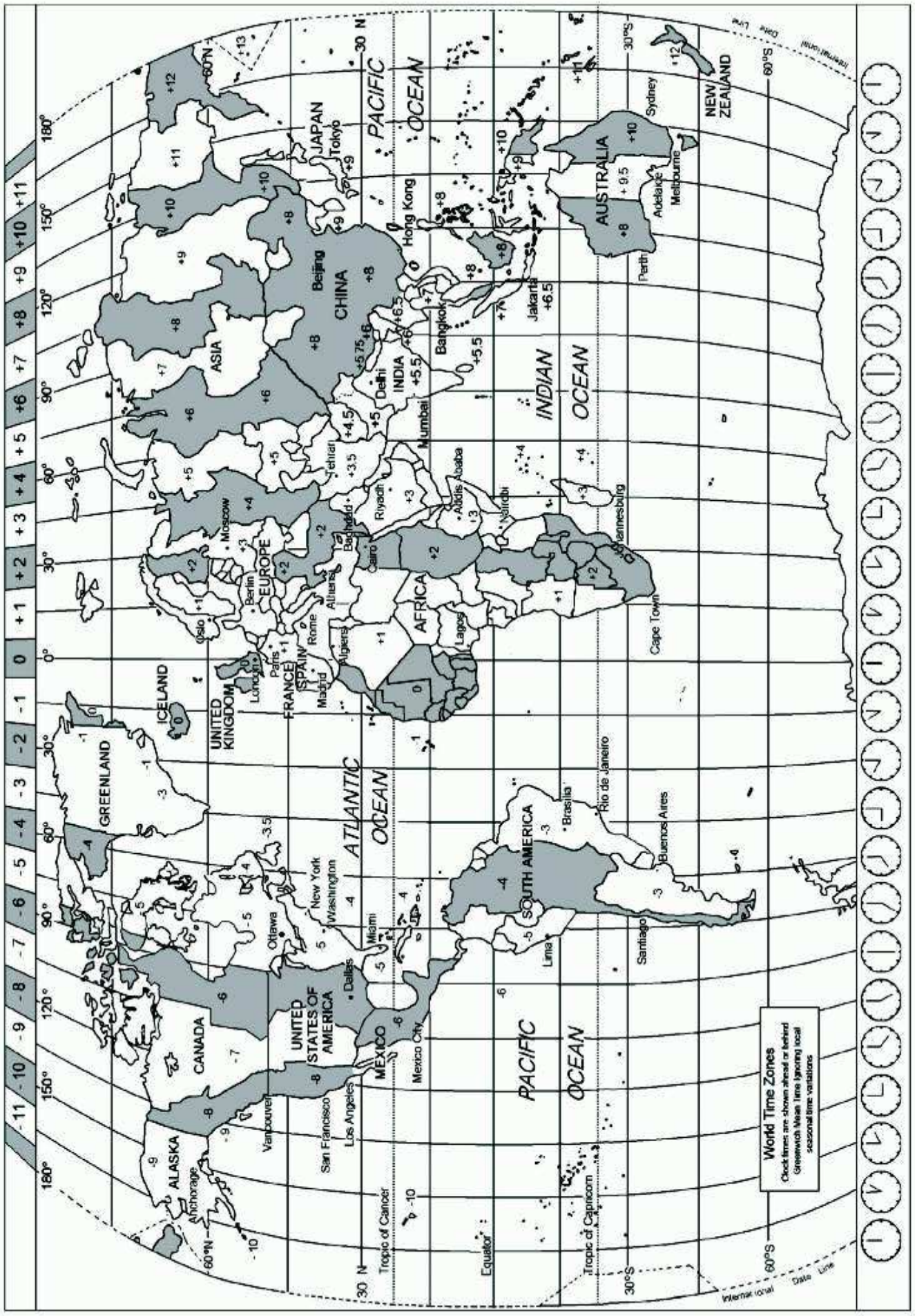
Time	City	Time in SA	Day	Date
07:00	Alaska	18:00	Wednesday	13 August
06:00	Moscow	05:00	Saturday	10 May
17:00	Dallas	01:00	Tuesday	2 November
24:00	Tokyo	17:00	Sunday	26 December
04:00	Sydney	20:00	Wednesday	21 February
18:00	Rio de Janeiro	23:00	Friday	3 July

9 Resource File

Useful websites:

- http://www.glencoe.com
  Interactive time zone map that features an hourly time line, displaying the New Year in different time zones around the world plus a quiz on cities and time zones.
- http://pitkos.blogspot.com(Afrikaans website)
- http://www.timegenie.com
- www.blurtit.com
- www.welltrainedmind.com
- www.sheffieldforum.co.uk
- www.aresearchguide.com
- www.docstoc.com/docs/.../World-Time-Zones-Worksheet

World Time Zone Map



Notes:

Global Travel & Tourism Partnership

GTTPSA

South Africa

www.gttpsa.org

This teaching resource is brought to you by:

NATIONAL BUSINESS INITIATIVE

The GTTP SA is managed by:

KUNDIZA

TRAINING AND CONSULTING