



MATHS IN MOTION

TIME ZONES

LEVEL

Level 8

ACTIVITY DESCRIPTION

Trains need to run on time! Puffing Billy Railway collaborates with railways all over the world. We share knowledge, resources, procedures, and learnings for continual improvement of the Railway industry for now and the future. Understanding time zones is crucial when working with other railway organisations, both in Australia and overseas. As a tourist attraction Puffing Billy Railway welcomes thousands of international and domestic visitors every year. We take bookings and provide product information 24-hours a day. In this activity students learn the importance of Time Zones and calculate different times according to location.

THEME

Time

MATERIALS REQUIRED

- “Time Zones” worksheet
- Pencils
- Erasers
- Pens

INSTRUCTIONS

Reiterate with students the importance of understanding different Time Zones throughout the world. Using the information below discuss the three time zones in Australia and Greenwich Mean Time (GMT).

Distribute the “Time Zones” worksheet for students to complete. Encourage group discussions and sharing knowledge. Once students have successfully completed their worksheet, encourage peer assessment or whole group assessment to make sure all students have a thorough understanding of the topic.

INTRODUCTION

Time changes as we travel around the world. In Europe it is night-time when in Australia it is day time.

To help everyone know what time it is in different countries, the world is divided into 24 time zones.

Australia is divided into three time zones.

Eastern Standard Zone (EST) includes Queensland, New South Wales, Australian Capital Territory, Victoria, and Tasmania

Central Standard Time (CST) includes South Australia and the Northern Territory, Central Standard time is half an hour behind

Western Standard Zone (WSZ) includes Western Australia, which is 2hours behind EST.

The time in England is called **Greenwich Mean Time (GMT)** and is 10hours behind **EST**.

Time in London (GMT)	Time in Jakarta	Time in Perth (WST)	Time in Melbourne at Puffing Billy Railway (EST)
7:00am	2:00pm	3:00pm	5:00pm
4:00pm	11:00pm	Midnight	2:00am (next day)
Midday	7:00pm	8:00pm	10:00pm
Midnight	7:00am	8:00am	10:00am
3:00am	10:00am	11:00am	1:00pm

✓ SUGGESTIONS FOR ASSESSMENT

Peer assessment of the Time Zone worksheet.

🔍 BACKGROUND INFORMATION

WORLD TIME AND DATE

Time Zones define and establish the appropriate time within individual countries and regions, having an enormous impact on business, communication, and world management. The time zones obey specific rules referring to geographical principles of longitude. In this regard, one should understand how the standard is defined.

ZERO MERIDIAN: WHERE THE NEW YEAR IS CELEBRATED FIRST

Zero meridian/prime meridian is situated in the United Kingdom, at the Royal Observatory in Greenwich. It doesn't have any physical or material representation, but still, it is a nominal line that affects every human being on the Earth.

Firstly, the Greenwich meridian becomes central in determining the time. The distance east or west from it adds or takes one hour. Under the scientific model of standard time, the zone covers every 15 degrees of the longitude. The longitude, being the geographical coordinate of the point on the Earth regarding the East or West, helps to reflect the impact of the Sun. In particular, if the Earth rotates 360 degrees in 24 hours, it means that it takes 15 degrees every hour.

GREENWICH MEAN TIME (GMT) AND COORDINATED UNIVERSAL TIME

The implementation of Greenwich Mean Time was the first step to determine the time zone of other countries in regard to GMT+0, while the concept of Coordinated Universal Time (UTC) was designed to provide a more accurate timekeeping system. Both of these time standards are widely used in the world for a similar purpose of time coordination.

HOW MANY TIME ZONES ARE THERE IN THE WORLD?

The acceptance and application of the idea of time zones took almost a century. Initially, the world was divided into 24 standard time zones which extend from the South Pole to the North Pole. However, due to different geographical, social, and political reasons, the time zones may deviate from the universal standards and recommendations set by international institutions. Governments often set time differently. They try to reflect not only the positions of the sun regarding the surface but inner processes within the regions. Some countries have colonial past and territories miles away from the governing centre set in the same time zones. Others are extremely large but have only one time zone (China), causing many problems to locals. That's why there are many more than 24 time zones, because every country may have a particular standard time zone, which is convenient for its international cooperation.

📌 CURRICULUM LINKS

Mathematics

Level 8

Solve problems involving duration, including using 12- and 24-hour time within a single time zone (VCMMG290)

WORKSHEET – TIME ZONES

Using the Time Zone map (attached), background information and example, answer the following questions.

EXAMPLE:

a. What is the time in Melbourne if the time in London (GMT) is 8:00am?

Melbourne is 10 hours ahead of London. Add 10hours to the London time.

Answer: It is 6:00pm the previous day.

b. What is the time in London (GMT) if the time in Melbourne is 8:00am?

London is 10hours behind Melbourne. Subtract 10hours from the Melbourne time

Answer: It is 10:00pm the previous day.

1. What is the time at Puffing Billy Railway if the time in London (GMT) is as given below?

a. 11:00am

b. 10:20am

c. 12:00noon

d. 3:30pm

e. 8:10am

f. 1:12pm

g. 12:20pm

h. Midnight

i. 2:15am

j. 5:45pm

k. 9:35pm

l. 1:12am

2. What is the time in London (GMT) if the time at Puffing Billy Railway is as given below?

a. 10:00am

b. 11:00am

c. Midnight

d. 2:29am

e. 2:29pm

f. 1:45pm

g. 8:05am

h. 4:30am

i. 9:35pm

j. Midday

k. 8:35pm

l. 12:05am

