
Time Zones-What time is it anyway?

Audience: Year 5-11

Time Required: 15 minutes

Activity: Students will explore time zones using map visualisations and mathematic calculations.

Standards: Some possible links to NZ Curriculum in this inquiry

- Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions and their environmental characteristics.
- Use a mathematical formula to compute time
- NZ Mathematics: *AO elaboration and other teaching resources*
 - GM4-1: Use appropriate scales, devices, and metric units for time.
 - GM4-4: Interpret and use scales, timetables, and charts.

Learning Outcomes: Students will

- identify time zones by their common names.
- compute the time in two places by time zone using a mathematical formula.

Map URL: <http://arcg.is/XbXbW>

Engage

Does each time zone have a name?

- To open the map, click the map link above or type it into your Internet browser.
- Ask students to find Wellington
- ? In what time zone is Wellington? [*New Zealand Standard Time-NZST*]
- In the search field, type Sydney Australia.
- ? In what time zone is Sydney? Hint: Zoom out several clicks to see labels. [*Australian Eastern Time Zone-AEST*]
- Find the time zones for Adelaide, Perth and London."
- ? In what time zones are Adelaide, Perth and London? [*Australian Central Time, Australian Western Time, Greenwich Mean Time, zones, respectively*]

Explore

What time is it in other places?

- In the upper-left corner of the map, click the Home button.
- Remind students that there are 24 time zones on the earth, one for each hour of the day. When someone travels east or west on the earth, he or she must add or subtract one hour for each time zone line crossed.
- ? If it is 1:00 P.M. in Wellington, what time is it in Sydney? *[It is 11:00am in Sydney.]*
- ? If it is 11:00 A.M. in Perth Australia, what time is it in Wellington NZ? *[It is 3:00pm in Wellington.]*

Explain

What happens when someone flies from one time zone to another?

- When someone flies from one part of the world to another, they have to use math to figure out the time.
- Tell Students they are on a 12 hour direct flight to Los Angeles leaving NZ at 9 pm on Tuesday. What will the time be on arrival?
- Find the time zones for Auckland and Los Angeles
- To decide if students are going to add or subtract hours for their flight, click the red and green arrows on the map.
- ? What time will students arrive in Los Angeles? *[The formula is 9PM. (time departing) -12 hours flying time - +4 hours (the number of time zones between NZ standard Time and Pacific Time.) = 1pm arrival on Tuesday.]*
- Tell students that they are in Auckland and are flying to London. They are leaving at 7:00 P.M. on Tuesday. Imagine it is a direct flight with no stops. It will take about 25 hours of flying hours. What will the time be when they arrive?
- Find the time zones for Auckland and London.
- To decide if students are going to add or subtract hours for their flight, click the red and green arrows on the map.
- ? What time will students arrive in London? *[The formula is 7 P.M. (time departing) + 25 hours flying time - 12 hours (12 time zones between NZ Standard Time and Greenwich mean time) . (Hint: 1 day is 24 hours) = 8am Greenwich Mean Time arrival on **Wednesday**.]*

Elaborate

How are time zones added or subtracted?

- Remind students that each time zone also has a numeric name that is a value equal to the number of time zones east or west of Greenwich, England.
- Click and drag the map to the left slightly until you can see England—Greenwich is circled in red.
- Click the NZ's zone, and ask students to notice that the numerical name for the NZ's time zone is +12. This means that if you start at Greenwich and count twelve time zones to the east, the NZ time zone is 12 hours earlier than Greenwich, England.
- Click the Adelaide's time zone.
- ? What is the Adelaide's time zone's numerical name? *[The numerical name is +9]*
- ? What is the difference in hours between +12 and +9? *[The difference is three hours.]*

Key Skills

Search for place names by keyword

- In the search field in the upper-right of the map, type a place name or keyword.
- As you type, recommended matches may appear below the text box.
- Click the magnifying glass to search

Click a map feature

- Click any feature on the map, and a pop-up window will open with information.
- Links and images in the window are often clickable.
- If multiple features are selected, click the arrow in the window's upper right corner to step through all features.

Next Steps

DID YOU KNOW?: ArcGIS Online is a mapping platform freely available to New Zealand public and private schools. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at <http://www.eagle.co.nz/gis-schools>

THEN TRY THIS...

- Time, or more specifically time keeping, was instrumental to early navigation. To learn about the connection, explore Esri's The Longitude Prize of 1714 story map at <http://esriurl.com/Geo462>.
- Earlier it was stated that there are 12 time Zones. Students may have noted that these are not evenly spaced across the map although by solar time each time zone should be equal. Find out why there are differences. For example explore Kiribati 's Time Zone.

Text References

- Even, Jane and Osborne, Cheryl. Geography 1.4 Workbook Level 1 Year 11. Pearson
- Peat, Justin, Geography Skills for NCEA Level One. Cenage 2016
- Figure It Out series
 - Measurement, Level 3-4, Gigantic Jumbo (Activity Three), pages 14 & 15
 - Getting Around, Level 4-4+, Time Zones, pages 16 & 17
 - Link, Years 7-8, Algebra, Geometry and Measurement, Sorry to Disturb You!, page 24.

NEW ZEALAND GEOINQUIRIES

<http://arcg.is/1GPDXe>