



# Time zones—what time is it anyway?

Target audience – Grade 4

Time required – 15 minutes

## Activity

Students will explore time zones using map visualizations and mathematic calculations.

## Standards

**D2.Geo.2.3-5.** Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions and their environmental characteristics.

**CCSS.MATH.CONTENT.4.MDA.2.** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and programs that require expressing measurements given in a larger unit in terms of a smaller unit.

## Learning Outcomes

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

Map URL: <http://esriurl.com/fourgeo inquiry2>



## 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 San Francisco on the west coast of the United States.
- ? In what time zone is San Francisco? [*Pacific time zone*]
- In the search field, type **Denver, Colorado**.
- ? In what time zone is Denver? Hint: Zoom out several clicks to see labels. [*Mountain time zone*]
- Find the time zones for Kansas City, Kansas and Philadelphia, Pennsylvania by repeating the previous step you used for Denver.”
- ? In what time zones are Kansas City and Philadelphia? [*Central and Eastern 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 San Francisco, what time is it in Kansas City? Hint: Click the large green arrow pointing east on the map. [*It is 3:00 P.M. in Kansas City.*]
- ? If it is 11:00 A.M. in Philadelphia, what time is it in Denver? [*It is 9:00 A.M. in Denver.*]

## Explain

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

- When someone flies from one side of the country to another, they have to use math to figure out the time.
- Tell students that they are in Philadelphia and are flying to San Francisco. They are leaving at 1:00 P.M., and it is a five-hour flight. They will add the amount of hours in flight to the time that they are leaving.
- Find the time zones for Philadelphia and San Francisco.
- 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 San Francisco? [*The formula is 1 P.M. (time departing) + 5 hours - 3 hours = 3:00 P.M. Pacific time arrival.*]

## 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 Eastern time zone, and ask students to notice that the numerical name for the Eastern time zone is -5. This means that if you start at Greenwich and count five time zones to the west, the Eastern time zone is five hours later than Greenwich, England.
- Click the Pacific time zone.
- ? What is the Pacific time zone's numerical name? [*The numerical name is -8.*]
- ? What is the difference in hours between -5 and -8? [*The difference is three hours.*]

## SEARCH FOR PLACES 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 U.S. public, private, and home schools as a part of the White House ConnectED Initiative. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at <http://connected.esri.com>.

### 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>.
- In ArcGIS Online, have students modify the map used in this activity and save it to their accounts, sharing it with classmates.

## TEXT REFERENCES

This GIS map has been cross-referenced to material in sections of chapters from these texts.

- *The United States Making a New Nation* by Harcourt — Chapter 13
- *Building a Nation* by Scott Foresman — Chapter H20
- *Math* by Macmillan McGraw — Chapter 5