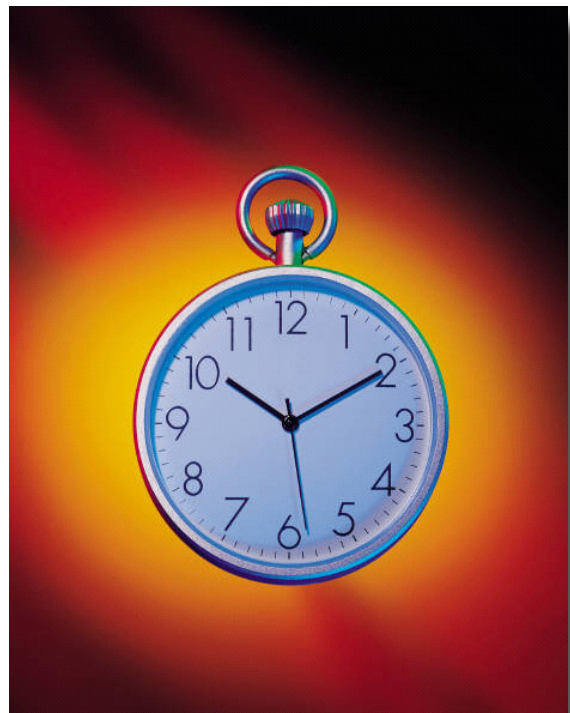# Activity 9 - A Review of Time Zone Mathematics

TEACHER'S GUIDE

The world is a big place! In fact it is so enormous that we, the citizens of the world, can't all use the same time on our clocks to measure the passage of day and night. Let's see how this works for the continental United States.

We have six "time zones" that divide the country from east to west. As you can see on the map on the next page, there are four time zones from the East Coast (yellow) to the Pacific Coast (red). We also have the Alaskan (purple) and Hawaiian (gold) time zones. Crossing into each time zone from east to west means that you have to move your clock back one hour. That means, for example, that on the East Coast it could be 3:00 PM (or 15:00) but in the Central Time Zone (green) it is one hour earlier, making it 2:00 PM (or 14:00). If you traveled to the Mountain Time Zone (blue) it would be 1:00 PM (or 13:00), and in the Pacific time zone (red) it would be 12:00 noon. In Alaska it would be 11:00 AM and in Hawaii it would be 10:00AM!

GOALS

1) Students will know there are multiple time zones in the U.S.

2) Students will review how to calculate the difference between two clock times.

3) Students will review how to calculate the time in one time zone, given the time in a second time zone.
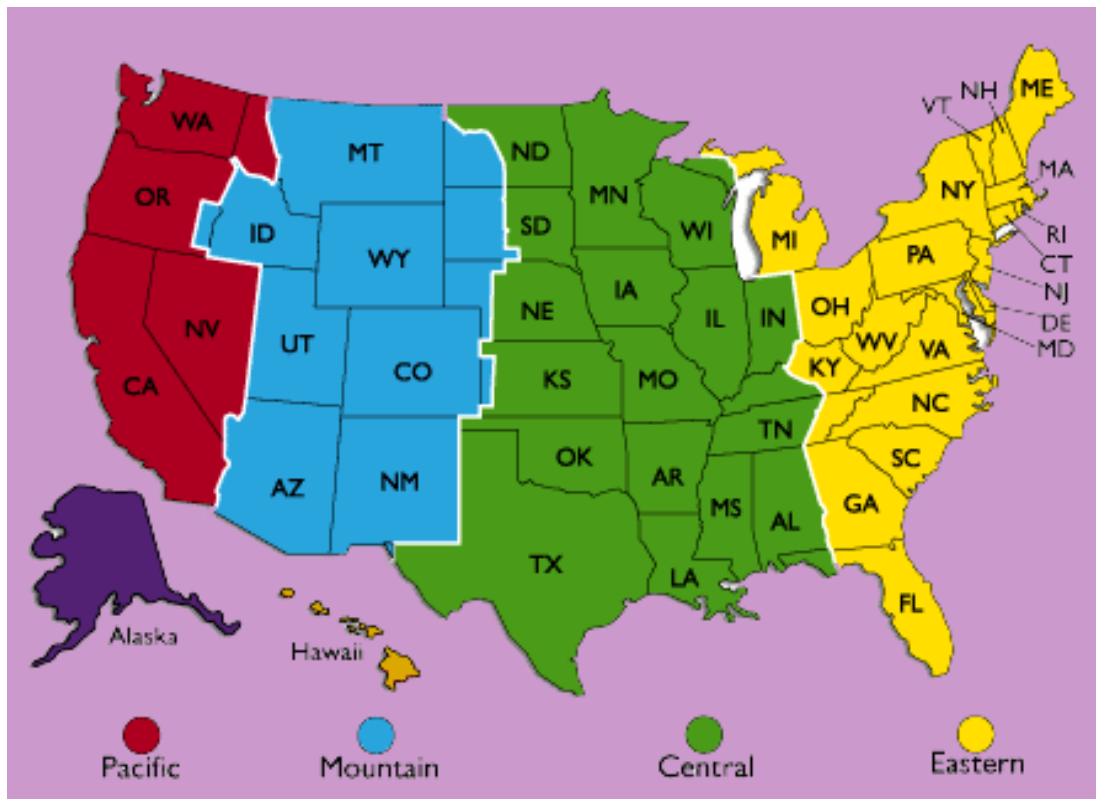
Without taking into account these time zone changes, suppose the sun set at 6:00 PM (or 18:00) on the East Coast. If you were living in Nevada, the sun would still be high up in the sky! It makes sense that sunset happens at the same clock time for each person around 6:00 PM. To do this, we all have to adopt the time zones idea and actually change our watches as we travel across the country. In all calculations, please use the "24-hour" clock to make calculations easier (i.e., 3:00 PM = 15:00, 9:45 AM = 09:45, etc.).

TEACHER ANSWER KEY

1) 7h 50m

2) 2h 50m

3) 09:00 Mountain Time Zone, Wednesday. And 07:00 Alaska Time Zone

4) 07:43 Wednesday

5) 03:14 Wednesday

6) 12:12 on Thursday 3 weeks later

Calculating time changes

Here are some solved problems with time arithmetic.

23:25	23 hrs – 21hrs = 2 hours
- 21:15	25min – 15min = 10 minutes
_____	
2 hours 10 minutes -	This is the difference in time between the two clock readings

21:15	This problem asks you to add 4 hours to the clock time 21:15
+ 4 hours	
_____	
01: 15 the next day	

02:00 Eastern Time	This problem asks you to calculate what clock time it is
- 3 hours	in the Pacific Time Zone 3 hours earlier.
_____	
23:00 Pacific Time the previous day.	

15:15	Subtract 1 hour 55 minutes from 15:15 (or 3:15 PM)
- 1hour 55 minutes	because 15 is less than 55, borrow 1 hour from 15:00 and add
_____	60 + 15 to get 75. Then the problem becomes:
13:20	14 75
	- 1 55

	13: 20

Time Zone Mathematics

1) 15:15 Wednesday

-     7:25 Wednesday

_____

          Time difference

2) 09:15 Pacific Time Zone, Friday

-   09:25   Eastern Time Zone, Friday

_____

          Time difference

3) 23:25 Mountain Time Zone, Tuesday

+   9h 35m   Added time

_____

          (give answer both in Mountain
          and in Alaska Time Zones)

4) 04:25 Monday

+   51h 18m   Added time

_____

5)   18:35 Friday

-   63h 21m   Subtracted time

_____

6)   03:25   Monday

+ 584h 47m   Added time

_____

7) **Make up a scenario where you would have to use time zone math. Write down your story and its equation, and show how you solved it.** For example, you are vacationing in Hawaii in December. You want to call your friend Pat in New York at noon Hawaii time to report the whales you saw today. What time will it be for Pat? The equation would be:

12 noon Hawaii Standard Time

+ five hours

= 5 pm Eastern Standard Time

We add **five** hours because December is during Standard Time in New York. *

Not all parts of the US use Daylight Standard Time. If you were vacationing in Hawaii in August, say, we would add six hours because it would be during Daylight Savings Time in New York— but not in Hawaii, because Hawaii doesn't participate in Daylight Savings Time.