MATH
Can Take You Places

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LESSON 5
"Right on Time"
by Rhonda Bailey

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CONCEPT AREA	Equivalency
GRADE LEVEL	4-6
TIME ALLOTMENT	60 minutes
LESSON OVERVIEW	Students will use the differences between time zones to practice equivalency concepts.
LESSON ACTIVITIES OVERVIEW	In this lesson, students solve equivalency problems related to time conversions for different areas.
LEARNING OBJECTIVES	Students will be able to:

LEARNING OBJECTIVES — Students will be able to:
- Write equations to describe elapsed time.
- Apply problem-solving strategies, understand the problem, write a plan, solve the problem and check the solution for reasonableness.

STANDARDS (TEKS)

From the Texas Essential Knowledge and Skills for Math for grades 4-6:

Grade 4
  4.1A; 4.8C
Grade 5
  5.1A
Grade 6
  6.1B; 6.2A, B, C; 6.8B

MEDIA COMPONENTS

Video: *Math Can Take You Places* #002 "Equivalency"
Internet:
  World Time Zone Web site: www.worldtimezone.com

MATERIALS
- World maps that shows time zones (see the Official U.S. Time Web site)
- Large clocks showing military time and/or World Time Zone Web site
- Student activity sheets
- Airplane stickers for the back of the clocks (optional)

PREP FOR TEACHERS
- Bookmark the Web sites.
- Cue video.
- Focus viewing.
- Gather the clocks.

Note:
The concepts of **equivalency** and **fact families** will be covered during this lesson. Students may need to review the concepts prior to beginning the activities, especially if your class includes students who are acquiring English as a second language (ESL).

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INTRODUCTORY ACTIVITY: SETTING THE STAGE

1. Introduce the lesson by having the students view the *Math Can Take You Places* video #002 "Equivalency." Follow with a discussion of the material presented in the video. Have the students think about New Year's Eve. Possibly have the class countdown from 5 and say "Happy New Year!"

2. **Pause** the video after Ms. Garcia asks, "Do you think everyone in the world will be counting down to midnight at the exact same time as we are?" Ask students to discuss the question. **Resume** the video for responses from the video class. **Stop** when Ms. Garcia says, "When it is 12:00 a.m. New Year's Day in Oklahoma City, what time will it be in Philadelphia, Pennsylvania? How do you know?" *Students should describe in their explanation that Oklahoma City (Central Time) and Philadelphia (Eastern Time) are in different time zones.*

3. Refer the students to the map with the time zones and discuss with them that Universal Time is based on the time at Greenwich, England. There are 24 time zones around the world and of those 24, seven time zones include the United States and the territories of Puerto Rico and American Samoa. Starting with the most eastern time zone, they are as follows:

Atlantic Time: Puerto Rico; Bermuda; Greenland; U. S. Virgin Islands; Nova Scotia, Canada; and Caracas, Venezuela
Eastern Time: New York City; Washington D.C.; Philadelphia, Pennsylvania; Hartford, Connecticut; Boston, Massachusetts; Indianapolis, Indiana; Chicago, Illinois; Atlanta, Georgia; and Miami, Florida
Central Time: New Orleans, Louisiana; St. Louis, Missouri; Omaha, Nebraska; Minneapolis, Minnesota; Green Bay, Wisconsin; Houston, San Antonio, Dallas, Fort Worth and Austin, Texas; and Mexico City, Mexico
Mountain Time: El Paso, Texas; Phoenix, Arizona; the Grand Canyon; Salt Lake City, Utah; Yellowstone National Park in Wyoming; and Alberta, Canada
Pacific Time: Hoover Dam in Nevada; Los Angeles, Hollywood and San Francisco, California; Portland, Oregon and Seattle, Washington
Alaska Time: Juno, Anchorage and Fairbanks, Alaska
Hawaii-Aleutian Time: Honolulu, Hawaii; the Aleutian Islands of Alaska; and New Zealand
Samoa Time: American Samoa, Midway Islands, and Samoa

4. Have students write equations to describe other time zones in terms of the Central Time Zone. Give this one example:

Central Time = Eastern Time – 1 hour, or Central Time + 1 hour = Eastern Time
Central Time = Samoa Time + 5 hours, or Central Time – 5 hours = Samoa Time

If we use the numbers in the time from the original problem, that means:
    12:00 a.m. (Central Time) + 1 hour = 1:00 a.m. (Eastern Time).
5. Discuss why pilots use military time, which is based on a 24-hour clock. Share with students the military time conversion chart.

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LEARNING ACTIVITIES

Cue the video to after the pilot says, "… make it feel in the cockpit like it does in the airplane." **Play** the video until Ms. Garcia says, "… begin working in your group to figure out the problem. **Stop** the video. Say: "Now, pretend you are the pilot flying a 777 airplane from Dallas, Texas to Los Angeles, California. One of your responsibilities is to use time zones to calculate the length of flights using time so you can let your passengers know what time they are landing."

*Problem: You are the captain flying a 777 airplane from Dallas to Los Angeles. If your flight is scheduled to leave DFW Airport at 5:53 p.m. (Central Time) and arrive at LAX Airport at 7:05 p.m. (Pacific Time), what was the actual length of your flight in hours and minutes? Be sure to write a number sentence to show how you got your solution.

Possible Solution: Change 5:53 p.m. (Central Time) to (Pacific Time):
Central Time – 2 hours = Pacific Time or Pacific Time + 2 hours = Central Time

5:53 p.m. (Central Time) – 2 hours = 3:53 p.m. (Pacific Time) for the time of departure

Time of Arrival – Time of Departure= Length of Flight
7:05 p.m. (Pacific Time) – 3:53 p.m. (Pacific Time)= 3 hrs 12 minutes
(* This problem is also number one on the "Follow Up Questions" handout.)
Ask students to explain how they arrived at their solution.

CULMINATING ACTIVITY

Allow students to complete the "Follow Up Questions" handout in groups of 3-4 students. Come back together as a class to discuss their solutions and any questions they may have.

"Follow Up Questions" handout key:
1. *See above; explanations may vary.*
2. *The Atlantic Time Zone is 6 hours ahead of the Hawaii-Aleutian Time Zone, so the time on the watch would be turned back 6 hours.*

The number 16:45 (military time) – 6 hours = 10:45 a.m.
10:45 a.m. + 6 hours = 4:45 p.m.

a. *2 hours and 21 minutes, traveling from the Mountain Time Zone to the Central Time Zone, you gain one hour.*

b. *2 hours and 6 minutes, traveling from the Central Time Zone into the Eastern Time Zone, you gain another hour.*

c. *Answers will vary: 9:03 a.m. in Phoenix is 11:03 a.m. in Atlanta.*
   4:17 p.m. (16:17 military time) – 11:03 a.m. = 5 hours and 14 minutes

CROSS-CURRICULAR EXTENSIONS

Science

It is important that pilots understand weather conditions, so that they have safe flights. Research the different meteorological signs they see on the weather reports, and what the signs mean.

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REAL-WORLD CONNECTIONS — Invite a local meteorologist to speak to the class.

ASSESSMENT — Show the students the video, *Math Can Take You Places* #002 "Equivalency". Pause the episode after the teacher gives the students in the classroom the time zone problem for the pilot. Allow students time to work the problem individually. Collect their written answers. Resume the tape, so that the students can see how the students in the video worked through the problem.

STUDENT HANDOUTS — "Follow Up Questions" worksheet
"Military Time" conversion chart

Name_____ Date _____

"Right On Time"
Follow Up Questions

1. You are the captain flying a 777 airplane from Dallas to Los Angeles. If your flight is scheduled to leave DFW Airport at 5:53 p.m. (Central Time) and arrive at LAX Airport at 7:05 p.m. (Pacific Time), what was the actual length of your flight in hours and minutes? Be sure to write a number sentence to show how you got your solution.

   Explain the process you used to solve this problem.

2. If you are flying from a location in the Atlantic Time Zone to a location in the Hawaii-Aleutian Time Zone, describe how you would change the time on your watch, so that it will reflect the right time when you arrive. Write a number sentence showing this change if it is 4:45 p.m. in the Atlantic Time Zone.

3. Suppose you board a plane in Phoenix, Arizona at 9:03 a.m. headed to Atlanta, Georgia. The flight is scheduled to arrive in Atlanta, Georgia at 4:17 p.m.

   a. First you must fly from Phoenix, Arizona to the Dallas/Ft. Worth or DFW Airport. Your departure time from Phoenix is 9:03 a.m. and your arrival time at DFW is 12:24 p.m. How long was your flight from Phoenix to DFW?

   b. Next, you will leave DFW to fly to Atlanta, Georgia. You depart from DFW at 1:11 p.m. and arrive in Atlanta at 4:17 p.m. What was your flight time?

   c. Write number sentences that describe the total flight time from Phoenix to Atlanta.

Military Time

This page is part of [The Marine Corps Wives Website](#)

Civilian Time	Marine Time
12:00 am	0000
1:00 am	0100
2:00 am	0200
3:00 am	0300
4:00 am	0400
5:00 am	0500
6:00 am	0600
7:00 am	0700
8:00 am	0800
9:00 am	0900
10:00 am	1000
11:00 am	1100
12:00 pm	1200
1:00 pm	1300
2:00 pm	1400
3:00 pm	1500
4:00 pm	1600
5:00 pm	1700
6:00 pm	1800
7:00 pm	1900
8:00 pm	2000
9:00 pm	2100
10:00 pm	2200
11:00 pm	2300

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LESSON 5
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Nombre_____ Fecha_____

Preguntas Para Reforzar

1. Eres el capitán de un vuelo en un avión 777 que va de Dallas a Los Angeles. Si el horario del vuelo para salir del aeropuerto DFW es a las 5:53 p.m. (Hora del Centro) y llegar al aeropuerto LAX a las 7:05 p.m. (Hora del Pacífico), ¿cuál fue la duración actual de tu vuelo en horas y minutos? No te olvides de escribir una oración numérica para demostrar cómo lograste tu solución.

   Explica el proceso que usaste para resolver el problema.

2. Si estás volando de una localidad en la zona con hora del Atlántico a una localidad en la zona con hora de Hawaii-Aleutian, explica cómo cambiarías la hora en tu reloj, para que pueda reflejar la hora correcta cuando llegas. Escribe una oración numérica para mostrar este cambio si son las 4:45 p.m. en la zona con Hora del Atlántico.

3. Vamos a suponer que subes a un avión en Fénix, Arizona a las 9:03 a.m. camino a Atlanta, Georgia. El horario de llegada a Atlanta, Georgia es 4:17 p.m.

   a. Primero tienes que volar de Fénix, Arizona al aeropuerto de Dallas/Fort Worth o Aeropuerto DFW. Tu hora de salida en Fénix es a las 9:03 a.m. y tu hora de llegada a DFW es 12:24 p.m. ¿Cuánto tiempo duró tu vuelo desde Fénix a DFW?

   b. Después, saldrás de DFW para volar a Atlanta, Georgia. Sales del DFW a la 1:11 p.m. y llegas a Atlanta a las 4:17 p.m. ¿Cuánto tiempo duró tu vuelo?

   c. Escribe oraciones numéricas que explican el total de horas de vuelo desde Fénix a Atlanta.

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Hora Militar

Esta página es parte de

Hora civil	Hora Marina
12:00 am	0000
1:00 am	0100
2:00 am	0200
3:00 am	0300
4:00 am	0400
5:00 am	0500
6:00 am	0600
7:00 am	0700
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9:00 am	0900
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