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2007

Reading Universal Time

STORM Project

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Recommended Citation

STORM Project, "Reading Universal Time" (2007). *Open Educational Resources*. 33.
http://scholarworks.uni.edu/oermaterials/33

Activity 1
Reading Universal Time
Level 2
http://www.uni.edu/storm/activities/level2/index.shtml

National Science Education Standards: As a result of activities in grades 5-8, all students should develop an understanding about science and technology, and science and technology in society.

Teacher Background:

To coordinate and standardize weather observations around the globe, one time zone has been selected as the standard time zone used for all observations. This time zone is located at 0° longitude (prime meridian) and runs through Greenwich, England. This time is called Universal Coordinated Time (UTC), Universal Time (UT), Greenwich Mean Time (GMT) or Zulu Time (Z Time) and is based on a military clock (24 hours). Possible Web Resources for Teachers:
- World Time Zones http://aa.usno.navy.mil/faq/docs/world_tzones.php
- The Astronomical League: What Times Is It?
  http://www.astroleague.org/al/astrnote/astnot10.html

Engage:

Lead your students through this part of the activity. You might have a class discussion about answers to the three questions presented to the students.

You are one of 24 meteorologists who are each stationed in a different time zone. Your current location is Australia. Your data center is in Chicago. The data center wants to know the cloud cover at each meteorologist's location simultaneously at 12:00 P.M. Chicago time. However, the reports are being received sporadically throughout the day even though the request is for observations taken simultaneously at 12:00 P.M. Chicago time.
1. Why is this problem occurring?
2. Your very unhappy supervisor wants you to fix the problem so all the observations are made at 12:00 P.M. Chicago time.
3. What are some possible ways you can coordinate the meteorologists so all observations are made at 12:00 P.M. Chicago time?

Explore:
Identify military time for the following. The first one is done for you.

1. 1:00 am = 0100 hours
2. 6:00 am = _____
3. 12:00 pm (noon)= _____
4. 6:00 pm = _____
5. 12:00 am (midnight)= _____

At the activity website, http://www.uni.edu/storm/activities/level2/act1.shtml , click on each weather map listed under Weather Images.
1. Find and record the date from each image.
2. Find and record the time each image was made.

3. Here is a helpful hint just in case you have trouble figuring out the time for the images: Weather data and images are labeled with times followed with a "Z," such as 00Z, 03Z, 19Z, or 2130Z. Or the times might be followed with a "UTC", such as 1530UTC or 0315UTC.

Explain:

Weather data and images are generated at regular intervals. Look at the most recent temperature map, IR satellite image and surface analysis map from the STORM website.
1. What are the differences between your current military time and the times on the images you are observing?
2. What similarities do you observe with the times on the data maps and images?

Use the following to calculate the Universal Time offset for your time zone. If it is currently morning, follow the morning example. If it is afternoon, follow the afternoon example.

		Ex. Morning	Ex. Afternoon
1. Write down current UT: (from one of the maps)	___ h ___ m	14h 24m	18h 05m
2. Write down current local time:	___ h ___ m	9h 24m	1h 05m
3. Convert to 24 hour clock:	___ h ___ m	9h 24m	13h 05m
4. Subtract (3) from (1):	___ h ___ m	5h	5h

The final number represents how many hours Universal Time is ahead of you. The example above was for Eastern Standard Time in the U.S. This means you would need to subtract 5 hours from UT to get your local time if you are in the Eastern Time zone. The UT offset changes when daylight saving time begins or ends because UT does not change. Therefore, the Eastern Time Zone offset would be 4 hours during daylight saving time.

Extend:

Monitor students progress with this section and provide assistances as necessary.

1. If you wanted to know the 12 noon Mountain Standard Time weather conditions in Denver, Colorado, you would need to look at a _____Z surface map.
2. A weather map is identified as 1730Z. This time is the same as _____ daylight saving time in the Eastern Time zone.
3. Weather balloons are launched twice a day, once in the morning and once in the evening. Radio transmitters send back to earth information called Upper Air Data. The balloons are launched about two hours before the time the data is released to the public. Use the Upper Air Data map to locate the most recent launch and closest launch sight to you. Calculate the local time at the sight when the balloon was launched.

4. The Storm Prediction Center's Day 1 Tornado, Severe Wind and Severe Hail maps, linked at the activity website, indicate the probability of damaging thunderstorm winds or large hail within 25 miles of a particular location. Answer the following questions based on your map observations:

    a. List the date, the Z time, and your local time when the maps were issued.
    b. What is your local time for which each map is valid?
    c. Which states have the highest probability of severe thunderstorm winds?
    d. Which states have the highest probability of severe hail?

Evaluate:
   1. Collect student worksheets and monitor discussions.

For Further Inquiry:

Ask students when the next time the difference between Universal Time and the local time zone will change by one hour. Have them design and investigation to answer this or any other question they might have about Universal Time.

Reading Universal Time

<div align="center">Time Zones and Z Time</div>

Engage
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   _____
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Explore
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1. 1:00 am = 0100 hours
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3. 12:00 pm (noon) = _____
4. 6:00 pm = _____
5. 12:00 am (midnight)= _____

At the activity website, http://www.uni.edu/storm/activities/level2/act1.shtml , click on Weather Images and answer the following questions:

1. Find and record the date from each image.
   _____
   _____

2. Find and record the time each image was made.
   _____
   _____

3. Here is a helpful hint just in case you have trouble figuring out the time for the images: Weather data and images are labeled with times followed with a "Z," such as 00Z, 03Z, 19Z, or 2130Z. Or the times might be followed with a "UTC" such as 1530UTC or 0315UTC.

Explain
Weather data and images are generated at regular intervals. Look at the most recent temperature map, IR satellite image and surface analysis map on the STORM website.

1. What are the differences between your current time and the times on the images you are observing?
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2. What similarities do you observe with the times on the data maps and images?
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4. The Storm Prediction Center's Day 1 Severe Thunderstorm Winds and Severe Hail maps indicate the probability of damaging Thunderstorm winds or large hail within 25 miles of a particular location. You can study these maps on the WEBLINK. Answer the following questions based on your map observations:
   a. List the date, the Z time, and your local time when the maps were issued.
   _____
   b. What is your local time for which each map is valid?
   _____
   c. Which states have the highest probability of severe thunderstorm winds?
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   _____