

## **Challenging the World's Greatest Energy Systems Ideas for a Mini-Unit: A Work in Progress**

### **Major Concept: Weather Systems**

Content	Skills
weather	measuring
atmospheric pressure	collecting data
temperature gradient	using tables & graphs
weather forecasting	recognizing patterns
jet stream	predicting
	communicating results
	using models

### **The Challenge:**

Weather systems control our lives. They affect the clothes we wear, dictate when we can and cannot engage in outdoor activities, delay our travel plans, cause major disasters, and sometimes even threaten our lives. From the beginning of time man has been challenged by weather systems. Since the energy in weather systems is too great to control, man has challenged weather systems by managing life around and through weather systems.

Most persons listen to daily weather forecasts or tune in to the weather channel to learn what the weather will be like today or over the next few days and make appropriate plans for dress, travel, or outdoor activities. Persons responsible for managing outdoor events, construction projects, air travel, or expeditions must have much more detailed information about weather systems. Also, they must be very knowledgeable about the weather and know how to interpret weather information and make sound judgments that affect people's lives based on their information.

While you may or may not be planning to be a meteorologist, astronaut, airline pilot, mountain climber, sailor, or fruit grower, you can have a real advantage over the average citizen who simply turns on CNN, Good Morning America, or the Weather Channel to get today's forecast if you understand weather systems. To do this, you will need to learn to interpret weather data you can't obtain from simple weather instruments and from sophisticated computers or satellites.

**Pre-assessment:**

1. Below is a weather map printed in the Louisville Courier Journal for June. What can you tell about weather across the United States from the map?

2. If you wanted to predict the weather for Louisville, Kentucky for tomorrow, June \_\_\_\_\_, what information from the map or additional information would you need?

3. What would you predict as the weather for Louisville tomorrow 12 noon EDT? Why did you make this prediction?

## **Performance Tasks:**

### Learn how weather systems affect your local daily weather

Task 1. Follow the weather systems across the United States from daily weather maps in the newspaper, the Weather Channel, or the Internet and explain your local weather each day at 12:00/noon in relation to these maps. Describe your local weather conditions in terms of temperature, wind velocity (speed and direction), relative humidity, and cloud conditions.

### Learn to predict your local weather from information provided to you from the Weather Channel

Task 2. Watch the Weather Channel and make predictions about your local weather conditions at 12 noon one day, 3 days, and 5 days from the time you watch the forecast information on television. Repeat your observations and predictions for five consecutive days and record your predictions and the actual weather.

### Learn to plan activities around weather systems

Task 3. You have been employed as the activities manager of a summer camp that provides all day hikes, fishing trips, water skiing activities, and horse riding. Some activities will need to be canceled if it rains. Watch the Weather Channel or other sources of long-range forecasting and select two days out of the next five that you would plan camp activities that cannot take place in rain. Give your reasons for your selection. Record the actual weather conditions on the days you selected.

To practice, review the long-range forecast provided you for the week of June 14 to 19. Make your prediction for the best two days without rain in Louisville, Kentucky. Look at the actual weather maps for each day of the week of June 14 to 19. What reasons can you give for being unable to make accurate predictions?

### Learn to become a weather consultant

Task 4. You have been employed as a weather consultant for the Louisville Cardinals. Your job is to advise the management on game days whether or not to call games because of rain. It is a game day and it has been raining most of the day until 3:00 p.m. Based on weather forecasts, there is some possibility that the rain will let up for a 7:00 p.m. game. You have been watching satellite pictures of the weather system passing over Louisville every half hour from 2:00 p.m. until 4:30 (see the six Doppler radar pictures.) The management needs your recommendation to go ahead with the 7:00 p.m. game or call it off by 4:45 so an announcement can be made at the 5:00 p.m. news. Your decision will mean thousands of dollars profit or loss. What do you recommend? How will you defend your position?



## Planning a high-risk 48 hour expedition

Task 5. Imagine you have been hired by an international intelligence agency called World Intelligence on Remote Targets (WIORT) to lead fact finding expeditions for four to six persons in extremely remote areas of the world. You will be able to set up a base camp but you will need to leave the base camp for up to 48 hours on fact finding missions and return with only a small back pack. You will need to predict the passage of weather systems that could endanger the lives of your expedition team and avoid life threatening conditions. For intelligence reasons you cannot communicate with the outside world for days at a time so you must learn to become accurate weather forecasters and learn how to predict the approach of weather systems. At base camp you will be able to communicate with satellites; however, once you leave, you must be able to use and construct simple instruments that measure temperature, air pressure, wind velocity and determine wind direction. At base camp your team can have equipment that costs no more than \$3000. Once you leave base camp you must use and understand the construction of a simple thermometer, barometer, anemometer, and wind vane. Also, you must be able to know cloud types to the passage of weather systems.

Plan and build a weather station made of ordinary materials that you can construct at base camp and take along in your back pack. You will need to measure temperature, wind velocity (speed and direction), atmospheric pressure, and humidity. Also, plan what other basic information you will need to take along in your back pack.

## **Open response assessment**

As part of a special promotion you can fly free from Nashville, Tennessee; to Cincinnati, Ohio; Atlanta, Georgia; or Dallas, Texas, and get free passes to a theme park near any of these cities. The offer ends tomorrow. You buy a copy of the Courier Journal and look up tomorrow's predicted weather map shown below.

Assume all three theme parks were equally desirable. Where would you choose to fly tomorrow morning, spend a day at the theme park and back to Nashville tomorrow evening based on the best weather conditions? Give reasons for your choice.

## Multiple Choice Questions

Below is a weather map provided by the Louisville Courier Journal. Answer the following questions based on information provided by the map.

1. What city will likely have the greatest temperature change over the next 24 hours?
  - a.
  - b.
  - c.
  - d.
2. Which city will most likely have windy conditions?
  - a.
  - b.
  - c.
  - d.
3. Which city will most likely have rain?
  - a.
  - b.
  - c.
  - d.
4. From what direction would you expect the wind to be blowing from in \_\_\_\_\_?
  - a.
  - b.
  - c.
  - d.

**Teacher Notes:**

- You can use the Internet to find weather maps and Doppler Radar.
- One great site is: <http://www.weather.com/weather/maps>. There are a variety of ways to get the information. One way might be looking at current temperatures. U.S. visible satellite and/or Doppler Radar. These can be viewed, downloaded, or printed as needed.