



Scout Day 2011 Workbook ANSWERS!



OFFICE TOUR (station 1)

1. The National Weather Service issues what products to help save lives and protect property.

Watches

Warnings

Advisories

2. Which of the following tools do meteorologists use to monitor and predict the weather?

a. Numerical Weather Models

b. Airport Observations

c. Satellites

d. Lightning Detection Systems

e. Upper Air Soundings

f. Radar

g. Microwave Ovens

3. True or False (circle the correct answer)

T F All weather forecasts are correct.

T F Looking at the same data, all meteorologists will make the same forecast

4. Put an "X" next to the types of weather that could be dangerous, damaging, or deadly to your community.

Thunderstorms Floods Flash Floods Heat Cold

Hurricanes Frost/freezes Lightning Fires Hail

Winter storms High Winds Rip Currents Droughts

5. Circle all the ways that severe weather and flood warnings can reach homes (inside) in your community.

a. NOAA Weather Radio

b. Cell Phones

c. Outdoor Tornado Sirens

d. Local TV and Radio Stations

e. Internet

(Outdoor tornado sirens are not designed to alert people inside a home, only people outdoors)

6. The scientific study of the atmosphere and of atmospheric conditions, especially as they relate to weather and weather forecasting is known as meteorology.

7. Weather is the state of the atmosphere at a given time and place, with respect to variables such as temperature, moisture, wind velocity, and barometric pressure.

8. Climate is the meteorological conditions, including temperature, precipitation, and wind that typically prevail in a particular region over a long period of time.

Panel Discussion (station 2)

1. How does weather affects people in the following jobs; list one part of the forecast that is most important to them and why?

Farmers

Rain – field conditions too wet or too dry to plant, need to water

Temperature – killing frosts and freezes, too hot for some crops

Sailors

Wind – control of sail boats

Waves – capsize boats

Thunderstorms/lightning – nowhere to take shelter

Pilots

Wind - landing and take off

Turbulence – comfort and safety of passengers

Thunderstorms – safely operate plane

Cloud height and visibility – landing and take off

Construction Workers

Wind – affects to cranes and other tall equipment

Rain – ruin concrete, can't paint

Temperature – affects how paint or concrete dries, safety of workers

Thunderstorms – Safety of workers

2. Weather Careers

a. What weather-related career interests you the most? _____

b. What education is needed for this career? _____

c. Name 2 major responsibilities for this career.

1) _____

2) _____

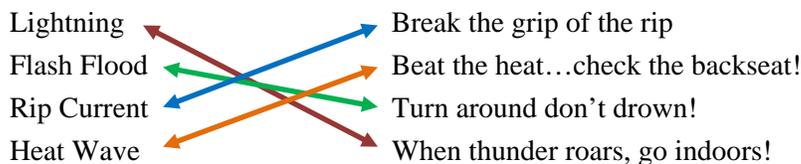
JEOPARDY (station 3)

See *Thunderstorms, Tornadoes, Lightning* booklet for help answering the following

1. Match the five dangerous weather-related conditions with the safety rule for each when outdoors.
(A safety rule can be used more than once)

Tornado	D
Lightning	A, B, D
Flash Flood	C
Hail	B, D
Wind	A, B, D

2. Match the NWS slogans to the dangerous weather threat:



3. A **watch** means severe weather is possible over the area for the next few hours. Be prepared!

A **warning** means severe weather is likely or already occurring, possibly life threatening.

4. True or False (circle the correct answer)

- T F No location is safe from tornadoes, including cities, highway underpasses, lakes, rivers, campgrounds, and mountains.
- T F If it is not raining, then there is no danger from lightning.
- T F The rubber soles of shoes or rubber tires on a car will protect you from being struck by lightning.
- T F People struck by lightning should not be touched because they carry an electrical charge.

5. Name three items that should be on your family safety plan:

See page 15 of the *Thunderstorms, Tornadoes, Lightning* brochure.

6. Name six items that should be in your emergency supply kit:

See pages 16-18 of the *Thunderstorms, Tornadoes, Lightning* brochure.

Homework

Discuss the safety rules with your family, and then make your own safety plan for your family.

MAKING AN ANEMOMETER

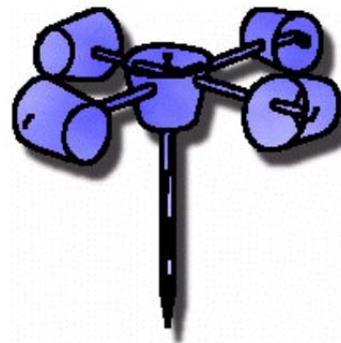
(station 4)

1. **True** or **False**: Wind is caused from the sun heating parts of the earth like land and water differently.
2. **True** or **False**: The Wind blows from High pressure to Low pressure.

Revolutions in 10 seconds	Wind Speed (mph)
2-4	1
5-7	2
8-9	3
10-12	4
13-15	5
16-18	6
19-21	7
22-23	8
24-26	9
27-29	10
30-32	11
33-35	12
36-37	13
38-40	14
41-43	15
44-46	16
47-49	17
50-51	18
52-54	19
55-57	20

Use this table to estimate the wind speed using the anemometer you made!

Look at the **X** on the bottom of the cup as it spins around. Count the number of times it spins around (revolutions) in 10 seconds. Use the table below to estimate the wind speed.



Homework

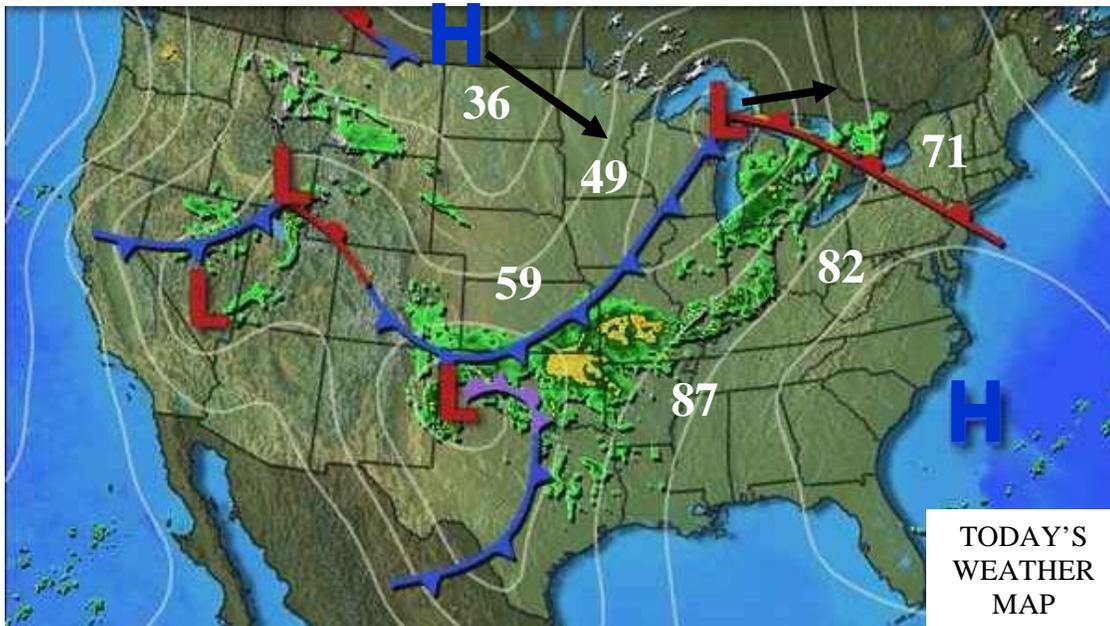
Document the wind speed and wind direction for *ONE* week using your anemometer.

DATE							
Wind Speed (mph)							
Wind Direction							

CLOUDS (station 5)

a. True or False (circle the correct answer)

- (T) F High pressure is often associated with good weather.
- (T) F Low pressure normally brings clouds, rain or snow, and stronger winds.

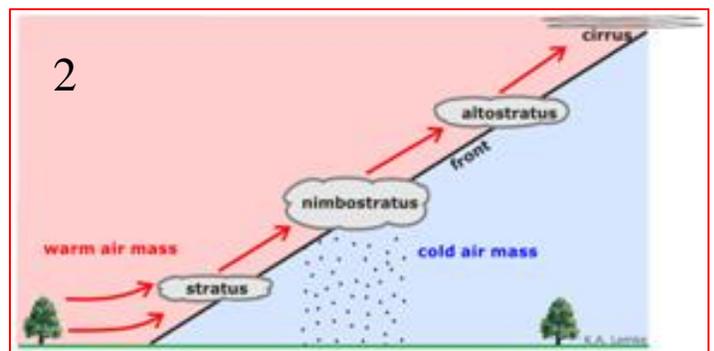
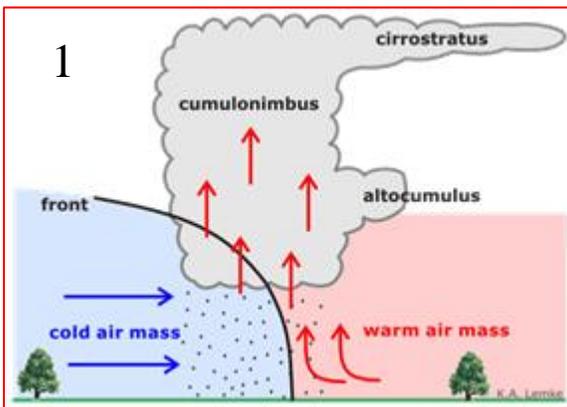


b. Pretend the weather map above is what is happening today. What kind of weather would you forecast for tomorrow for the Green Bay area?

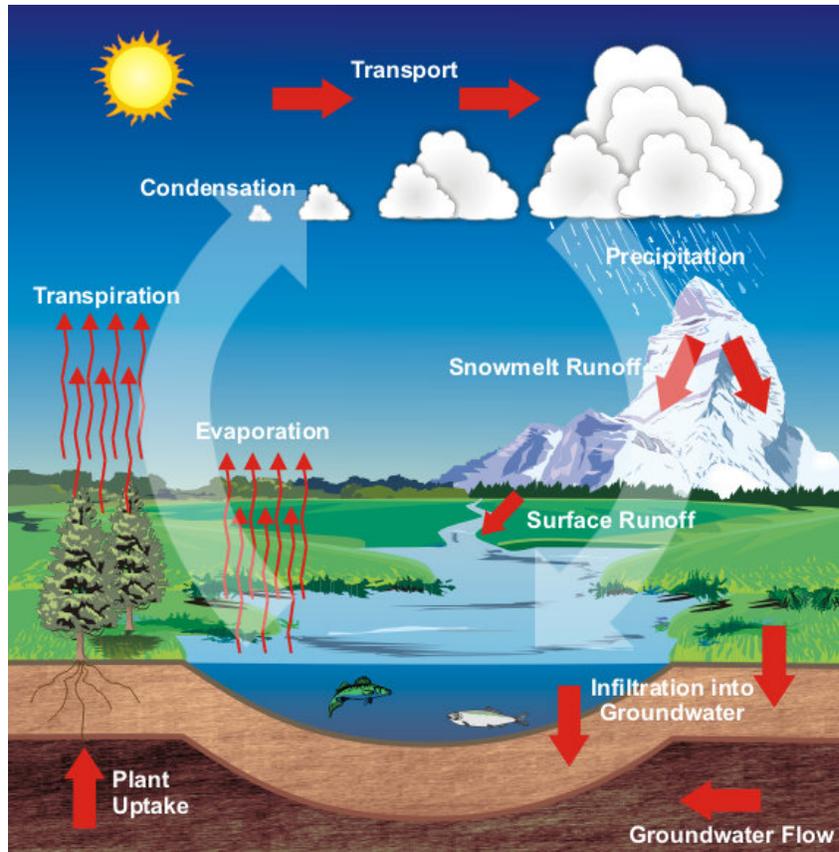
As the cold front moves east of Green Bay, high pressure over southern Canada will move into the northern United States, bringing fair skies and cooler weather to the Green Bay area.

c. On the pictures below, draw arrows showing the direction of the movement of the:

1. Cold air and warm air with the cold front.
2. The warm air with the warm front.



HYDROLOGY (station 6)



2. **True or False:** Acid rain is rain consisting of water droplets that are unusually acidic because of atmospheric pollution - most notably the excessive amounts of sulfur and nitrogen released by cars and industrial processes. Acid rain is also called acid deposition because this term includes other forms of acidic precipitation such as snow. Acid deposition can occur from natural sources like volcanoes.

3. Identify one human activity that pollutes the atmosphere and an effect such pollution can have on people or environment.

Activities that pollute the environment: driving cars, factories/manufacturing, oil drilling, waste burning, power plants, and farming (methane, pesticides).

Effects on people or the environment: lung problems (asthma, cancer), skin disorders, killing plants/trees, and poisoning animals.

Thunderstorms

1. The rings in a hail stone can tell you **the number of up and down trips the hail stone took within the cloud.**

2. **True** or False: The flash of light that we see with cloud to ground lightning starts at the earth's surface and moves up to the cloud.

3. For rain to occur, rising air motion is required. Name two of the ways air on the earth's surface is lifted to produce rain.

Heating from the sun, a front, or forced by terrain (mountains)

CLOUDS (station 2)

Cirrus



Cirrostratus



Contrails



Altostratus



Altostratus



Altostratus Lenticular



Stratus



Nimbostratus



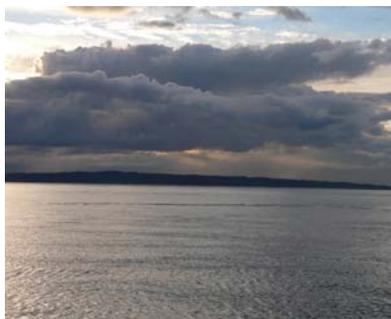
Cumulus



Fog



Stratocumulus



Cumulonimbus



CLOUDS (station 2)

HIGH 20,000ft – 50,000ft	<p>Cirrus</p> <p>Cirrus → Curl</p> <p>“Mares tails” Long wisps of cloud, thicker at one end than the other. Always associated with fair weather.</p>	<p>Cirrostratus</p> <p>A sheet of clouds. When thickening and increasingly covering the sky, it often means a change in weather, such as an approaching front.</p>	<p>Contrail</p> <p>Contrail → Condensation Trail Formed as water vapor in aircraft exhaust condenses and freezes forming cirrus clouds. Streaks may appear straight when wind shear is absent, or in a tangle if turbulence is present.</p>
MIDDLE 6,500ft – 20,000ft	<p>Altostratus</p> <p>Alto → High (as in music second highest range)</p> <p>Altostratus Castellanus Looks like castle turrets. Presence may foretell thunderstorms later in the day.</p>	<p>Altostratus</p> <p>Very often covers the entire sky. Often forms from the lowering of Cirrostratus as a warm front approaches.</p>	<p>Altostratus</p> <p>Altostratus Lenticular (Lens like shape)</p> <p>Seen as a stationary cloud. They often look like flying saucers. Formed as moist air is forced upward over mountain tops.</p>
LOW Up to 6,500ft	<p>Stratus</p> <p>Stratus → spread out</p> <p>A diffuse, grayish cloud that covers much of the sky and often produces drizzle. Bases of cloud usually below 2,000 feet. Often seen in marine regions.</p>	<p>Nimbostratus</p> <p>Nimbus → Cloud producing rain</p> <p>Stratus cloud with continuously falling rain, snow, or sleet. No well defined base. Forms ahead of warm front as rain or snow begins to fall from altostratus.</p>	<p>Cumulus</p> <p>Cumulus → heap</p> <p>Fair weather cumulus, go away with sunset. Cloud types we like to watch to see different shapes.</p>
	<p>Fog</p> <p>A stratus cloud close to the ground or water is called fog.</p>	<p>Stratocumulus</p> <p>Looks like layers of cotton. Often forms from the rising of stratus. Prevalent cloud type in Great Lakes region due to the lakes.</p>	<p>Cumulonimbus</p> <p>Thunderstorm Associated with these 5 hazards: Lightning, Hail, Strong Winds, Flooding from heavy rains, and tornadoes.</p>

Useful Weather Internet Sites

National Weather Service sites:

National Weather Service - <http://www.weather.gov/>

National Weather Service Green Bay - <http://www.crh.noaa.gov/grb/>

North Central River Forecast Center - <http://www.crh.noaa.gov/ncrfc/>

Storm Prediction Center - <http://www.spc.noaa.gov/>

National Hurricane Center - <http://www.nhc.noaa.gov/>

Radar Imagery:

KGRB – covers all of NE Wisconsin - <http://radar.weather.gov/radar.php?rid=grb>

Central Great Lakes - <http://radar.weather.gov/Conus/centgrtlakes.php>

National Mosaic - <http://radar.weather.gov/Conus/index.php>

Location of all NWS radars - <http://radar.weather.gov/>

Satellite Imagery:

Wisconsin Visible Satellite - http://www.crh.noaa.gov/grb/?n=wi_sat

Midwest Visible Satellite - http://aviationweather.gov/adds/data/satellite/latest_MSP_vis.jpg

Midwest Infrared Satellite - http://aviationweather.gov/adds/data/satellite/latest_MSP_irbw.jpg

Other satellite images - <http://www.crh.noaa.gov/grb/?n=satellite>

Surface Observations:

Weather Observations for the U.S. - <http://weather.noaa.gov/>

Weather Maps:

Wisconsin Surface Map - http://www.crh.noaa.gov/images/grb/maps/wi_sfc.gif

Midwest Surface Map - http://www.crh.noaa.gov/images/grb/maps/midwest_sfc.gif

Midwest Analyzed Surface Map - <http://www.hpc.ncep.noaa.gov/sfc/namncsfcbwg.gif>

Hydrometeorological Prediction Center - <http://www.hpc.ncep.noaa.gov/>

Current National Analysis - <http://www.hpc.ncep.noaa.gov/noaa/noaa.gif>

Forecast Maps Days 1 & 2 - http://www.hpc.ncep.noaa.gov/basicwx/basicwx_wbg.php

Forecast Maps Days 3-7 - http://www.hpc.ncep.noaa.gov/basicwx/basicwx_wbg.php

Code for Surface Fronts - <http://www.hpc.ncep.noaa.gov/html/fntcodes2.shtml>

Other:

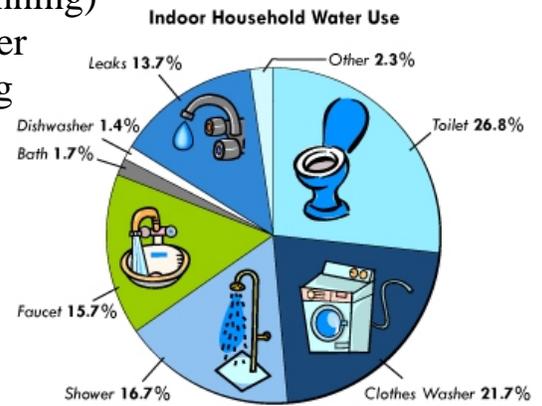
National Weather Service Glossary - <http://www.weather.gov/glossary/>

Cloud Chart - <http://www.weather.gov/os/brochures/cloudchart.pdf>

Every Drop Counts!

Conservation = use only what you need

- ◆ Water your lawn at night or in the early morning (8pm – 6am)
- ◆ Don't water when it is windy
- ◆ Apply mulch or bark around shrubs and trees to help retain moisture in the soil
- ◆ Plant trees and plants that need little watering
- ◆ Wash your car and bicycle with a bucket and sponge
- ◆ Take short showers - 4 minutes max (Take a 'Navy' shower")
- ◆ Collect rainwater in a bucket and use it to water houseplants
- ◆ Only run the dishwasher and clothes washer with full loads
- ◆ Wash and rinse dishes by hand in sink (tap not running)
- ◆ Install an energy and water efficient clothes washer
- ◆ Keep a jug of water in the refrigerator for drinking
- ◆ Install a low-flow shower head
- ◆ Sweep with a broom, not a hose
- ◆ Check for leaky faucets and toilets
- ◆ Turn off the faucet when brushing your teeth



Source: Awwa Research Foundation (1999)

Common Water – Use Habits

	Typical Usage	Water-Saving Habits
Showering	25-50 gallons (3-5 gal/min)	Take a 'Navy' shower. Wet down, soap up, rinse off (5 gal.)
Tub Bathing	35 gallons full	Use low level (10-12 gallons)
Toilet Flushing	4 gal/flush; (avg 5 flushes /day per person)	Install low flush toilet (1.6 gal/flush) or use tank displacement devices
Teeth Brushing	2-3 gallons* (tap running)	Wet brush; rinse briefly (1 pint)
Hand Washing	3-6 gallons* (tap running)	Fill basin; rinse (1 gallon)
Shaving	5-10 gallons* (tap running)	Fill basin; rinse (1 gallon)
Dishwashing	7-11 gal/load (full cycle dishwasher)	Wash; rinse in sink (5 gallons); Use paper plates; install high efficiency dishwasher < 7gal/load
Clothes Washer	40-50 gal/load for top loading machine	Do only full loads, front loading machines average 27 gal/load
Outdoor Watering	5-10 gal/minute	Be sensible; water at night or early morning, don't over water, mulch ground to retain moisture

* Faucet use based on average flow of 2 to 3 gallons per minute.