



- ### Questions
- Should I irrigate?
  - Should I be scouting for diseases?
  - Can I spray today?
  - Should I syringe?
  - Should we start later in the morning?
  - Are we going to have a frost delay?
  - Should I tarp or will I be ok if I don't?
  - What do I do about lightning?



TRANSMIT  
Horizontal Pulse

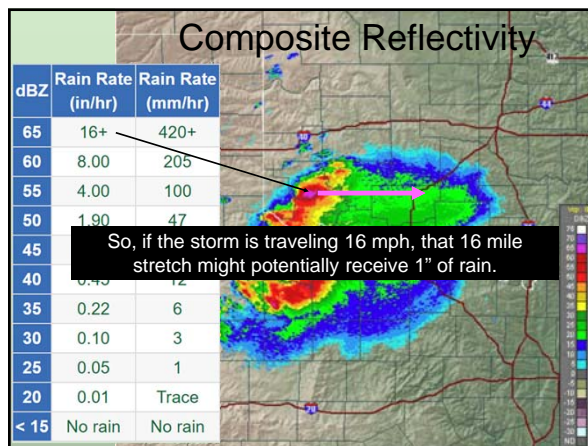
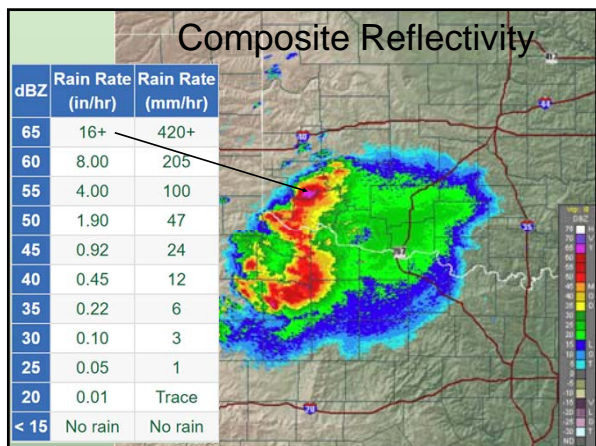
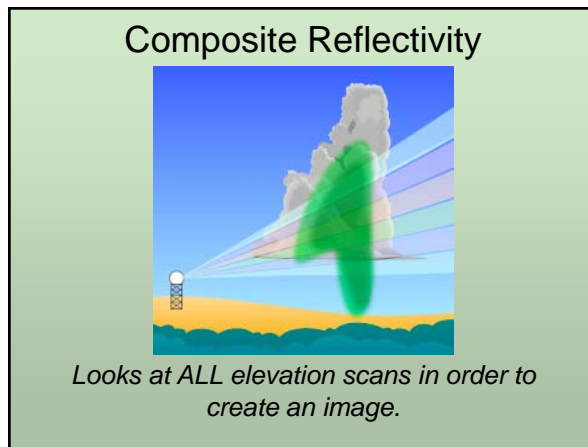
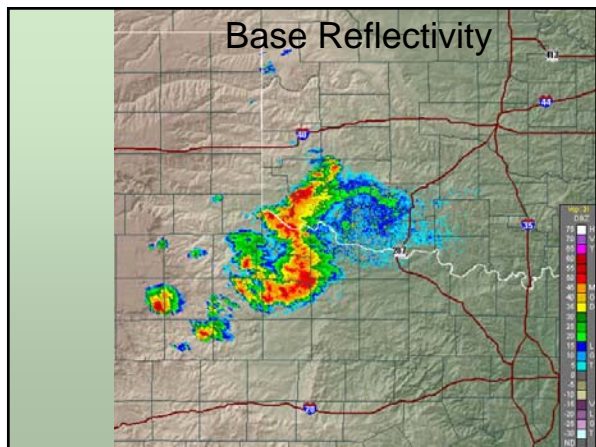
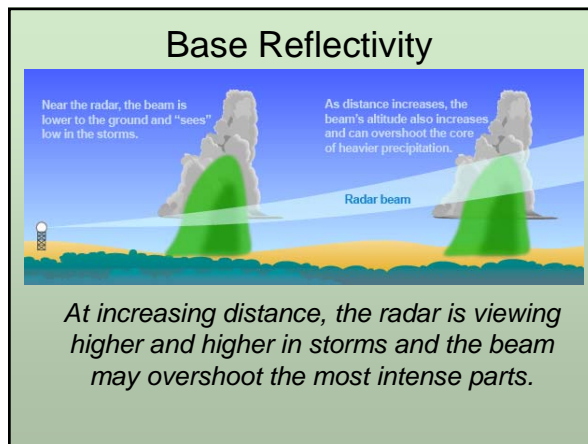
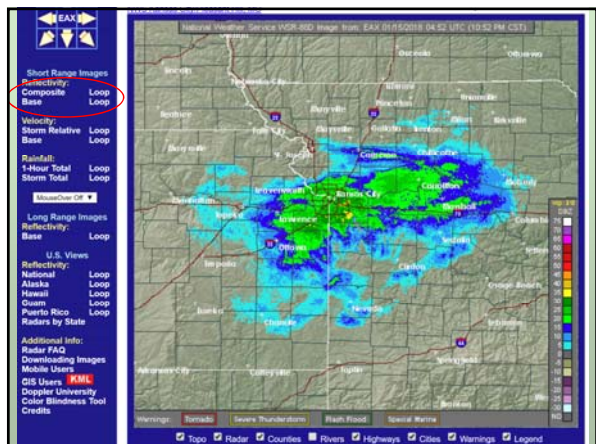
450,000 Watts

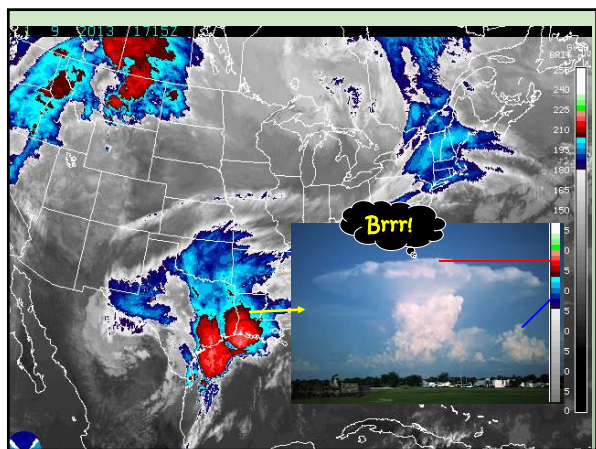
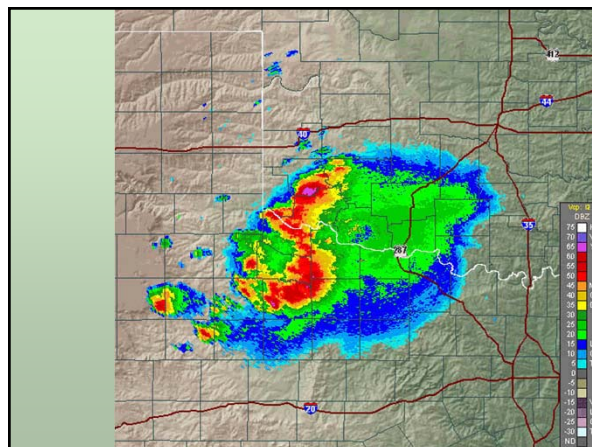
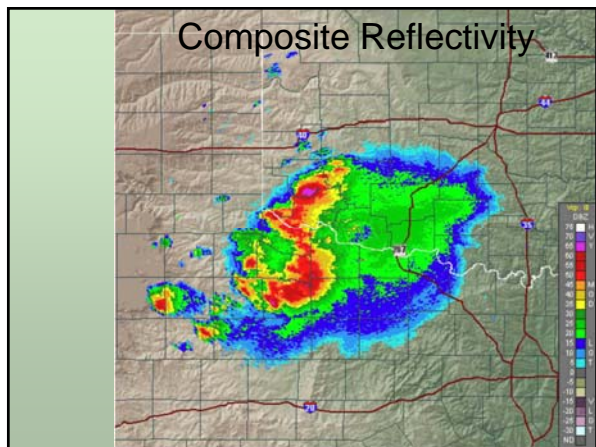
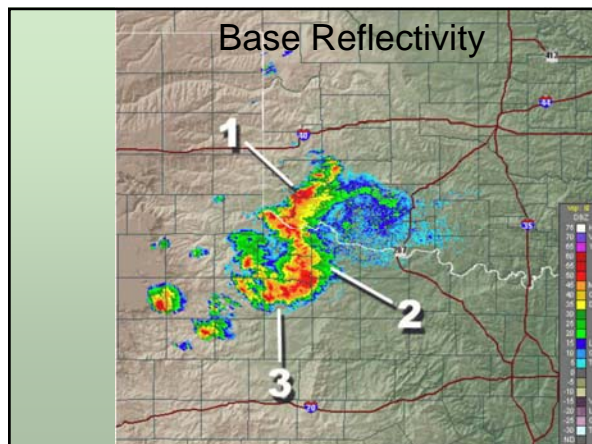
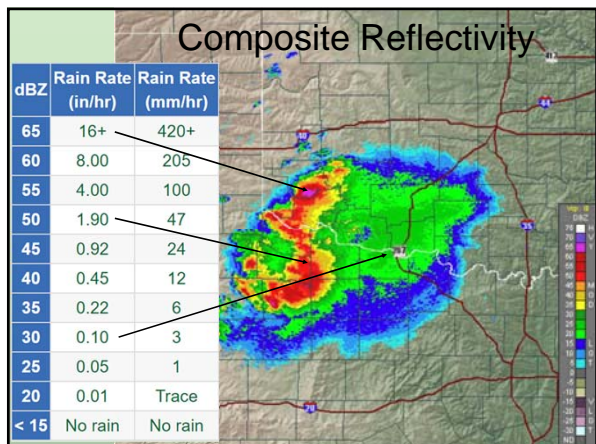
### Radar Imaging

- 
- *Doppler radar sends the energy in pulses and listens for any returned signal.*
  - *Signal is measured in decibels DBZ*
    - Value of 20 dBZ is typically the point at which light rain begins.
    - 60 to 65 dBZ is about the level where 1" diameter hail can occur.

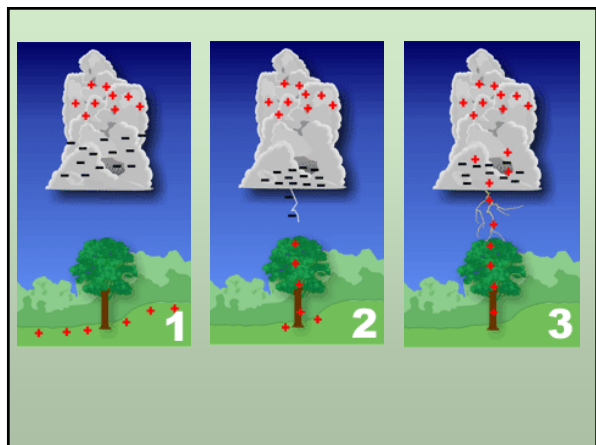




### Dual Polarization

TRANSMIT  
Horizontal Pulse





- Avoid Wide Open Areas
  - Sports Fields
  - Playgrounds
  - Parking Lots
  - Beaches
  - Others



**50,000 Degrees** **NOT SAFE!!**



**100 Million Volts**

This image shows a silver Calorway oven with a glass door. Inside the oven, a baseball team in orange uniforms is lined up. The oven has three control knobs on the right side. The text '50,000 Degrees' is in the top left, 'NOT SAFE!!' is in the top right, and '100 Million Volts' is in the bottom left.

**NOT SAFE!!**



This image shows a dugout on a baseball field. The dugout is a long, narrow structure with a green roof and metal benches inside. It is situated on a dirt infield next to a grassy area. The text 'NOT SAFE!!' is in the top right corner.

**SAFE!!**



This image shows a small, single-story brick building with a dark door and a green roof. It is surrounded by trees and a dirt path. The text 'SAFE!!' is in the top right corner.

**NOT SAFE!!**



This image shows a red Kubota tractor with a front loader. A person wearing a hard hat is sitting in the driver's seat. The tractor is parked on a dirt area next to a building. The text 'NOT SAFE!!' is in the top right corner.

**SAFE!!**



This image shows a red riding lawn mower with a black seat and a white roof. It has four wheels and a cutting deck. The text 'SAFE!!' is in the top right corner. There is a '4 TIER' logo in the bottom left corner.

Lightning can strike long distances, even outside of rain and cloud cover

***"If Thunder Roars, Get Indoors"***

Obey the 30/30 rule

Hey!!?!!

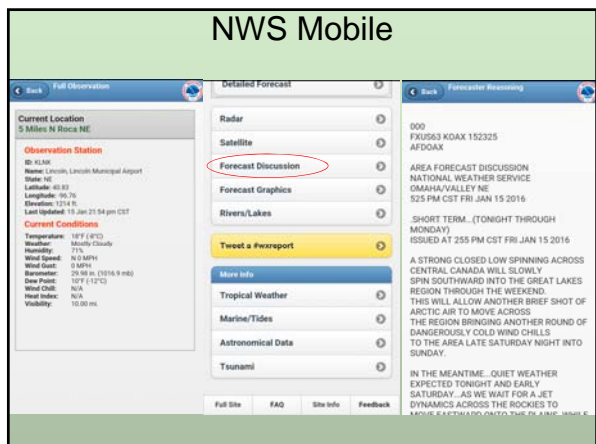
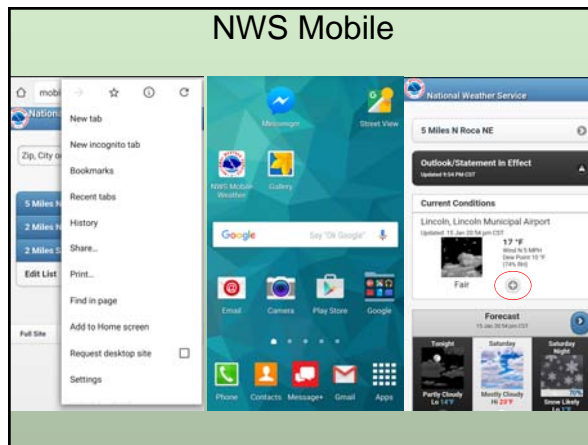
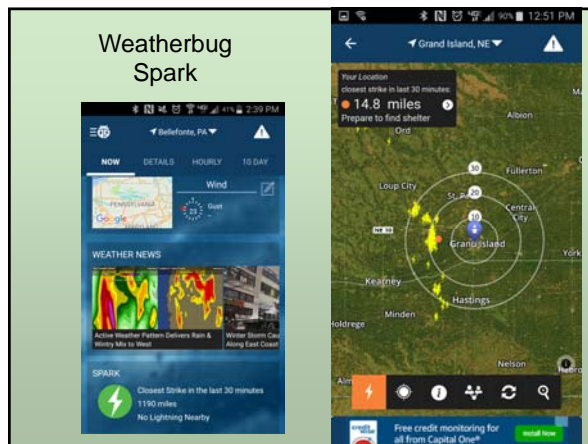
Copyright Robert A. Prentice, 1990

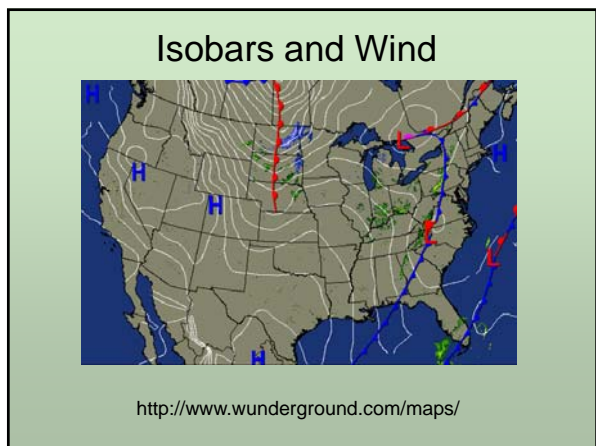
This image has a dark blue background with a lightning bolt striking a cloud. The text is in yellow and white. The text 'Hey!!?!!' is written in a slanted font near the lightning bolt. The copyright notice is at the bottom.

**Weather Safety for Organized Outdoor Athletic Events**

Another good lightning safety motto is:

**"If you can see it (lightning) flee it; if you can hear it (thunder), clear it."**





NATIONAL WEATHER SERVICE

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Go

News Headlines

- The official name of the upcoming Federal Holiday is... Head with Jaws
- 2017 Pennsylvania Weather Safety Poster and PSA Contest... 18 and 17: Check it out!

Your local forecast office is **State College, PA**

Current conditions at **Harrisburg, Capital City Airport (KCCY)**  
Lat: 41.227°N Lon: 76.871°W Elev: 338ft

37°F  
3°C

Humidity: 48%  
Wind Speed: 14.20 (0.31 mph)  
Sunset: 20:55 (in 12m) (2:55)  
Dewpoint: 19°F (7°C)  
Visibility: 10.00 mi  
Wind Chill: 27°F (2°C)  
Last update: 13 May 8:56 pm EST

More Information:  
Local Forecast Office  
Webcam Data  
3 Day History  
Weather Photo  
Monthly Climate Forecast

Extended Forecast for **Harrisburg PA**

Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday	Sunday Night
Increasing Clouds	Partly Sunny	Mostly Clear	Mostly Sunny	Partly Cloudy	Mostly Sunny	Partly Cloudy	Partly Sunny	Partly Cloudy
Low: 28°F	High: 37°F	Low: 23°F	High: 42°F	Low: 28°F	High: 55°F	Low: 48°F	High: 58°F	Low: 38°F

Detailed Forecast

Tonight: Increasing clouds, with a low around 28. Wind wind 11 to 14 mph, with gusts as high as 20 mph.

Topography: Click Map For Forecast

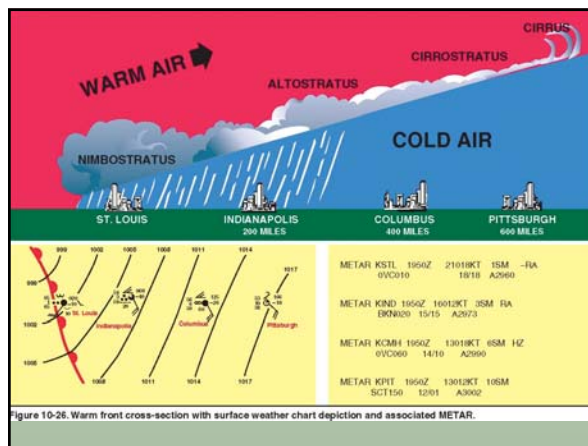
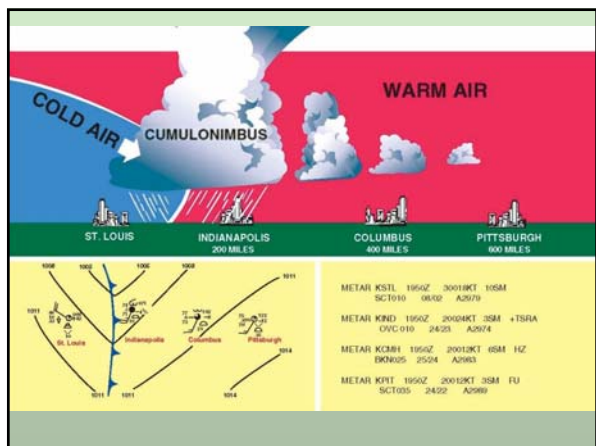
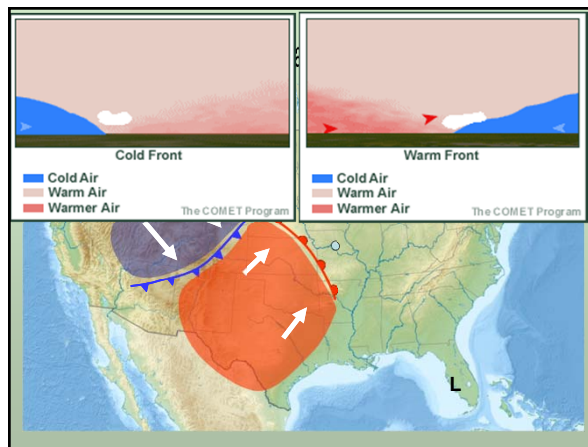
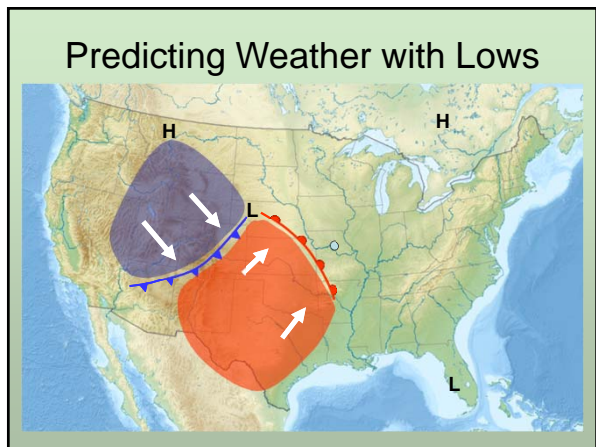
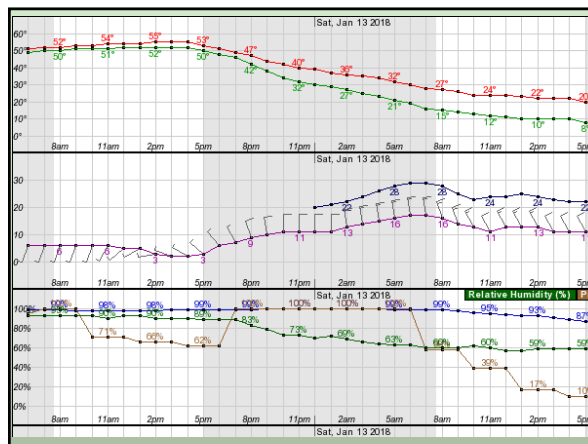
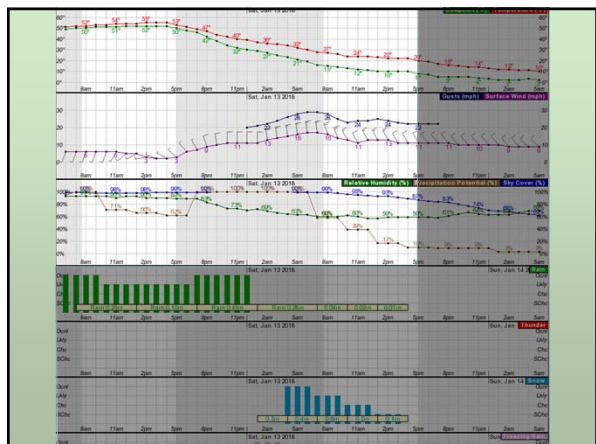


Figure 10-26. Warm front cross-section with surface weather chart depiction and associated METAR.



**NATIONAL WEATHER SERVICE**

News Headlines

Current conditions at Harrisburg, Capital City Airport (KCKY)

37°F  
3°C

Humidity: 68%

Wind Speed: 20.20 (3.1 mph)

Barometer: 29.55 (1000.2 mb)

Dewpoint: 59°F (15°C)

Visibility: 10.00 mi

Wind Chill: 27°F (3°C)

Last update: 04 Aug 5:36 pm EDT

Extended Forecast for Harrisburg PA

Tonight: Increasing Clouds  
Low: 28°F

Thursday: Partly Sunny  
High: 81°F

Thursday Night: Mostly Clear  
Low: 33°F

Friday: Mostly Sunny  
High: 82°F

Friday Night: Partly Cloudy  
Low: 28°F

Saturday: Mostly Sunny  
High: 88°F

Saturday Night: Partly Cloudy  
Low: 40°F

Sunday: Partly Sunny  
High: 88°F

Sunday Night: Partly Cloudy  
Low: 58°F

Date	Time (EST)	Wind (mph)	Vis. (mi)	Weather	Sky Cond.	Temperature (°F)			Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)			
						Air	Dwpt	6 hour				altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr	
						Max.	Min.										
15	18:56	W 20	10.00	Fair	CLR	37	19	46	37	48%	27	NA	29.55	1001.2			
		G 31															
15	17:56	W 14	10.00	Partly Cloudy	SCT055	39	18			43%	31	NA	29.55	1000.5			
		G 25															
15	16:56	W 17	10.00	Mostly Cloudy	BKN055	41	17			38%	33	NA	29.51	999.7			
		G 29															
15	15:56	NW 16	10.00	A Few Clouds	FEW060	42	18			38%	34	NA	29.49	999.0			
		G 32															
15	14:56	NW 21	10.00	Partly Cloudy and Breezy	SCT075	44	16			32%	36	NA	29.48	998.5			
		G 39															
15	13:56	W 18	10.00	Mostly Cloudy	BKN065	45	17			33%	37	NA	29.44	997.3			
		G 36															
15	12:56	W 18	10.00	Mostly Cloudy	SCT070	46	26	48	29	46%	39	NA	29.43	997.1			
		G 29															
15	11:56	NW 14	10.00	Mostly Cloudy	SCT041	43	29			58%	36	NA	29.45	997.6			
		G 22															
15	10:56	W 7	10.00	A Few Clouds	FEW100	44	29			55%	40	NA	29.45	997.4			
15	09:56	Vht 5	10.00	Fair	CLR	38	27			65%	34	NA	29.47	998.2			
15	08:56	N 6	10.00	Overcast	FEW050	35	27			72%	30	NA	29.50	999.2			
		G 32															
15	07:56	Calm	10.00	Overcast	BKN065	32	26			79%	NA	NA	29.51	999.5			
		G 30															

Current conditions at Flagstaff, Flagstaff Pulliam Airport (KFLG)

71°F  
22°C

Humidity: 20%

Wind Speed: Light

Barometer: 29.59 (1002.8 mb)

Dewpoint: 38°F (3°C)

Visibility: 10.00 mi

Last update: 04 Aug 7:57 am MST

Extended Forecast for Flagstaff AZ

Today: Sunny  
High: 83°F

Tonight: Mostly Clear  
Low: 53°F

Wednesday: Sunny  
High: 84°F

Wednesday Night: Mostly Clear  
Low: 54°F

Thursday: Slight Chance Rain  
High: 82°F

Current conditions at Phoenix, Phoenix Sky Harbor International Airport (KPHX)

92°F  
33°C

Humidity: 27%

Wind Speed: 2.5 (0.4 mph)

Barometer: 29.87 (1002.2 mb)

Dewpoint: 52°F (12°C)

Visibility: 10.00 mi

Heat Index: 90°F (32°C)

Last update: 04 Aug 7:51 am MST

Extended Forecast for Phoenix AZ

Today: Hot  
High: 111°F

Tonight: Clear  
Low: 61°F

Wednesday: Hot  
High: 111°F

Wednesday Night: Mostly Clear  
Low: 61°F

Thursday: Slight Chance Rain  
High: 108°F

2 hrs ZONA

Why such a difference in temps?



### Water's Changes of State

Ice melting **absorbs HEAT**  
Anyone make ice cream?  
80 calories per gram

Evaporation **absorbs HEAT**  
Anyone syringe their turf?  
600 calories per gram

### Should I Syringe?

Canopy Temperature

Air Temp 90°F (32.2°C)  
RH12%  
Solstice sun angle @ 5,280 ft altitude  
Light Winds

Quick Spritz of Water (Syringe)

5 mins later

85°F (29.4°C)

Call me old-school  
I still syringe when conditions are right

The amount of water air holds depends on temperature

**Cooler Air holds less moisture**

**Warmer air holds more moisture**

Moisture Holding Capacity of Air	
Temperature (°F)	g/kg
-40	0.1
-22	0.3
0	1
14	2
32	3.5
40	4
50	7
60	11
70	16
80	20
90	32
100	45

### Relative Humidity (%Humidity): Is a Ratio

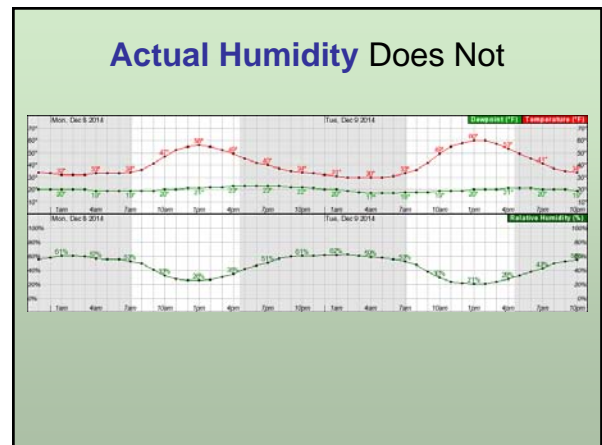
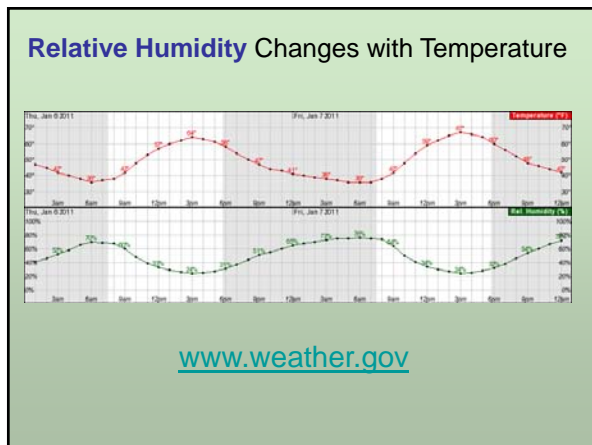
**Amount of H<sub>2</sub>O in air**  
How much H<sub>2</sub>O air can hold

- Indicates how near air is to being 100% saturated with water
- NOT actual amount of water in the air

Total Water Vapor Air can Hold

Actual Amount of Water

**50% Relative Humidity**



### Dew Point or Dew Point Temperature

- The temperature at which dew, clouds or frost forms
  - Occurs when the air temp and dewpoint meet
- Dewpoint is a direct indicator of how much moisture is in the air

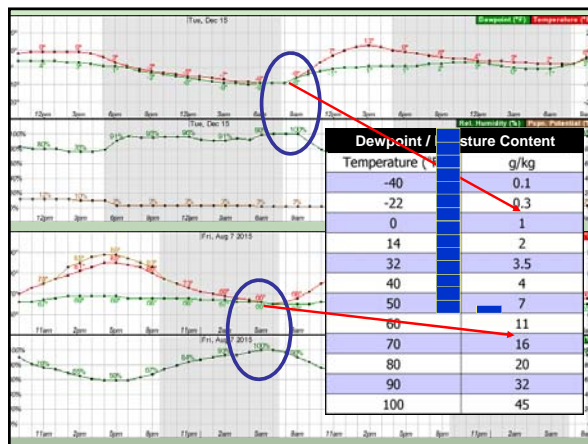
Total Water Vapor Air can Hold

Actual Amount of Water

Dew-point temperature	
≤ 10°F	Significant snowfall is inhibited.
≥ 55°F	Minimum for severe thunderstorms to form.
≥ 65°F	Considered humid by most people.
≥ 70°F	Typical of the rainy tropics.
≥ 75°F	Considered oppressive by most.

So:  
 High dew point temps = **moist air**  
 Low dew point temps = **dry air**

**Do We Consider  
100% Relative Humidity  
Humid?**



**Should We Consider  
70% Relative Humidity Humid?**

**A**

- Humidity 70%
- Wind Speed SW 6 mph
- Barometer 30.83 in (1040.3 mb)
- Dewpoint -17°F (-27°C)
- Visibility 10.00 mi

**B**

- Humidity 70%
- Wind Speed E 8 mph
- Barometer 29.78 in (1010.3 mb)
- Dewpoint 80°F (27°C)
- Visibility 10.00 mi

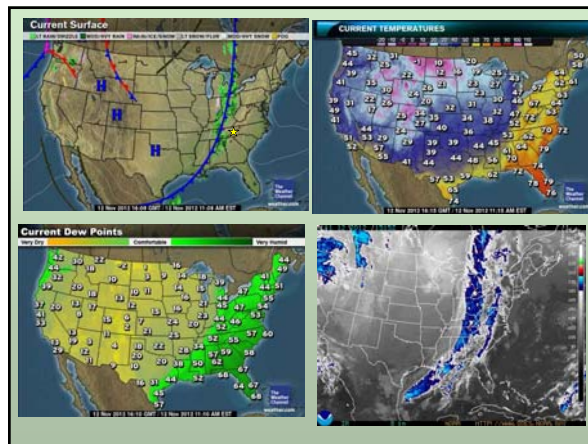
**Which city has a greater disease potential?**

**A**

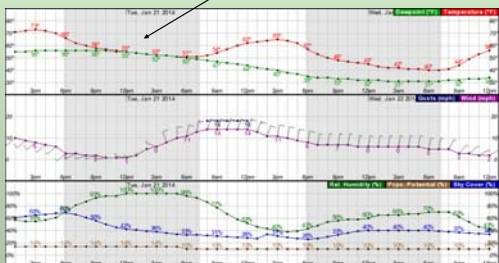
- Humidity 80%
- Wind Speed N 10 mph
- Barometer 30.61 in (1036.7 mb)
- Dewpoint 12°F (-11°C)

**B**

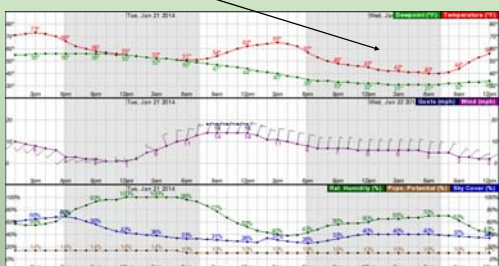
- Humidity 80%
- Wind Speed N 7 mph
- Barometer 30.23 in (1023.7 mb)
- Dewpoint 61°F (16°C)



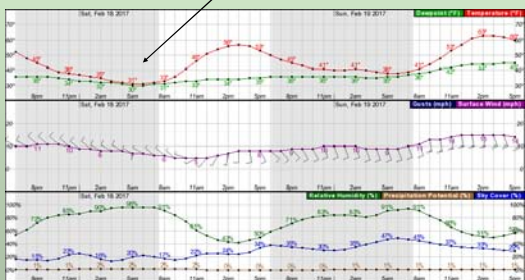
What conditions can we expect overnight Monday/Tuesday?



What conditions can we expect overnight Tuesday/Wednesday?



What conditions can we expect overnight Friday/Saturday?



### Temps are below freezing Can we expect frost on either night?

### Which day would a have greater need for irrigation?

Potential ET Rates*	
Climate Type	Daily Loss (in inches)
Cool Humid	0.15
Cool Dry	0.20
Warm Humid	0.20
Warm Dry	0.25
Hot Humid	0.30
Hot Dry	0.40

\*Approximate Rates\*

### Which days may have greater disease potential?

### IPM Example

Pest Management Log	
Date	7/16/17
Current Time	7:00 am
Sunrise / Sunset	5:52 / 9:32
Wind Speed / Direction	SW 5-8 mph; shifting NW 10-15 mph
Current Temperature	79°F (yesterday's high: 95)
Dewpoint	70
Relative Humidity	84%
Target Pest ID	Pythium alert?
Product Used	
Total Amount	
Amount ai	

### Management Decisions Based on Weather Information

You have a cold front coming through the night before a 3 pm Softball Championship game.

The forecast is ¼ - 1 inch of rain overnight, 28°dewpoints, sunny, breezy. What will you do?

People are traveling long distances, what calls do you make?

### Management Decisions Based on Weather Information

You have a warm front coming through in 4 days, you were planning to deep-tine aerify during that time.

How does it affect your plans?

