

# **Rural Training Center – Thailand (RTC-TH)**



**Community-based Environmental Education  
for the Self-sufficiency and Sustainability of  
Small Rural Family Farms**

# Advanced MEWS

## Weather Observing Lesson A1: Measuring Relative Humidity and Heat Stress



**2012 Ed**

**MEWS  
Lesson A1**

© 2010, rev 2012. G. K. Lee  
HSØZHM All rights reserved.

# Advanced Temperature measurements are needed to

- Calculate Relative Humidity
- Heat Stress Index

The topics below are covered in other Advanced MEWS lessons.

- Wind Chill Temperature
- Dew Point Temperature
- Cloud Base Height



You may want to review MEWS Lesson B1 about basic temperature measurement before proceeding.



# A Mobile Emergency Weather Station (MEWS) Training Series presentation



Rural Training Center-Thailand  
Emergency Communications Program

**Ready to serve and sustain our community**

For other lessons in the series e-mail [hs0zhm@gmail.com](mailto:hs0zhm@gmail.com)  
[www.neighborhoodlink.com/RTC-TH\\_Tech/pages](http://www.neighborhoodlink.com/RTC-TH_Tech/pages)



# A part of the RTC-TH EmComm Program

The Rural Training Center-  
Thailand Emergency  
Communications program  
is a volunteer effort to  
provide emergency

amateur radio communications for  
local community self-sufficiency and  
sustainability in times of need.



# The Rural Training Center-Thailand (RTC-TH)



is an all volunteer  
organization providing  
community-based  
environmental education  
for self-sufficiency and  
sustainability of small  
rural family farms

[www.neighborhoodlink.com/org/rtcth](http://www.neighborhoodlink.com/org/rtcth)

E-mail: [rtc2k5@gmail.com](mailto:rtc2k5@gmail.com)



# MEWS adapts weather lessons from two existing RTC-TH programs



Unless otherwise indicated, photos in this presentation are the exclusive property of the RTC-TH. Use of RTC-TH copyrighted materials are available for private / non-commercial educational use without written permission if no changes are made, no fee is charged, and proper attribution is made to the RTC-TH.

**Commercial use of the materials is prohibited without written permission.**



E-mail: [rtc2k5@gmail.com](mailto:rtc2k5@gmail.com)

[www.neighborhoodlink.com/RTCTH\\_Tech/pages](http://www.neighborhoodlink.com/RTCTH_Tech/pages)



The Rural Training Center-Thailand was created to honor the life and memory of Mr. Tang Suttisan, a father, farmer and former custodian of Ban Na Fa Elementary School who appreciated and valued education.





# Survivors often lack shelter. Excessive temperature makes life difficult and stressful.







Photos from the Internet; educational fair use clause

Relative humidity affects the health / well-being and food / water needs of disaster survivors. This valuable information can be obtained and reported by MEWS trained HAMs.





High temperature with  
high relative humidity  
adds stress and  
increases the need for  
water and shelter.







Relative humidity  
affects air density  
for flight conditions  
in disaster relief  
flight operations.



# Advanced Temperature measurements are needed to

- Calculate Relative Humidity
- Heat Stress Index

The topics below are covered in other Advanced MEWS lessons.

- Wind Chill Temperature
- Dew Point Temperature
- Calculating Cloud Base Height



You may want to review MEWS Lesson B1 about basic temperature measurement before proceeding.



# Knowing the Relative Humidity helps relief officials

to better plan water, food, shelter,  
clothing and supplies needed for  
the emergency relief effort.

**However, in most cases, weather  
information for the local disaster site  
may NOT be available.**

**You can help fill the gap by learning  
about weather observing and/or  
becoming a licensed HAM (amateur radio  
operator).**



# Relative Humidity

is the amount of **moisture** in the **air** compared to how much moisture could be in the air **IF** the air was holding all the moisture it could hold.



# Moisture is another word for water.

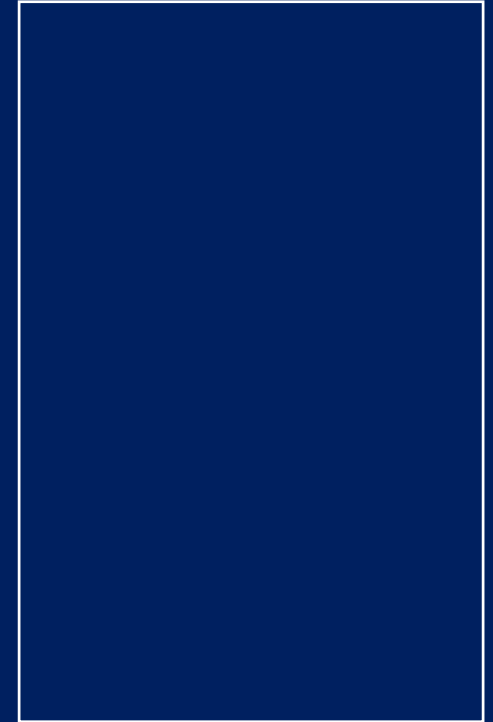
## Water can be a liquid, solid, or a gas.



Water



Ice



Water Vapor





# Water vapor is a gas.

Water vapor is moisture in the form of a gas in the air. It can be used to make clouds.



# A gas has no shape

## A gas takes the shape of the container that holds it.





# You cannot see a gas.

## Air is a gas.





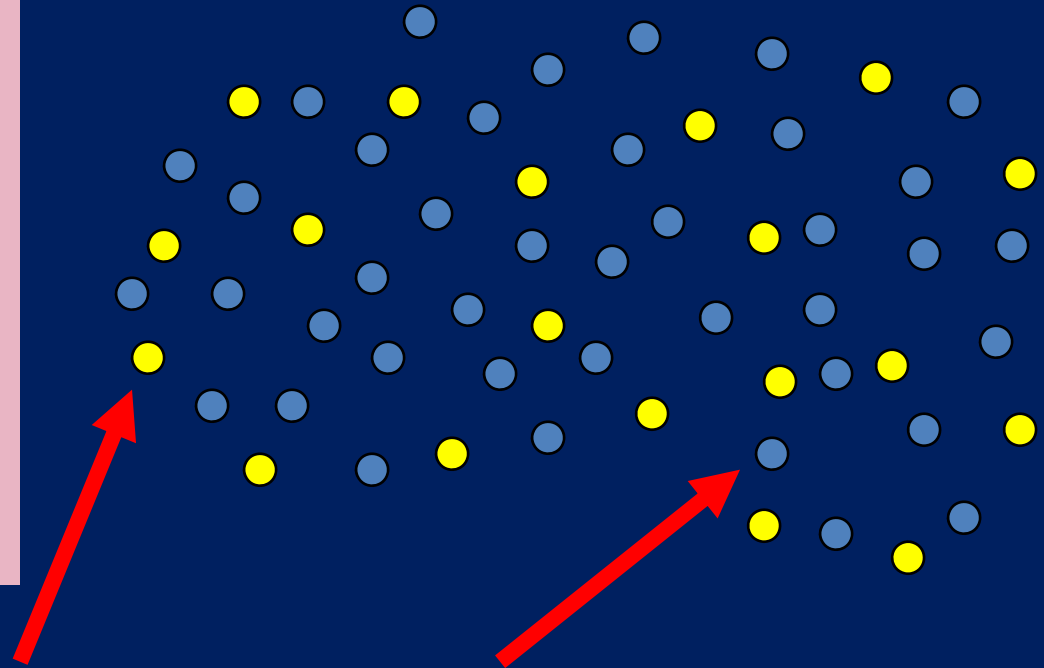
The moisture forming on the outside of this container came from the water vapor in the air.



# Air Temperature Affects Relative Humidity



Warm air  
can have a  
higher  
relative  
humidity



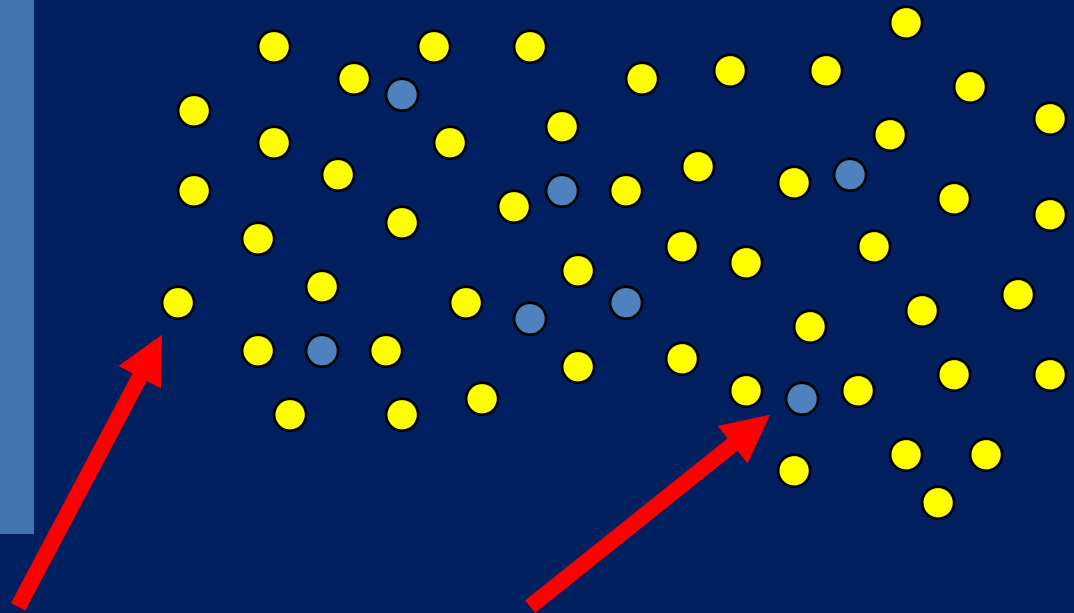
Air molecule

Water molecule



# Air Temperature Affects Relative Humidity

Cool air  
can have  
a lower  
relative  
humidity



Air molecule

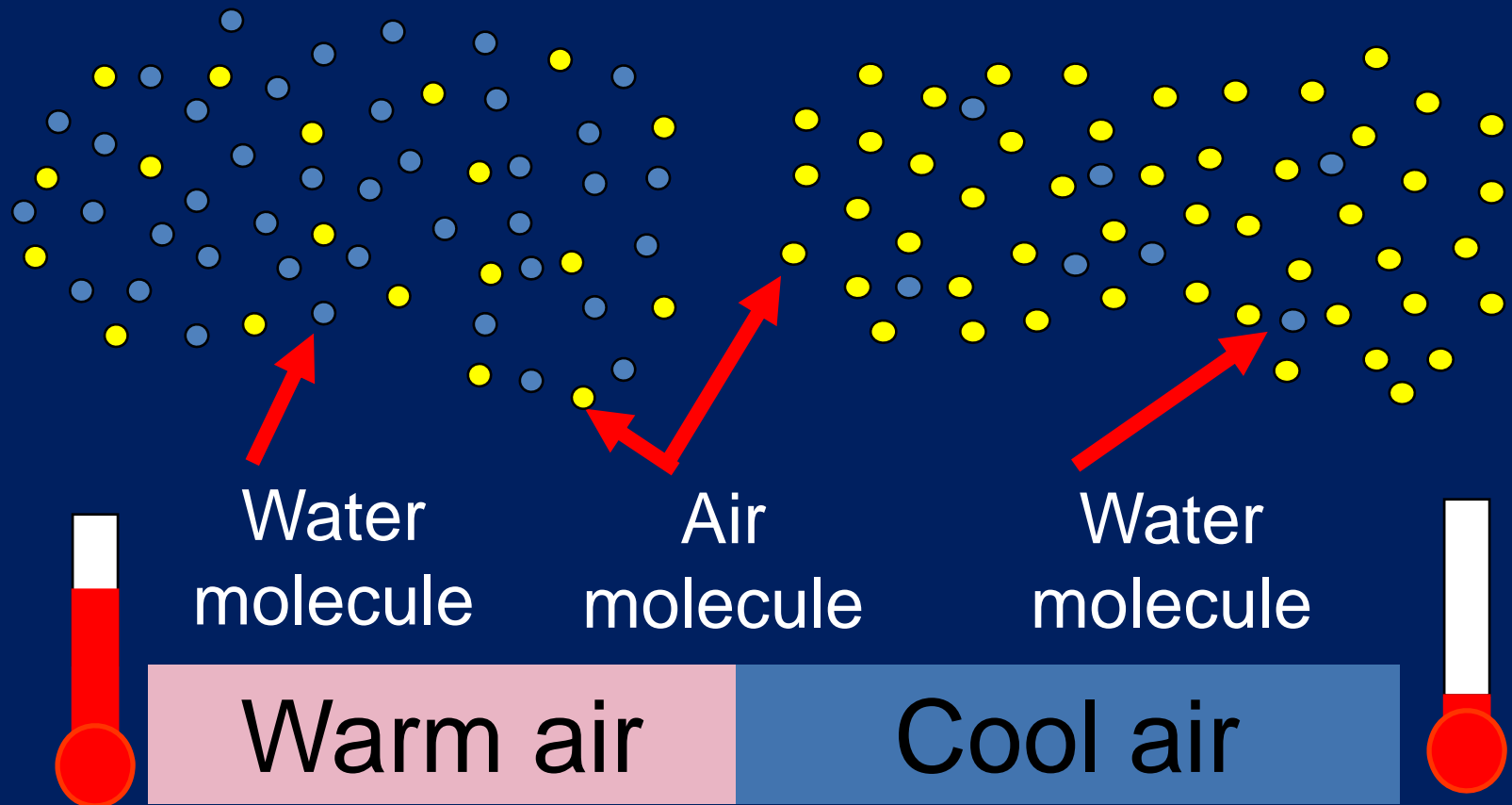
Water molecule






# Do you know why?

## Can you see the difference?




# This is why.



Warm air  
has more  
space to  
hold water  
molecules

Cool air has less  
space to hold water  
molecules

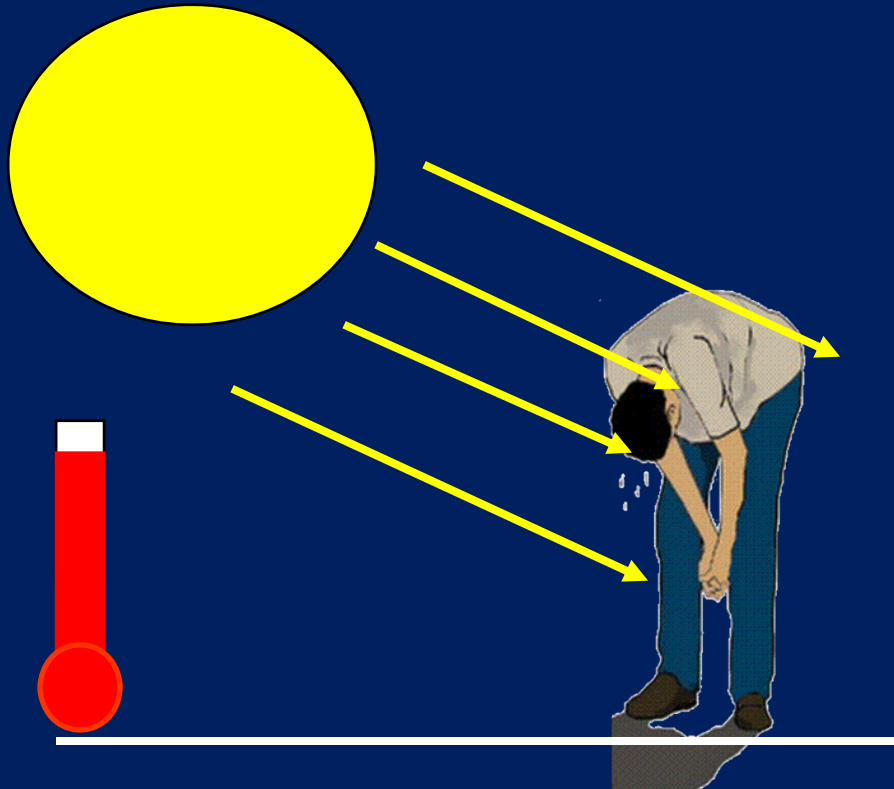


Another way to think about it is the warm air is a bigger container than the cold air (which is a smaller container).



# High temperatures and high relative humidity...

...can make it dangerous to work outside.



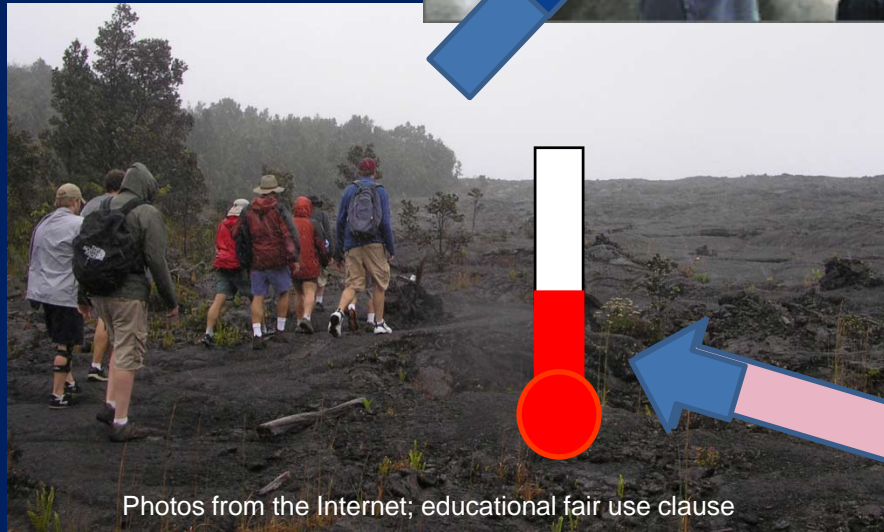
The amount of danger can be determined using the Heat Stress Index.



# Low temperatures, high relative humidity, and high wind speed makes you feel cooler...

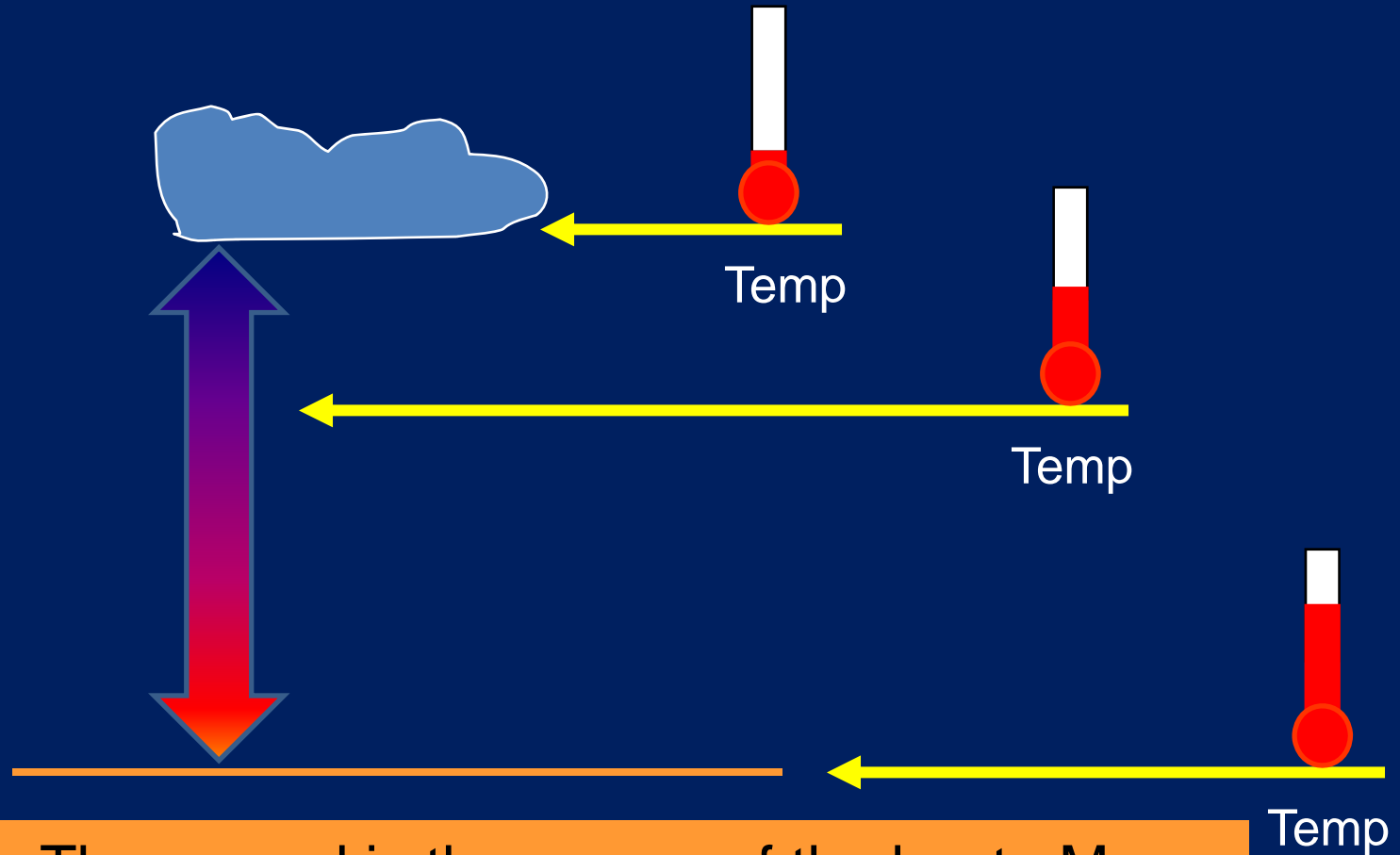
## ...than the measured air temperature.

Wind Chill is covered in  
Advanced Lesson A2



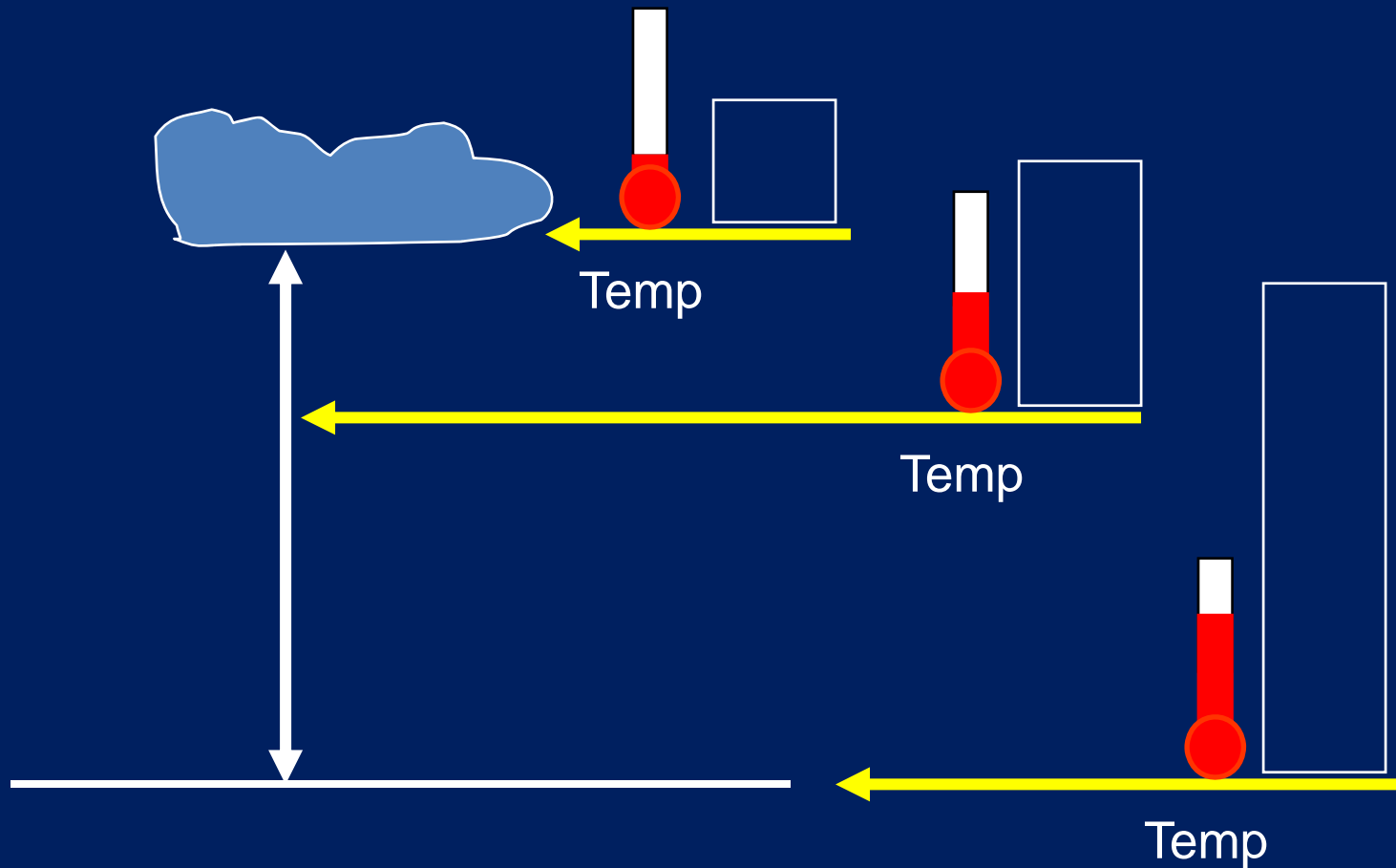
Photos from the Internet; educational fair use clause

# The air temperature gets lower as you go higher above the ground.



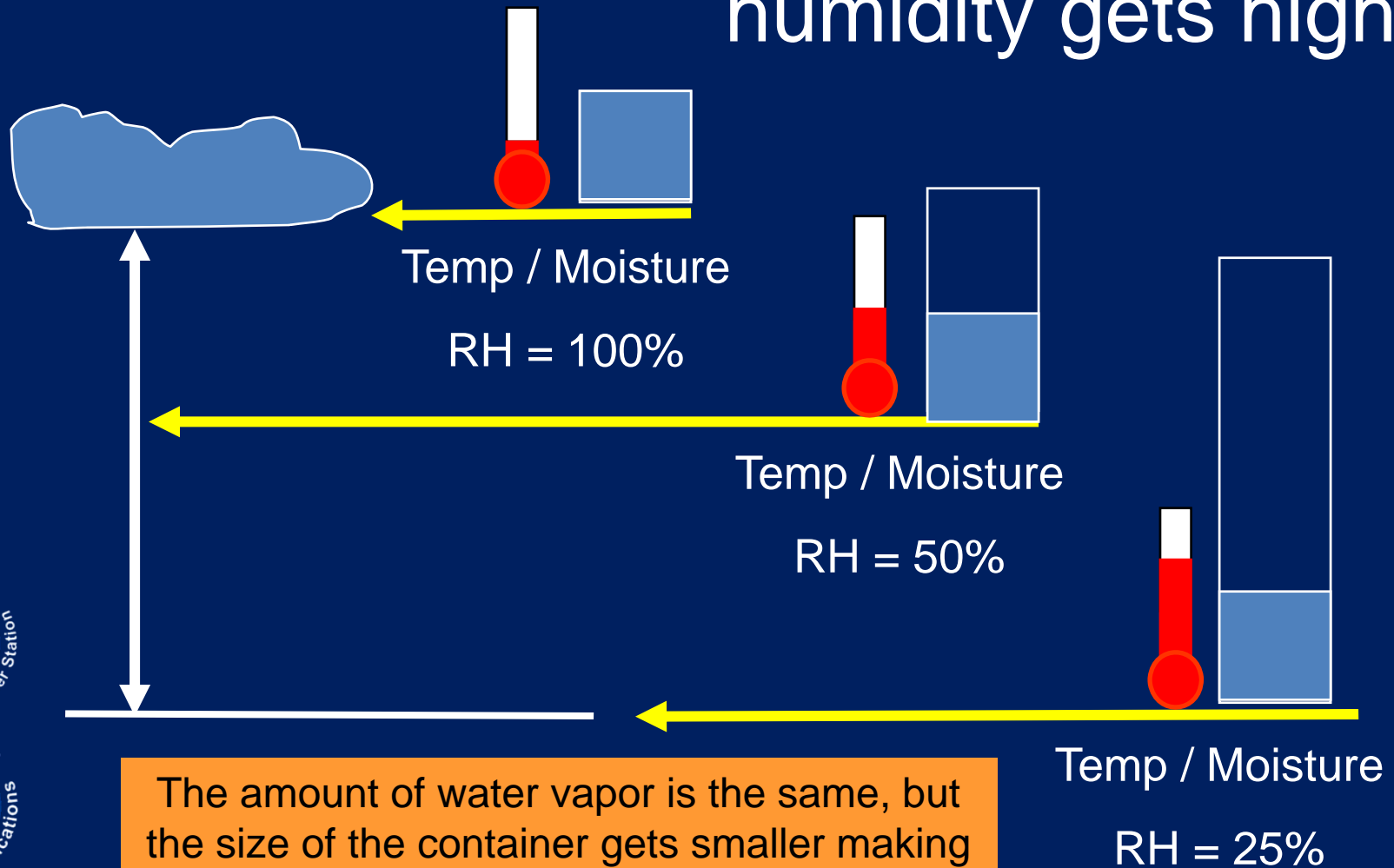
The ground is the source of the heat. Move away from the heat source and it is cooler.

# Air Temp affect “size of container” to hold the moisture





So as you go higher above the ground the temperature gets lower and the relative humidity gets higher.



The amount of water vapor is the same, but the size of the container gets smaller making the container seem to fill up.

Also, as you go higher above the ground the wind speeds get higher.



Wind moves cooler air molecules to take heat away from you making you feel less warm (colder).



# Section 2.4 is for Relative Humidity

Brief notes are on the form to help remind you how to calculate Relative Humidity

M.E.W.S. Thailand RTC-TH M.E.W.S. Weather Observation Log											
Location											
Lat		° ' " N		Long		° ' " E		Elev m AMSL			
Lat		N		Long		E		m AMSL			
Date				Weather Observations Time							
Local time 24-hr format				Hour →		Sunrise		Mid-Afternoon		Sunset	
Observer (initial; see back)											
1. Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground		°C		°C		°C		
	2.2	Wet Bulb			°C		°C		°C		
	2.3	Difference	Subtract 2.2 from 2.1;		°C		°C		°C		
2. Temperature / Relative Humidity	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table		%RH		%RH		%RH		
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table		°C		°C		°C		
	2.6	Heat Stress	Use 2.1, 2.4; HSI Table Danger Level (if any from Heat Stress Index table)		Heat Stress °C		Heat Stress °C		Heat Stress °C		
3. Wind	2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl Danger Level (if any from Wind Chill chart)		Wind Chill °C		Wind Chill °C		Wind Chill °C		
	Report wind speed in <i>knots to air crews</i> ; km/h to all others.										
	Average	Get 3 readings & average		km/h		knts		km/h		knts	

## Temperature / Relative Humidity

**2.1 Air (Dry Bulb) Temp:** Read thermometer kept in the shade, 1.5 m above the ground.

**2.2 Wet Bulb Temp** from hygrometer kept in the shade, 1.5 m above the ground.

**2.3 Difference** between Dry and Wet Bulb temperatures.

**2.4 Relative Humidity:** Use Dry Bulb Temp (2.1), Difference (2.3) and Relative Humidity table to find % Relative Humidity.

More detailed notes are on the back of the form to help remind you what to do.

See Handbook Section 2,  
pp 9-10

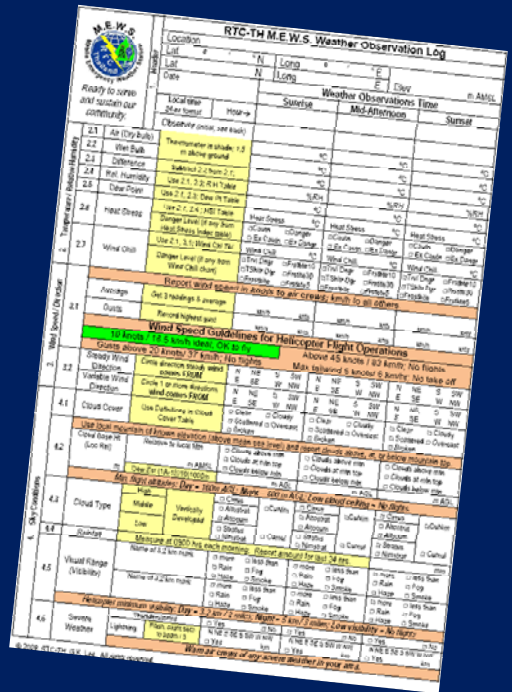
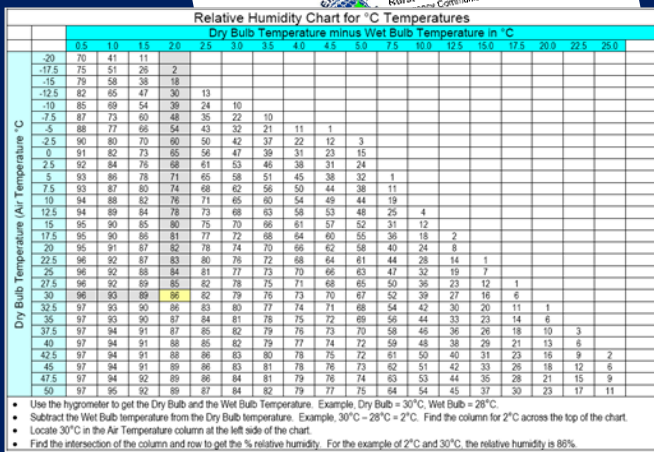
4.	4.5	Visual Range (Visibility)	Name of 3.2 km mark	<input type="checkbox"/> more	<input type="checkbox"/> less than	<input type="checkbox"/> more	<input type="checkbox"/> less than	<input type="checkbox"/> more	<input type="checkbox"/> less than
			<input type="checkbox"/> Rain	<input type="checkbox"/> Fog	<input type="checkbox"/> Rain	<input type="checkbox"/> Fog	<input type="checkbox"/> Rain	<input type="checkbox"/> Fog	
			Name of 3.2 km mark	<input type="checkbox"/> more	<input type="checkbox"/> less than	<input type="checkbox"/> more	<input type="checkbox"/> less than	<input type="checkbox"/> more	<input type="checkbox"/> less than
4.6	Severe Weather	Thunderstorms	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
		Lightning	Flash, count secs to boom / 3	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW		
			<input type="checkbox"/> Yes	km	<input type="checkbox"/> Yes	km	<input type="checkbox"/> Yes	km	

Helicopter minimum visibility: Day - 3.2 km / 2 miles; Night - 5 km / 3 miles; Low visibility - No flights

Warn air crews of any severe weather in your area.



# Calculator



# MEWS Log Form

# Relative Humidity Reference Table



Many English words in science  
come from Latin or Greek language.

hygro = water

meter = to measure

A hygrometer is a tool to  
measure water in the air.

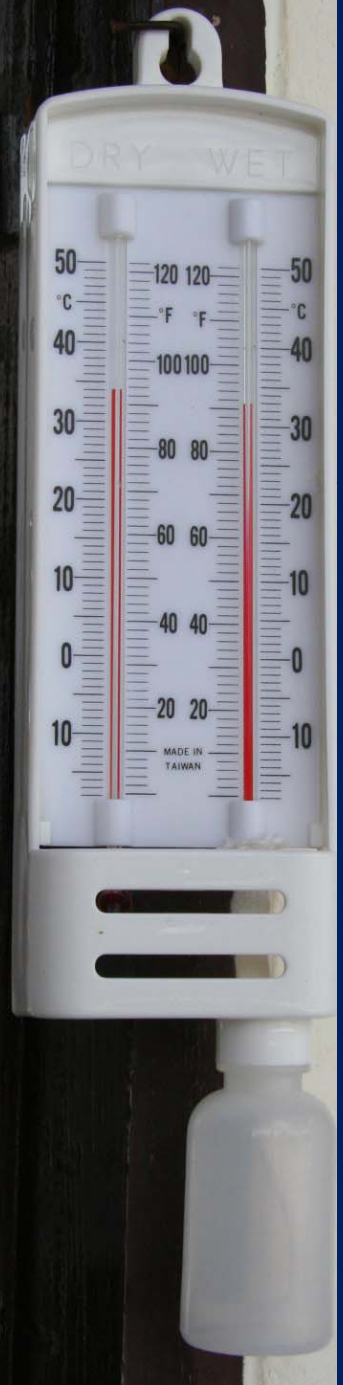


# A hygrometer...

...is a tool to  
measure relative  
humidity



Before starting, be sure  
the water bottle is full  
and the cloth wick on the  
wet bulb thermometer is  
soaking wet.



# The Parts of a Hygrometer

Dry Bulb  
Thermometer

Wet Bulb  
Thermometer

A hygrometer  
may cost about  
230 THB.

Temperature  
Scales

See addendum  
after this lesson  
on how you can  
make your own  
hygrometer.

Water Bottle





# MEWS weather data



Photos from the Internet; educational fair use clause

...may be used for many purposes in relief operations. If possible, it should meet weather service standards.



# These guidelines are for official weather stations



EmComm  
situations will  
probably be less  
than ideal.





# Standard Weather Instrument Shelter



Ideally, the thermometer should be shaded and ventilated about 1.5 m above the ground.

This is the international standard for weather measurements.





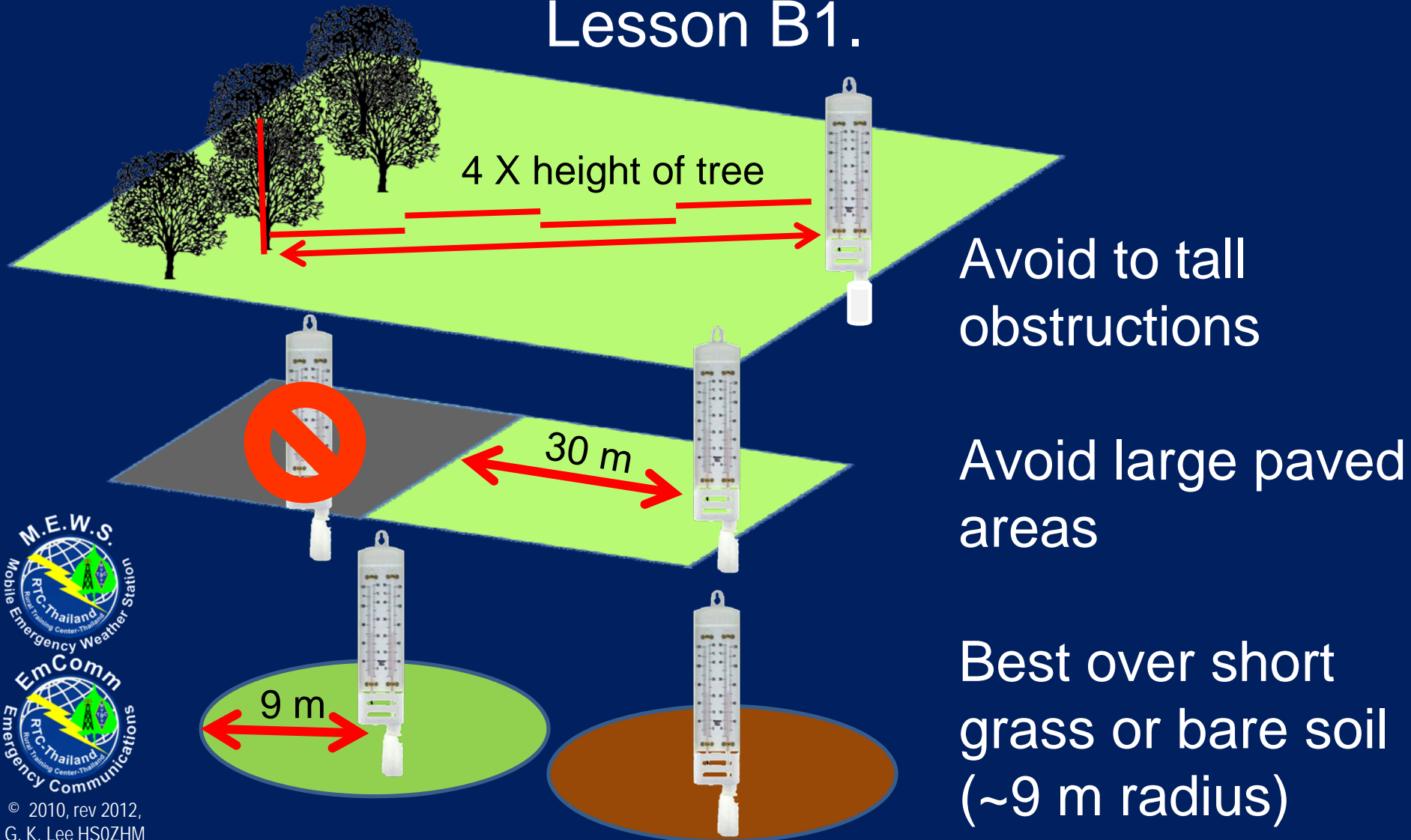
# Hygrometer Placement



Ideally, the hygrometer should be located in an open area, 30m from large paved areas, etc. similar to a thermometer.

# Hygrometer Placement

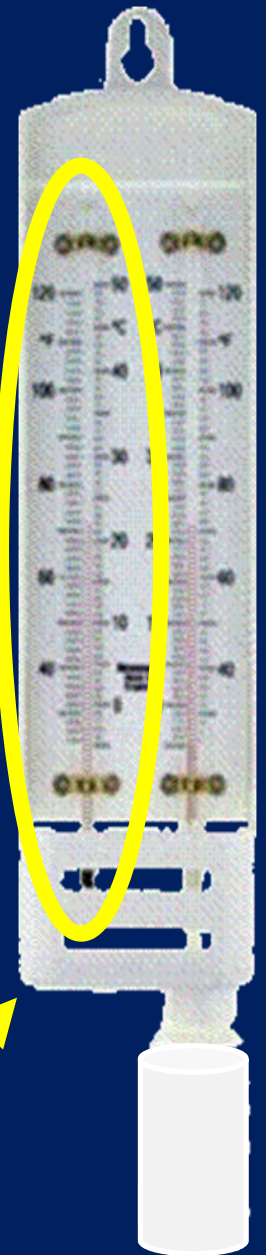
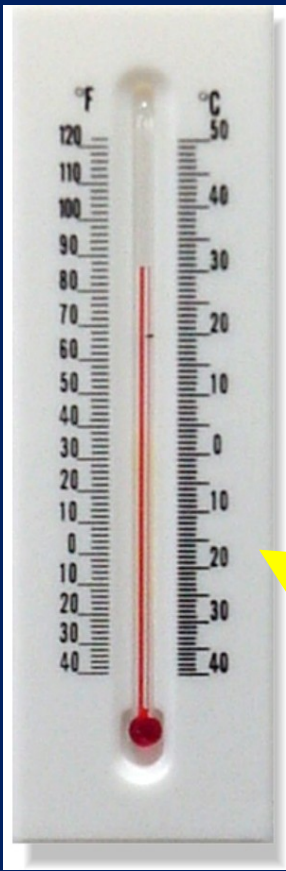
Follow same guidelines as for Temperature in Lesson B1.



# Temperature is a measure of the amount of heat.

You can use a thermometer or the dry bulb thermometer on a hygrometer to measure air temperature for weather observations.

However, a hygrometer is needed to measure relative humidity.





# The hygrometer can be installed in the MEWS PWIS (Portable Weather Instrument Shelter)

Set up and using  
the MEWS PWIS is  
shown in Basic  
MEWS Lesson B1.



© 2010, rev 2012,  
G. K. Lee HS0ZHM  
All Rights Reserved.



Before starting, be sure the  
water bottle is full and the  
cloth wick on the wet bulb  
thermometer is soaking wet.

# More notes are on the back of the form to help remind you how to calculate Relative Humidity

Temperature / Relative Humidity	
2.1 Air (Dry Bulb) Temp: Read thermometer kept in the shade, 1.5 m above the ground.	2.1 Air (Dry Bulb) Thermometer in shade, 1.5 m above ground. °C °C °C
2.2 Wet Bulb Temp from hygrometer kept in the shade, 1.5 m above the ground.	2.2 Wet Bulb °C °C °C
2.3 Difference between Dry and Wet Bulb temperatures.	2.3 Difference Subtracted 2.2 from 2.1. °C °C °C
	2.4 Rel. Humidity Use 2.1, 2.3; R.H. Table %RH %RH %RH
	2.5 Dew Point Use 2.1, 2.3; Dew Pt Table °C °C °C
	2.6 Heat Stress Use 2.1, 2.4; HSI Table Heat Stress °C Heat Stress °C Heat Stress °C □ Caution □ Danger □ Caution □ Danger □ Caution □ Danger □ Ex Caution □ Ex Caution □ Ex Caution □ Ex Caution □ Ex Caution □ Ex Caution
	2.7 Wind Chill Use 2.1, 3.1; Wind Chl Tbl Wind Chill °C Wind Chill °C Wind Chill °C □ Trvl Dngr □ Frostbite30 □ Trvl Dngr □ Frostbite30 □ Trvl Dngr □ Frostbite30 □ Trvl Dngr □ Frostbite30 □ Trvl Dngr □ Frostbite30 □ Trvl Dngr □ Frostbite30

**2.4 Relative Humidity: Use Dry Bulb Temp (2.1), Difference (2.3) and Relative Humidity table to find % Relative Humidity.**

2.5 Dew Point Temperature: Use Dry Bulb Temp (2.1), Difference (2.3) and Dew Point Temp table to find Dew Point Temp.

2.6 Heat Stress Temperature: Use Dry Bulb Temp (2.1), % Relative Humidity (2.4) and Heat Stress Index Table to find Heat Stress Temperature and relevant advisory warning.

2.7 Wind Chill: Use the Dry Bulb Temp (2.1) and Wind Speed (3.1) and Wind Chill Table to find the Wind Chill Temperature and relevant advisory warning.

Relative Humidity: Use Dry Bulb (2.1), Difference (2.3) and Relative Humidity Table to find % Relative Humidity.

See MEWS Handbook, Section 2 pp. 9-12



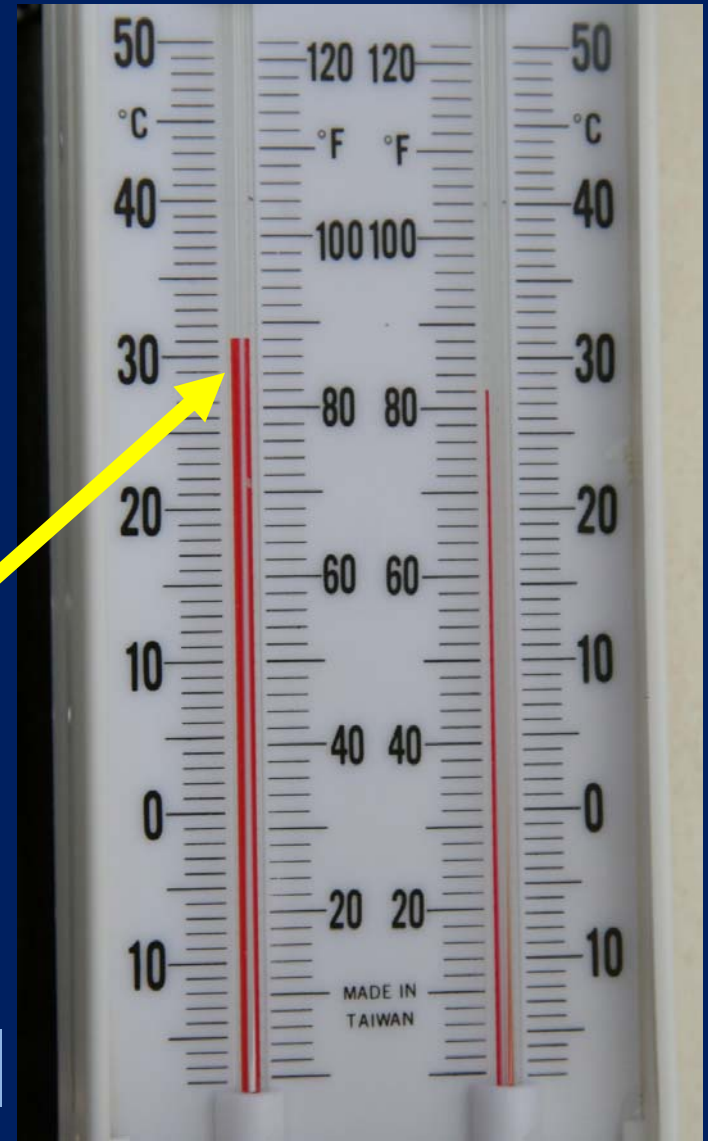
# Taking the Measurements



Before starting, be sure the water bottle is full and the cloth wick on the wet bulb thermometer is soaking wet.

Step 1: Read and write down the dry bulb temperature in Line 2.1

(31°C)





You can record the Dry Bulb Temperature in Line 2.1 if you haven't already measured the Air temperature.

Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5	°C
	2.2	Wet Bulb	m above ground	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH

See MEWS Handbook,  
Section 2 pp. 9-12



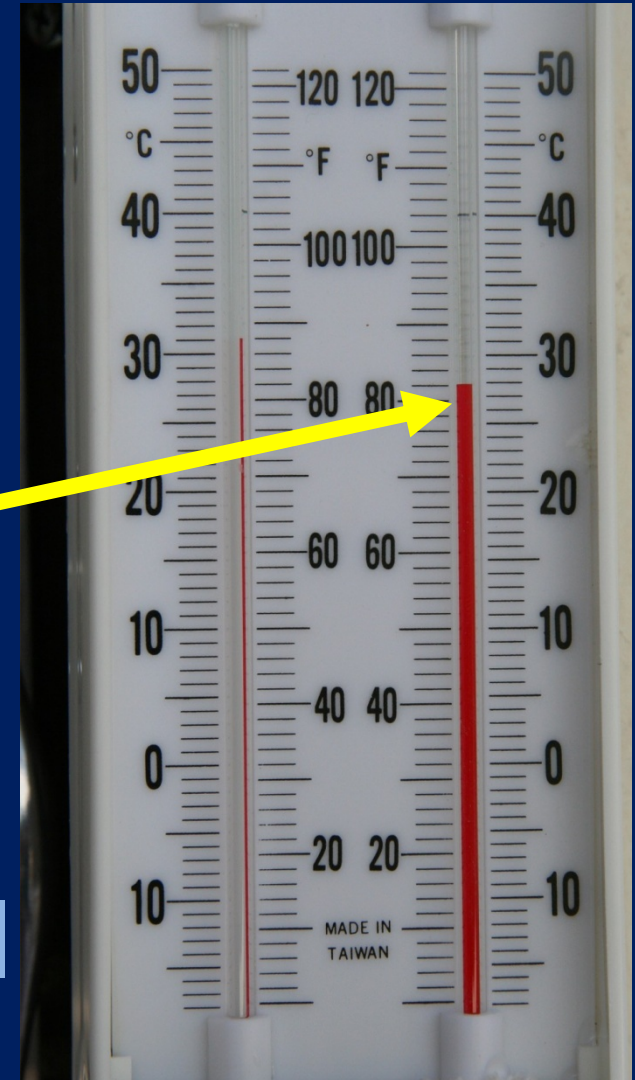
RTC-TH M.E.W.S. Weather Observation Log									
Location		Lat ° ' " N		Long ° ' " E		Elev m AMSL			
Date		Sunrise		Mid-Afternoon		Sunset			
Local time 24-hr format		Hour →							
Observer (initial; see back)									
1. Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5	°C	°C	°C	°C	°C	°C
	2.2	Wet Bulb	m above ground	°C	°C	°C	°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C	°C	°C	°C
2. Temperature / Relative Humidity	2.6	Heat Stress	Use 2.1, 2.4; HSI Table	Heat Stress	°C	Heat Stress	°C	Heat Stress	°C
	2.7	Wind Chill	Use 2.1, 3.1; Wind ChillTbl	Wind Chill	°C	Wind Chill	°C	Wind Chill	°C
	2.8	Wind Speed	Report wind speed in knots to air crews; km/h to all others.	Average	Get 3 readings & average	km/h	knts	km/h	knts
	2.9	Gusts	Record highest gust	km/h	knts	km/h	knts	km/h	knts
	2.10	Wind Speed Guidelines for Helicopter Flight Operations	10 knots / 18.5 km/h ideal; OK to fly	Above 45 knots / 83 km/h; No flights.	Gusts above 20 knots/ 37 km/h; No flights	Max tailwind 5 knots/ 6 km/hr; No take off			
3. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	Clear	Cloudy	Scattered	Overcast	Broken	
	4.2	Cloud Base Ht (Loo Rel)	Relative to local Mtn	Clouds above mtn	Clouds at mtn top	Clouds below mtn			
	4.3	Cloud Type	High	Cirrus	CuNim	Cirrus	CuNim	Cirrus	CuNim
	4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.	mm					
	4.5	Visual Range (Visibility)	Name of 3.2 km mark	more	less than	more	less than	more	less than
4.6	Severe Weather	Thunderstorms	Yes	No	Yes	No	Yes	No	
	Lightning	Flash, count secs to boom / 3	Yes	No	Yes	No	Yes	No	



# Taking the Measurements

Step 2: Read and  
write down the wet  
bulb temperature in  
Line 2.2

(28°C)



See MEWS Handbook, Section 2.2 p. 9



# You can record the Wet Bulb temperature data in Line 2.2

Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade: 1.5	°C
	2.2	Wet Bulb	m above ground	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH



RTC-TH M.E.W.S. Weather Observation Log									
Location		Lat ° ' " N		Long ° ' " E		Elev m AMSL			
Date		Local time 24-hr format		Hour →		Weather Observations Time			
Observer (initial; see back)		Sunrise		Mid-Afternoon		Sunset			
1.	2.1	Air (Dry bulb)	Thermometer in shade: 1.5	°C	°C	°C	°C	°C	°C
1.	2.2	Wet Bulb	m above ground	°C	°C	°C	°C	°C	°C
1.	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C	°C	°C	°C
1.	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH	%RH	%RH	%RH
1.	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C	°C	°C	°C
1.	2.6	Heat Stress	Use 2.1, 2.4; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C	Heat Stress °C	Heat Stress °C	Heat Stress °C
2.	2.7	Wind Chill	Use 2.1, 3.1; Wind ChillTbl	Wind Chill °C	Wind Chill °C	Wind Chill °C	Wind Chill °C	Wind Chill °C	Wind Chill °C
2.	2.8	Direction	Report wind speed in knots to air crews; km/h to all others.	Average	Get 3 readings & average	km/h	knts	km/h	knts
2.	2.9	Gusts	Record highest gust	km/h	knts	km/h	knts	km/h	knts
Wind Speed Guidelines for Helicopter Flight Operations									
10 knots / 18.5 km/h ideal; OK to fly									
Above 45 knots / 83 km/h; No flights.									
Gusts above 20 knots/ 37 km/h; No flights									
Max tailwind 5 knots/ 6 km/hr; No take off									
3.	3.1	Steady Wind Direction	Circle direction steady wind comes FROM	N	NE	S	SW	N	NE
3.	3.2	Variable Wind Direction	Circle 1 or more directions wind comes FROM	N	NE	S	SW	N	NE
3.	3.3	Cloud Cover	Use Definitions in Cloud Cover Table	Clear	Cloudy	Scattered	Overcast	Clear	Cloudy
3.	3.4	Cloud Base Ht (Loo Rel)	Relative to local Mtn	Clouds above mtn	Clouds at mtn top	Clouds below mtn	Clouds above mtn	Clouds at mtn top	Clouds below mtn
3.	3.5	Cloud Type	High	Cirrus	CuNim	Cirrus	CuNim	Cirrus	CuNim
3.	3.6	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.	mm	mm	mm	mm	mm	mm
3.	3.7	Visual Range (Visibility)	Name of 3.2 km mark	more	less than	more	less than	more	less than
3.	3.8	Severe Weather	Thunderstorms	Yes	No	Yes	No	Yes	No
3.	3.9	Lightning	Flash, count secs to boom / 3	N	NE	E	SE	S	SW
3.	3.10	Wam air crews of any severe weather in your area.		km	km	km	km	km	km

# Do some arithmetic.

Step 3: Subtract the wet bulb temperature (Line 2.2) from the dry bulb temperature (Line 2.1). Write it down the result in Line 2.3.

31°C Dry

-28°C Wet

3°C Difference



See MEWS Handbook, Section 2.3 p. 10

# Record the difference between the Dry and Wet Bulb Temperatures in Section #2.3

Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C
	2.2	Wet Bulb		°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH

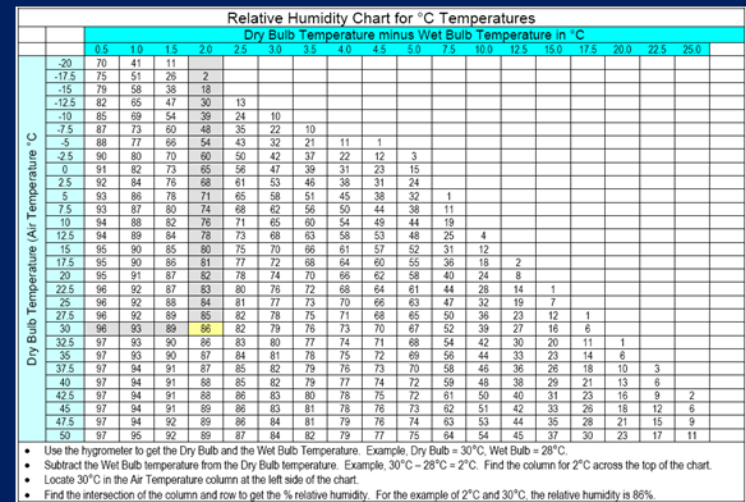
See MEWS Handbook,  
Section 2.3 p. 10

M.E.W.S. Thailand Emergency Weather Station Ready to serve and sustain our community.										RTC-TH M.E.W.S. Weather Observation Log									
Location					Header					1.									
Lat		° ' " N		Long		° ' " E		Elev		m AMSL		Date		Weather Observations Time					
Lat		N		Long		E						Sunrise		Mid-Afternoon		Sunset			
24-hr format		Hour →																	
Observer (initial; see back)																			
Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C															
	2.2	Wet Bulb		°C															
	2.3	Difference	Subtract 2.2 from 2.1;	°C															
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH															
Temperature / Relative Humidity	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C															
	2.6	Heat Stress	Use 2.1, 2.4; HSI Table	Heat Stress	°C														
			Danger Level (if any from Heat Stress Index table)																
			Use 2.1, 2.4; HSI Table	Heat Stress	°C														
Wind	2.7	Wind Chill	Danger Level (if any from Wind Chill chart)	Wind Chill	°C														
Direction	3.1	Average	Get 3 readings & average	km/h	knts														
Report wind speed in <b>knots to air crews</b> ; km/h to all others.																			
Wind Speed Guidelines for Helicopter Flight Operations																			
10 knots / 18.5 km/h ideal; OK to fly										Above 45 knots / 83 km/h; No flights.									
Gusts above 20 knots/ 37 km/h; No flights										Max tailwind 5 knots/ 6 km/hr; No take off									
Steady Wind	Direction	Circle direction steady wind comes FROM	N	NE	S	SW	N	NE	S	SW	N	NE	S	SW	N	NE	S	SW	
			E	SE	W	NW	E	SE	W	NW	E	SE	W	NW	E	SE	W	NW	
Variable Wind	Direction	Circle 1 or more directions wind comes FROM	N	NE	S	SW	N	NE	S	SW	N	NE	S	SW	N	NE	S	SW	
			E	SE	W	NW	E	SE	W	NW	E	SE	W	NW	E	SE	W	NW	
Cloud Cover		Use Definitions in Cloud Cover Table	Clear	Cloudy	Scattered	Overcast	Clear	Cloudy	Scattered	Overcast	Clear	Cloudy	Scattered	Overcast	Clear	Cloudy	Scattered	Overcast	
			Broken				Broken				Broken				Broken				
4.2	Cloud Base Ht (Loo Rel)	Relative to local Mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	
			Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	
			Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	Clouds below mtn	
Min. flight altitudes: Day - 160m AGL; Night - 500 m AGL; Low cloud ceiling - No flights.																			
4.3	Cloud Type	High	Cirrus	CuNim	Cirrus	CuNim	Cirrus	CuNim	Cirrus	CuNim	Cirrus	CuNim	Cirrus	CuNim	Cirrus	CuNim	Cirrus	CuNim	
		Middle	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	Altostrat	
		Low	Stratus	Cumul	Stratus	Cumul	Stratus	Cumul	Stratus	Cumul	Stratus	Cumul	Stratus	Cumul	Stratus	Cumul	Stratus	Cumul	
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.																	
4.5	Visual Range (Visibility)	Name of 3.2 km mark	more	less than	more	less than	more	less than	more	less than	more	less than	more	less than	more	less than	more	less than	
			Rain	Fog	Rain	Fog	Rain	Fog	Rain	Fog	Rain	Fog	Rain	Fog	Rain	Fog	Rain	Fog	
			Haze	Smoke	Haze	Smoke	Haze	Smoke	Haze	Smoke	Haze	Smoke	Haze	Smoke	Haze	Smoke	Haze	Smoke	
4.6	Severe Weather	Thunderstorms	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
		Lightning	Flash, count secs to boom / 3	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW
Helicopter minimum visibility: Day - 3.2 km / 2 miles; Night - 5 km / 3 miles; Low visibility - No flights																			
Warn air crews of any severe weather in your area.																			





- the dry bulb (air) temperature (Line 2.1)
- the wet bulb temperature (Line 2.2)
- the difference between the dry and the wet bulb temperatures (Line 2.3)



The chart can be found in the MEWS  
Weather Observer Handbook p 11.



# Using the Relative Humidity Chart

Step 1: Get the dry bulb temperature from Line 2.1 of the Observation log (e.g. 30°C).

Step 2. Look in the left column (Air Temp) of the table

In the table,  
30°C is the  
closest value  
to 31°C.

See MEWS  
Handbook,  
Section 2.4  
pp. 10-12

		Dry Bulb Temperature minus Wet Bulb Temperature in °C																		
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0	
Dry Bulb Temperature (Air Temperature) °C	-20	70	41	11																
	-17.5	75	51	26	2															
	-15	79	58	38	18															
	-12.5	82	65	47	30	13														
	-10	85	69	54	39	24	10													
	-7.5	87	73	60	40	35	22	10												
	-5	88	77	66	54	43	32	21	11	1										
	-2.5	90	80	70	60	50	42	37	22	12	3									
	0	91	82	73	65	56	47	39	31	23	15									
	2.5	92	84	76	68	61	53	46	38	31	24									
	5	93	86	78	71	65	58	51	45	38	32	1								
	7.5	93	87	80	74	68	62	56	50	44	38	11								
	10	94	88	82	76	71	65	60	54	49	44	19								
	12.5	94	89	84	78	73	68	63	58	53	48	25	4							
	15	95	90	85	80	75	70	66	61	57	52	31	12							
	17.5	95	90	86	81	77	72	68	64	60	55	36	18	2						
	20	95	91	87	82	78	74	70	66	62	58	40	24	8						
	22.5	96	92	87	83	80	76	72	68	64	61	44	28	14	1					
	25	96	92	88	84	81	77	73	70	66	63	47	32	19	7					
	27.5	96	92	89	85	82	78	75	71	68	65	50	36	23	12	1				
30	97	93	89	86	82	79	76	73	70	67	52	39	27	16	6					
32.5	97	93	90	86	83	80	77	74	71	68	54	42	30	20	11	1				
35	97	93	90	87	84	81	78	75	72	69	56	44	33	23	14	6				
37.5	97	94	91	87	85	82	79	76	73	70	58	46	36	26	18	10	3			
40	97	94	91	88	85	82	79	77	74	72	59	48	38	29	21	13	6			
42.5	97	94	91	88	86	83	80	78	75	72	61	50	40	31	23	16	9	2		
45	97	94	91	89	86	83	81	78	76	73	62	51	42	33	26	18	12	6		
47.5	97	94	92	89	86	84	81	79	76	74	63	53	44	35	28	21	15	9		
50	97	95	92	89	87	84	82	79	77	75	64	54	45	37	30	23	17	11		

- Use the hygrometer to get the Dry Bulb and the Wet Bulb Temperature. Example, Dry Bulb = 30°C, Wet Bulb = 28°C.
- Subtract the Wet Bulb temperature from the Dry Bulb temperature. Example, 30°C – 28°C = 2°C. Find the column for 2°C across the top of the chart.
- Locate 30°C in the Air Temperature column at the left side of the chart.
- Find the intersection of the column and row to get the % relative humidity. For the example of 2°C and 30°C, the relative humidity is 86%.

- Use the hygrometer to get the Dry Bulb and the Wet Bulb Temperature. Example, Dry Bulb = 30°C, Wet Bulb = 28°C.
- Subtract the Wet Bulb temperature from the Dry Bulb temperature. Example, 30°C - 28°C = 2°C. Find the column for 2°C across the top of the chart.
- Locate 30°C in the Air Temperature column at the left side of the chart.
- Find the intersection of the column and row to get the % relative humidity. For the example of 2°C and 30°C, the relative humidity is 86%.



## Step 4. Find 3°C in the row at the top of the chart.

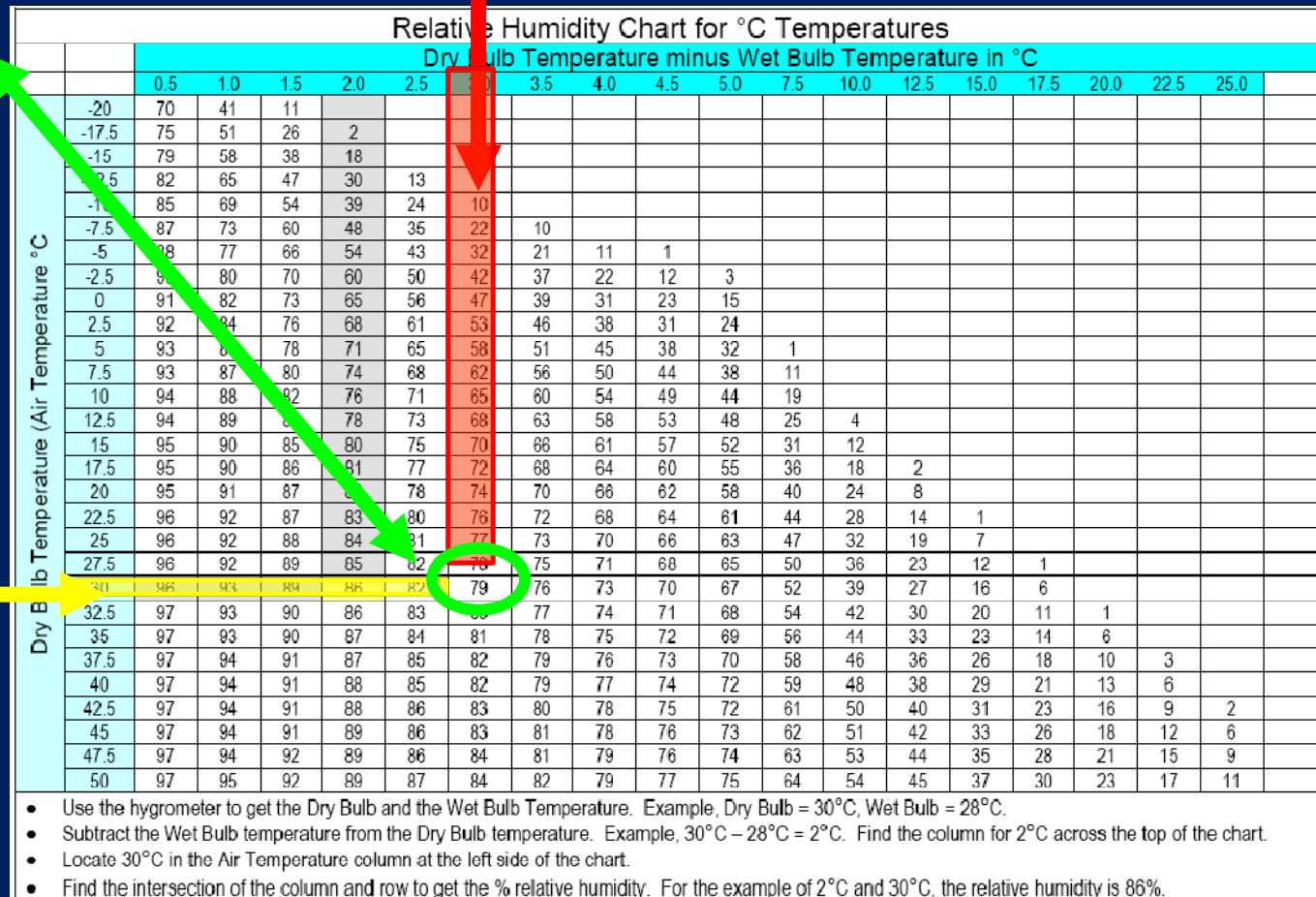




# Using the Relative Humidity Chart

Step 5: Read **across the row** and **down the column** to find the % relative humidity.

(79%)



# Record the % Relative Humidity (% RH) in the space provided in Section #2.4

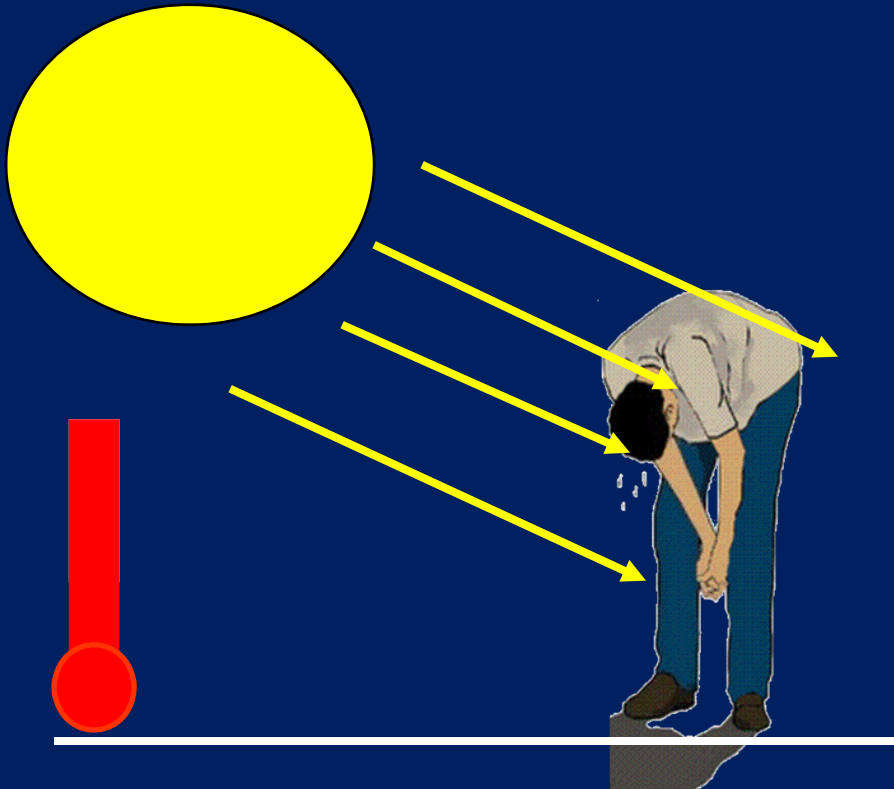
Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C
	2.2	Wet Bulb		°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH

M.E.W.S. Thailand Ready to serve and sustain our community.										RTC-TH M.E.W.S. Weather Observation Log									
Location					Header					1.									
Lat		° ' " N		Long		° ' " E		Elev		m AMSL		Date		Weather Observations Time					
Lat		N		Long		E						Sunrise		Mid-Afternoon		Sunset			
Date		Local time 24-hr format		Hour →		Observer (initial; see back)													
Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C															
	2.2	Wet Bulb		°C															
	2.3	Difference	Subtract 2.2 from 2.1;	°C															
Relative Humidity	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH															
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C															
Heat Stress	2.6	Heat Stress	Use 2.1, 2.4; HSI Table	Heat Stress	°C														
			Danger Level (if any from Heat Stress Index table)	□ Caution □ Danger □ Ex Caution □ Ex Danger															
Wind	2.7	Wind Chill	Danger Level (if any from Wind Chill chart)	□ Trvl Dngr □ TShltr Dgr □ Frostbite □ Frostbite5															
			Report wind speed in knots to air crews; km/h to all others.																
Average		Average	Get 3 readings & average	km/h	knts														
		Gusts	Record highest gust	km/h	knts														
Wind Speed Guidelines for Helicopter Flight Operations																			
10 knots / 18.5 km/h ideal; OK to fly																			
Above 45 knots / 83 km/h; No flights.																			
Gusts above 20 knots/ 37 km/h; No flights																			
Max tailwind 5 knots/ 6 km/hr; No take off																			
Steady Wind		Direction	Circle direction steady wind comes FROM	N NE S SW E SE W NW															
		Variable Wind	Circle 1 or more directions wind comes FROM	N NE S SW E SE W NW															
Cloud Cover		Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken															
		Cloud Base Ht (Loo Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn															
Cloud Type		High	Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat															
		Middle		□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat															
Rainfall		Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.																
		Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke															
Severe Weather		Severe Weather	Thunderstorms	□ Yes □ No															
		Lightning	Flash, count secs to boom / 3	N NE E SE S SW W NW															



# High temperatures and high relative humidity...

...can make it dangerous to work outside.



The amount of danger can be determined using the Heat Stress Index.





# Record the Heat Stress Index in Section 2.6

Guide notes are on the front of the form

RTC-TH M.E.W.S. Weather Observation Log									
Location		Lat ° ' " N		Long ° ' " E		Elev m AMSL			
Date		Sunrise		Mid-Afternoon		Sunset			
Local time 24-hr format		Hour →							
Observer (initial; see back)									
Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C	°C	°C	°C
	2.2	Wet Bulb		°C	°C	°C	°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C	°C	°C	°C
Temperature	2.6	Heat Stress	Use 2.1, 2.4; HSI Table Danger Level (if any from Heat Stress Index table)	Heat Stress °C	Heat Stress °C	Heat Stress °C	Heat Stress °C	Heat Stress °C	Heat Stress °C
	2.7	Wind Chill	Use 2.1, 3.1; Wind ChlTbl Danger Level (if any from Wind Chill chart)	Wind Chill °C	Wind Chill °C	Wind Chill °C	Wind Chill °C	Wind Chill °C	Wind Chill °C
Direction	Report wind speed in <i>knots to air crews</i> ; km/h to all others.								
	3.1	Average	Get 3 readings & average	km/h	knts	km/h	knts	km/h	knts
		Gusts	Record highest gust	km/h	knts	km/h	knts	km/h	knts

**2.6 Heat Stress Temperature:** Use Dry Bulb Temp (2.1), % Relative Humidity (2.4) and Heat Stress Index Table to find Heat Stress Temperature and relevant advisory warning.

Brief notes on the back of the form give more details

See Handbook Section 2.6, pp. 14-15

4. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	<input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken	<input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken	<input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken
	4.2	Cloud Base Ht (Loo Rel)	Relative to local Mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn
			m AMSL	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn
			m Dew Est (1A-1E/10)1000m	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn
	Min. flight altitudes: Day - 160m AGL; Night - 500 m AGL; Low cloud ceiling - No flights.					
4.3	Cloud Type	High	Vertically Developed	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum <input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> CuNim <input type="checkbox"/> Cumul	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum <input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.				
4.5	Visual Range (Visibility)	Name of 3.2 km mark	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke
		Name of 3.2 km mark	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke
Helicopter minimum visibility: Day - 3.2 km / 2 miles; Night - 5 km / 3 miles; Low visibility - No flights						
4.6	Severe Weather	Thunderstorms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
		Lightning	Flash, count secs to boom / 3	N NE E SE S SW W NW <input type="checkbox"/> Yes <input type="checkbox"/> No km	N NE E SE S SW W NW <input type="checkbox"/> Yes <input type="checkbox"/> No km	N NE E SE S SW W NW <input type="checkbox"/> Yes <input type="checkbox"/> No km
Warn air crews of any severe weather in your area.						



# Close-up of the Heat Stress Index Instructions on the Log form

## Front

Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2	Wet Bulb		°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table Danger Level (if any from Heat Stress Index table)	Heat Stress °C <input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	Heat Stress °C <input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	Heat Stress °C <input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr

## Back

### Temperature / Relative Humidity

2.1 Air (Dry Bulb) Temp: Read thermometer kept in the shade, 1.5 m above the ground.

2.2 Wet Bulb Temp from hygrometer kept in the shade, 1.5 m above the ground.

2.3 Difference between Dry and Wet Bulb temperatures.

2.4 Relative Humidity: Use Dry Bulb Temp (2.1), Difference (2.3) and Relative Humidity table to find % Relative Humidity.

2.5 Dew Point Temperature: Use Dry Bulb Temp (2.1), Difference (2.3) and Dew Point Temp table to find Dew Point Temp.

2.6 Heat Stress Temperature: Use Dry Bulb Temp (2.1), % Relative Humidity (2.4) and Heat Stress Index Table to find Heat Stress Temperature and relevant advisory warning.

2.7 Wind Chill: Use the Dry Bulb Temp (2.1) and Wind Speed (3.1) and Wind Chill Table to find the Wind Chill Temperature and relevant advisory warning.

Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2	Wet Bulb		°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table Danger Level (if any from Heat Stress Index table)	Heat Stress °C <input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	Heat Stress °C <input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	Heat Stress °C <input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr

Full instructions and all needed reference tables are in the MEWS Weather Observer Handbook.



# To determine the Heat Stress Index

Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5	°C
	2.2	Wet Bulb	m above ground	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH

You need:

- The air temperature and relative humidity from the log form
- the Heat Stress Index table

ne

		Heat Stress Index (Sensible Temperature)									
		Relative Humidity									
Air Temp		10%	20%	30%	40%	50%	60%	70%	80%	90%	
46°C		44°C	43°C	41°C	38°C	36°C	34°C	32°C	30°C	28°C	
43°C		41°C	40°C	38°C	35°C	33°C	31°C	29°C	27°C	25°C	
41°C		38°C	37°C	35°C	32°C	30°C	28°C	26°C	24°C	22°C	
38°C		36°C	34°C	32°C	29°C	27°C	25°C	23°C	21°C	19°C	
35°C		32°C	30°C	28°C	25°C	23°C	21°C	19°C	17°C	15°C	
32°C		29°C	27°C	25°C	22°C	20°C	18°C	16°C	14°C	12°C	
30°C		27°C	25°C	23°C	20°C	18°C	16°C	14°C	12°C	10°C	
28°C		24°C	23°C	21°C	18°C	16°C	14°C	12°C	10°C	8°C	
27°C		24°C	23°C	21°C	18°C	16°C	14°C	12°C	10°C	8°C	
Danger Level		I Caution		II Extreme Caution		III Danger		IV Extreme Danger		Relative humidity rarely observed	
Heat Index		27-32°C		32-40°C		40-46°C		Above 46°C		Generally not applicable but conditions would be extremely dangerous	
Heat Syndrome		Fatigue possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion likely; heat stroke possible with prolonged exposure and/or physical activity		Heat / sunstroke highly likely with continued exposure			

• Use a hygrometer placed in a shaded position about 1.2 m / 5 ft above the ground.

• Air Temperature is read from the Dry Bulb Thermometer.

• Relative Humidity is calculated using the Relative Humidity Table. This requires the following data: Air Temperature and the Temperature Difference between the Dry and Wet Bulb readings.

The chart is in the MEWS  
Weather Observer Handbook  
on p. 16



# Step 1. Get the air temperature from Line 2.1

Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade: 1.5	°C
	2.2	Wet Bulb	m above ground	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C
			Danger Level (if any from Heat Stress Index table)	<input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr

Let's use 31°C  
from the Relative Humidity example.



RTC-TH M.E.W.S. Weather Observation Log										
Header		Location		Lat ° ' " N		Long ° ' " E		Elev m AMSL		
		Lat N		Long E						
		Date		Weather Observations Time						
Local time 24-hr format		Hour →		Sunrise		Mid-Afternoon		Sunset		
Observer (initial; see back)										
1. Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade: 1.5	°C	°C	°C	°C	°C	°C	
	2.2	Wet Bulb	m above ground	°C	°C	°C	°C	°C	°C	
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C	°C	°C	°C	
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH	%RH	%RH	%RH	
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C	°C	°C	°C	
2. Temperature	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C	Heat Stress °C	Heat Stress °C	Heat Stress °C	
	2.7	Wind Chill	Danger Level (if any from Heat Stress Index table)	<input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	<input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	<input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	<input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	<input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	<input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr	
3. Wind Speed / Direction	Report wind speed in knots to air crews; km/h to all others.									
	Average	Get 3 readings & average		km/h	knts	km/h	knts	km/h	knts	
	Gusts	Record highest gust		km/h	knts	km/h	knts	km/h	knts	
4. Sky Conditions	Wind Speed Guidelines for Helicopter Flight Operations									
	10 knots / 18.5 km/h ideal; OK to fly			Above 45 knots / 83 km/h; No flights.						
	Gusts above 20 knots/ 37 km/h; No flights			Max tailwind 5 knots/ 6 km/hr; No take off						
4.1	Steady Wind Direction	Circle direction steady wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	
	Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW	
	Cloud Cover	Use Definitions in Cloud Cover Table	<input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Scattered <input type="checkbox"/> Overcast <input type="checkbox"/> Broken
4.2	Cloud Base Ht (Loo Rel)	Relative to local Mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	
		m AMSL								
		Dew Est (1A-1E/10) 1000m	m AGL	m AGL	m AGL	m AGL	m AGL	m AGL	m AGL	
Min. flight altitudes: Day - 160m AGL; Night - 500 m AGL; Low cloud ceiling - No flights.										
4.3	Cloud Type	High	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum	
		Middle	<input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	
		Low	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.								
	Visual Range (Visibility)	Name of 3.2 km mark	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke
		Name of 3.2 km mark	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke
4.5	Helicopter minimum visibility: Day - 3.2 km / 2 miles; Night - 5 km / 3 miles; Low visibility - No flights									
	Thunderstorms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Lightning	Flash, count secs to boom / 3	N NE E SE S SW W NW <input type="checkbox"/> Yes km	N NE E SE S SW W NW <input type="checkbox"/> Yes km	N NE E SE S SW W NW <input type="checkbox"/> Yes km	N NE E SE S SW W NW <input type="checkbox"/> Yes km	N NE E SE S SW W NW <input type="checkbox"/> Yes km	N NE E SE S SW W NW <input type="checkbox"/> Yes km	N NE E SE S SW W NW <input type="checkbox"/> Yes km	
4.6	Severe Weather	Warn air crews of any severe weather in your area.								



# Using the Heat Stress Index Table

**Step 2.** Find the air temperature in the left column.

The air temp from Line 2.1 was 31°C use 32°C.

Use 32°C.  
It is the  
closest to  
31°C on  
the table

Heat Stress Index (Sensible Temperature)										
Air Temp	Relative Humidity									
	10%	20%	30%	40%	50%	60%	70%	80%	90%	
46°C	44°C	49°C	57°C	66°C						
43°C	41°C	44°C	51°C	58°C	56°C					
41°C	38°C	41°C	45°C	51°C	57°C	65°C				
38°C	35°C	37°C	40°C	43°C	49°C	56°C	62°C			
35°C	32°C	34°C	36°C	38°C	42°C	46°C	51°C	58°C		
32°C	29°C	31°C	32°C	34°C	36°C	38°C	41°C	45°C	50°C	
29°C	27°C	28°C	29°C	30°C	31°C	32°C	34°C	36°C	36°C	
27°C	24°C	25°C	26°C	26°C	27°C	28°C	29°C	30°C	31°C	
Danger Level	I Caution		II Extreme Caution		III Danger		IV Extreme Danger		---	
Heat Index	27-32°C		32-40°C		40-54°C		Above 54°C		Relative humidity rarely observed	
Heat Syndrome	Fatigue possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion likely; heat stroke possible with prolonged exposure and/or physical activity		Heat / sunstroke highly likely with continued exposure		Generally not applicable but conditions would be extremely dangerous	

See MEWS  
Handbook,  
p. 16



# Step 3. Get the relative humidity from Line 2.4

Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C
	2.2	Wet Bulb		°C
	2.3	Difference	Subtract 2.2 from 2.1:	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table Danger Level (if any from Heat Stress Index table)	Heat Stress °C <input type="checkbox"/> Cautn <input type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr

Let's use 79% from the Relative Humidity example.

RTC-TH M.E.W.S. Weather Observation Log									
M.E.W.S. Thailand Emergency Weather Station		Header							
Location		Lat ° ' " N		Long ° ' " E		Elev m AMSL			
Date		Weather Observations Time							
Local time 24-hr format		Hour →		Sunrise		Mid-Afternoon		Sunset	
Observer (initial; see back)									
1. Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C					
	2.2	Wet Bulb		°C					
	2.3	Difference	Subtract 2.2 from 2.1:	°C					
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table		%RH		%RH		%RH	
2. Temperature / Relative Humidity	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C					
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table Danger Level (if any from Heat Stress Index table)	Heat Stress °C		Heat Stress °C		Heat Stress °C	
	2.7	Wind Chill	Use 2.1, 3.1; Wind Chill Table Danger Level (if any from Wind Chill chart)	Wind Chill °C		Wind Chill °C		Wind Chill °C	
3. Wind Speed / Direction	Report wind speed in <b>knots to air crews</b> ; km/h to all others.								
	Average	Get 3 readings & average		km/h	knts	km/h	knts	km/h	knts
	Gusts	Record highest gust		km/h	knts	km/h	knts	km/h	knts
4. Sky Conditions	Wind Speed Guidelines for Helicopter Flight Operations								
	10 knots / 18.5 km/h ideal; OK to fly				Above 45 knots / 83 km/h; No flights.				
	Gusts above 20 knots/ 37 km/h; No flights				Max tailwind 5 knots/ 6 km/hr; No take off				
4.1	Cloud Cover	Use Definitions in Cloud Cover Table	<input type="checkbox"/> Clear <input type="checkbox"/> Scattered <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Scattered <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Scattered <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Scattered <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Scattered <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Scattered <input type="checkbox"/> Broken	<input type="checkbox"/> Clear <input type="checkbox"/> Scattered <input type="checkbox"/> Broken
	Cloud Base Ht (Loo Rel)	Relative to local Mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn	<input type="checkbox"/> Clouds above mtn <input type="checkbox"/> Clouds at mtn top <input type="checkbox"/> Clouds below mtn
	Dew Est (1A-1E/10)/1000m	m AMSL	m AGL	m AGL	m AGL	m AGL	m AGL	m AGL	m AGL
Min. flight altitudes: Day - 160m AGL; Night - 500 m AGL; Low cloud ceiling - No flights.									
4.2	Cloud Type	High	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum <input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum <input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum <input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum <input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum <input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum <input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat	<input type="checkbox"/> Cirrus <input type="checkbox"/> Altostrat <input type="checkbox"/> Altocum <input type="checkbox"/> Stratus <input type="checkbox"/> Nimstrat
	Middle	Vertically Developed	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus
	Low	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus	<input type="checkbox"/> Cumulus <input type="checkbox"/> Cumulonimbus
4.3	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.							mm
	Visual Range (Visibility)	Name of 3.2 km mark	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke
	Name of 3.2 km mark	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke	<input type="checkbox"/> more <input type="checkbox"/> less than <input type="checkbox"/> Rain <input type="checkbox"/> Fog <input type="checkbox"/> Haze <input type="checkbox"/> Smoke
4.4	Severe Weather	Thunderstorms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Lightning	Flash, count secs to boom / 3	N NE E SE S SW W NW km	N NE E SE S SW W NW km	N NE E SE S SW W NW km	N NE E SE S SW W NW km	N NE E SE S SW W NW km	N NE E SE S SW W NW km	
Warn air crews of any severe weather in your area.									



# Using the Heat Stress Index Table

**Step 4.** Find the relative humidity across the top of the table

The % RH from Line 2.4 was 79%.

Use 80%.  
It is the  
closest to  
79% on the  
table

Heat Stress Index (Sensible Temperature)									
Air Temp	Relative Humidity								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
46°C	44°C	49°C	57°C	66°C					
43°C	41°C	44°C	51°C	58°C	65°C				
41°C	38°C	41°C	48°C	51°C	57°C	65°C			
38°C	35°C	37°C	40°C	43°C	49°C	56°C	62°C		
35°C	32°C	34°C	36°C	38°C	42°C	46°C	51°C	58°C	
32°C	29°C	31°C	32°C	34°C	36°C	38°C	41°C	45°C	50°C
29°C	27°C	28°C	29°C	30°C	31°C	32°C	34°C	36°C	36°C
27°C	24°C	25°C	26°C	26°C	27°C	28°C	29°C	30°C	31°C
Danger Level	I Caution		II Extreme Caution		III Danger		IV Extreme Danger		---
Heat Index	27-32°C		32-40°C		40-54°C		Above 54°C		Relative humidity rarely observed
Heat Syndrome	Fatigue possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion likely; heat stroke possible with prolonged exposure and/or physical activity		Heat / sunstroke highly likely with continued exposure		Generally not applicable but conditions would be extremely dangerous

- Use a hygrometer placed in a shaded position about 1.2 m / 5 ft above the ground.
- Air Temperature is read from the Dry Bulb Thermometer.
- Relative Humidity is calculated using the Relative Humidity Table. This requires the following data: Air Temperature and the Temperature Difference between the Dry and Wet Bulb readings.



# Determining the Heat Stress Index

**Step 5.** Read across the row and down the column into the chart. Look at the table temperature.

Record  
45°C on  
Line 2.6 on  
the log  
form

Heat Stress Index (Sensible Temperature)									
Air Temp	Relative Humidity								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
48°C	44°C	49°C	57°C	66°C					
43°C	41°C	44°C	51°C	58°C	56°C				
41°C	38°C	41°C	45°C	51°C	57°C	65°C			
38°C	35°C	37°C	40°C	43°C	49°C	56°C	62°C		
35°C	32°C	34°C	36°C	38°C	42°C	46°C	51°C		
32°C	29°C	31°C	32°C	34°C	36°C	38°C	41°C	45°C	50°C
29°C	27°C	28°C	29°C	30°C	31°C	32°C	34°C	36°C	36°C
27°C	24°C	25°C	26°C	26°C	27°C	28°C	29°C	30°C	31°C
Danger Level	I Caution		II Extreme Caution		III Danger		IV Extreme Danger		---
Heat Index	27-32°C		32-40°C		40-54°C		Above 54°C		Relative humidity rarely observed
Heat Syndrome	Fatigue possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion likely; heat stroke possible with prolonged exposure and/or physical activity		Heat / sunstroke highly likely with continued exposure		Generally not applicable but conditions would be extremely dangerous

This tells you though the thermometer is showing 31°C, you feel as though it were **45°C**!





# Step 6. Record the Heat Stress Index in upper Line of 2.6

Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C
	2.2	Wet Bulb		°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table Heat Stress (if any from Heat Stress Index table)	°C

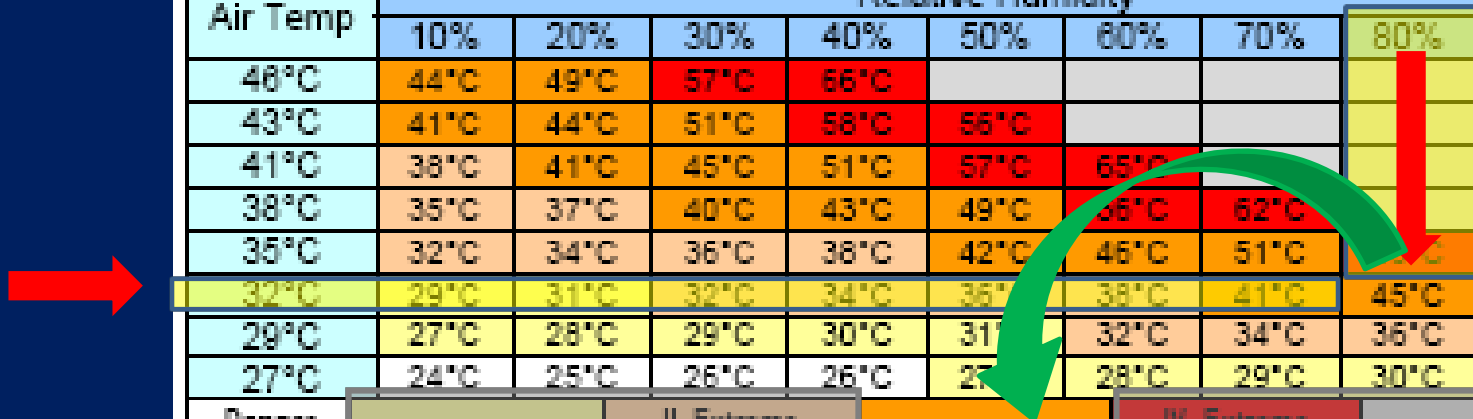
This is the temperature people “feel”. It is not the temperature recorded in Line 2.1

M.E.W.S. Thailand Emergency Weather Station										
RTC-TH M.E.W.S. Weather Observation Log										
Location										
Lat		° ' " N		Long		° ' " E		Elev m AMSL		
Lat		N		Long		E		m AMSL		
Date		Weather Observations Time								
Local time 24-hr format		Hour →		Sunrise		Mid-Afternoon		Sunset		
Observer (initial; see back)										
Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C						
	2.2	Wet Bulb		°C						
	2.3	Difference	Subtract 2.2 from 2.1;	°C						
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH						
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C						
Temperature /	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table Heat Stress (if any from Heat Stress Index table)	°C	Heat Stress	°C	Heat Stress	°C	Heat Stress	°C
					Caution	Danger	Caution	Danger	Caution	Danger
2. Temperature /	2.7	Wind Chill	Use 2.1, 2.5; Wind Chill Table Danger Level (if any from Wind Chill chart)	°C	Wind Chill	°C	Wind Chill	°C	Wind Chill	°C
					Trvl Dngr	Frstbtle10	Trvl Dngr	Frstbtle10	Trvl Dngr	Frstbtle10
3. Wind Speed / Direction	3.1	Average	Get 3 readings & average	km/h	knts	km/h	knts	km/h	knts	km/h
	3.1	Gusts	Record highest gust	km/h	knts	km/h	knts	km/h	knts	km/h
3. Wind Speed / Direction	3.2	Steady Wind Direction	Circle direction steady wind comes FROM	N NE S SW	N NE S SW	N NE S SW	N NE S SW	N NE S SW	N NE S SW	N NE S SW
	3.2	Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE S SW	N NE S SW	N NE S SW	N NE S SW	N NE S SW	N NE S SW	N NE S SW
4. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	Clear	Cloudy	Clear	Cloudy	Clear	Cloudy	Clear
	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	Scattered	Overcast	Scattered	Overcast	Scattered	Overcast	Scattered
4. Sky Conditions	4.2	Cloud Base Ht (Loo Rel)	Relative to local Mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn	Clouds above mtn
	4.2	Cloud Base Ht (Loo Rel)	Relative to local Mtn	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top	Clouds at mtn top
4. Sky Conditions	4.3	Cloud Type	High	Cirrus	CuNim	Cirrus	CuNim	Cirrus	CuNim	Cirrus
	4.3	Cloud Type	Middle	Altostrat	Alto cum	Altostrat	Alto cum	Altostrat	Alto cum	Altostrat
4. Sky Conditions	4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.	mm		mm		mm		mm
	4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.	mm		mm		mm		mm
4. Sky Conditions	4.5	Visual Range (Visibility)	Name of 3.2 km mark	more	less than	more	less than	more	less than	more
	4.5	Visual Range (Visibility)	Name of 3.2 km mark	more	less than	more	less than	more	less than	more
4. Sky Conditions	4.6	Severe Weather	Thunderstorms	Yes	No	Yes	No	Yes	No	Yes
	4.6	Severe Weather	Thunderstorms	Yes	No	Yes	No	Yes	No	Yes



# Look at the Danger Level Warning

**Step 7.** Look at the color code and read the notation.



Heat Stress Index (Sensible Temperature)									
Air Temp	Relative Humidity								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
48°C	44°C	49°C	57°C	66°C					
43°C	41°C	44°C	51°C	58°C	56°C				
41°C	38°C	41°C	45°C	51°C	57°C	65°C			
38°C	35°C	37°C	40°C	43°C	49°C	56°C	62°C		
35°C	32°C	34°C	36°C	38°C	42°C	46°C	51°C		
32°C	29°C	31°C	32°C	34°C	36°C	38°C	41°C	45°C	50°C
29°C	27°C	28°C	29°C	30°C	31°C	32°C	34°C	36°C	36°C
27°C	24°C	25°C	26°C	26°C	27°C	28°C	29°C	30°C	31°C
Danger Level	I Caution		II Extreme Caution		III Danger		IV Extreme Danger		---
Heat Index	27-32°C		32-40°C		40-54°C		Above 54°C		Relative humidity rarely observed
Heat Syndrome	Fatigue possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity		Sunstroke, heat cramps, or heat exhaustion likely; heat stroke possible with prolonged exposure and/or physical activity		Heat / sunstroke highly likely with continued exposure		Generally not applicable but conditions would be extremely dangerous

In this case, it is Danger Level III (3) Danger. Heat or sunstroke are highly likely.

# Step 8. Record the Heat Stress Index Danger Level notation in lower part of Line 2.6

Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C
	2.2	Wet Bulb	Thermometer in shade; 1.5 m above ground	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	°C
			Danger Level (if any from Heat Stress Index table)	<input type="checkbox"/> Cautn <input checked="" type="checkbox"/> Danger <input type="checkbox"/> Ex Cautn <input type="checkbox"/> Ex Dangr

For this example, check the box for “Danger”. If no Danger Level exists, **cross out this section** to show the Stress Warning is not applicable.

**M.E.W.S. Weather Observation Log**

Location  
Lat ° ' " N Long ° ' " E Elev m AMSL

Date  
Local time 24-hr format Hour → Observer (initial; see back)

1. Header

2.1 Air (Dry bulb) Thermometer in shade; 1.5 m above ground °C

2.2 Wet Bulb °C

2.3 Difference Subtract 2.2 from 2.1; °C

2.4 Rel. Humidity Use 2.1, 2.3; R H Table %RH

2.5 Dew Point Use 2.1, 2.3; Dew Pt Table °C

2.6 Heat Stress Danger Level (if any from Heat Stress Index table)

3. Wind Speed / Direction

3.1 Gusts Record highest gust

3.2 Steady Wind Direction Circle direction steady wind comes FROM

3.2 Variable Wind Direction Circle 1 or more directions wind comes FROM

4.1 Cloud Cover Use Definitions in Cloud Cover Table

4.2 Cloud Base Ht (Loo Rel) Relative to local Mtn

4.3 Cloud Type

4.4 Rainfall Measure at 0900 hrs each morning. Report amount for last 24 hrs.

4.5 Visual Range (Visibility) Name of 3.2 km mark

4.6 Severe Weather

© 2008, RTH, G.K. Lee. All rights reserved.

# Knowing the Relative Humidity and Heat Stress Index helps relief officials

to better plan water, food, shelter, clothing and supplies needed for the emergency relief effort.

**However, in most cases, weather information for the local disaster site may NOT be available.**

**You can help fill the gap by learning about weather observing and becoming a licensed HAM (amateur radio operator).**





# Important Note

Normally MEWS observations are made 3 times a day. However, if flight operations are in progress, try to provide flight crews with weather updates prior to landings and take-offs for flight safety.



# For flight operations, make and report observations to flight crews before landings and take-offs

Cross out the headings for Sunrise, Mid-Afternoon, Sunset

Record the specific local time of your observations

	Weather Observations Time		
	<del>Sunrise</del>	<del>Mid-Afternoon</del>	<del>Sunset</del>
Hour→	1430		
al; see back)	HSØZHM		
shade; 1.5 ground	°C	°C	°C
from 2.1;	°C	°C	°C

If a HAM, print your call sign (or name if no call sign)

Record temperature in Section 2.1 and relative humidity in Section 2.4

Weather observations to support flight operations are critical for safety of flight crew and LZ area.

# For flight operations, make and report observations to flight crews before landings and take-offs

## Advanced Weather Reports for Flight Crews

- 2.1 Temperature
- 2.4 Relative Humidity
- 3.1 Wind Speed
- 3.2 Wind Direction
- 4.1 Cloud Cover
- 4.2 Cloud Base Height
- 4.3 Cloud Type
- 4.4 Rainfall
- 4.5 Visual Range
- 4.6 Severe Weather

Weather observations to support flight operations are critical for safety of flight crew and LZ area.



If more frequent observations are done to support flight operations...

...cross out the headings “Sunrise”, etc. and record the time of the observations in the space provided.



RTC-TH M.E.W.S. Weather Observation Log									
Header		Location							
Lat ° ' " N		Long ° ' " E		Elev m AMSL				Date	
1.		Weather Observations Time							
Ready to serve and sustain our community.		Local time		24-hr format		Observer (initials see back)		Sunrise	
Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C		°C		°C	
	2.2	Wet Bulb		°C		°C		°C	
	2.3	Difference	Subtract 2.2 from 2.1;	°C		°C		°C	
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH		%RH		%RH	
	2.5	Dew Point	Use 2.1, 2.3; Dew Point Table	°C		°C		°C	
Temperature / Relative Humidity	2.6	Heat Stress	Use 2.1, 2.4; Heat Stress Table	Heat Stress °C		Heat Stress °C		Heat Stress °C	
	2.7	Wind Chill	Use 2.1, 2.4; Wind Chill Table	Wind Chill °C		Wind Chill °C		Wind Chill °C	
Wind Speed / Direction	Report wind speed in knots to air crews; km/h to all others.								
	3.1	Average	Get 3 readings & average	km/h		knts		km/h	
	3.1	Gusts	Record highest gust	km/h		knts		km/h	
	Wind Speed Guidelines for Helicopter Flight Operations								
	10 knots / 18.5 km/h ideal; OK to fly. Above 45 knots / 83 km/h; No flights. Gusts above 20 knots/ 37 km/h; No flights. Max tailwind 5 knots/ 6 km/h; No take off.								
Wind Speed / Direction	3.2	Steady Wind Direction	Circle direction steady wind comes FROM	N	NE	S	SW	N	NE
	3.2	Variable Wind Direction	Circle 1 or more directions wind comes FROM	N	NE	S	SW	N	NE
4. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	Clear		Cloudy		Clear	
	4.2	Cloud Base Ht (Loo Rel)	Relative to local Mtn	Clouds above mtn		Clouds above mtn		Clouds above mtn	
	4.2	Cloud Base Ht (Loo Rel)	m AMSL	Clouds at mtn top		Clouds at mtn top		Clouds at mtn top	
	4.2	Cloud Base Ht (Loo Rel)	m AMSL	Clouds below mtn		Clouds below mtn		Clouds below mtn	
	4.2	Cloud Base Ht (Loo Rel)	m AMSL	Clouds below mtn		Clouds below mtn		Clouds below mtn	
4. Sky Conditions	4.3	Cloud Type	High	Cirrus		CuNim		Cirrus	
	4.3	Cloud Type	Middle	Altostrat		Altostrat		Altostrat	
	4.3	Cloud Type	Low	Stratus		Cumul		Stratus	
	4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.	mm		mm		mm	
	4.5	Visual Range (Visibility)	Name of 3.2 km mark	more		less than		more	
4.6	Severe Weather	Thunderstorms	Yes	No	Yes	No	Yes	No	
	Severe Weather	Lightning	Flash, count secs to boom / 3	km		km		km	
	Severe Weather	Flash, count secs to boom / 3	km		km		km		
	Severe Weather	Flash, count secs to boom / 3	km		km		km		
	Severe Weather	Flash, count secs to boom / 3	km		km		km		



# Relative Humidity can also help to determine the cloud base height



Calculating the cloud base height is covered in Advanced MEWS lesson A3



# You have completed the Advanced MEWS Lesson A1: Measuring Relative Humidity & Heat Stress

## Advanced MEWS Weather Observing Lesson A1: Measuring Relative Humidity and Heat Stress



## Advanced MEWS Weather Observing Lesson A2: Measuring Wind Speed and Wind Chill

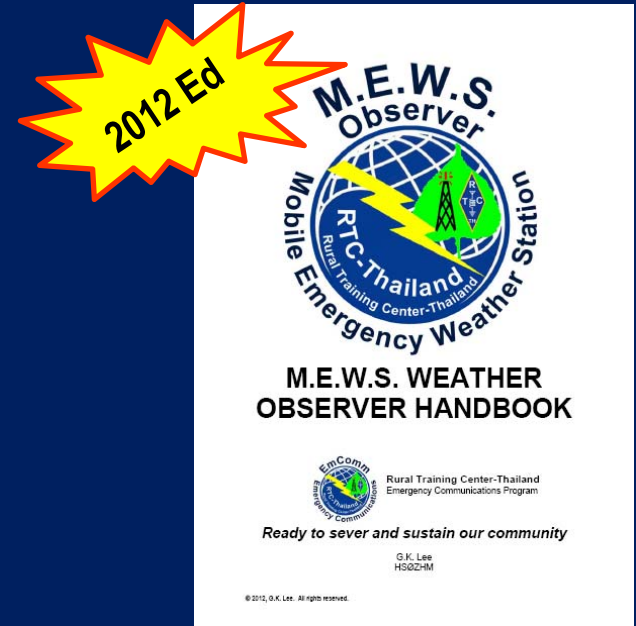


You are now ready for Advanced MEWS Lesson A2: Measuring Wind Speed & Windchill



# Questions or Comments

Refer to the MEWS  
Weather Observer  
Handbook for more  
details on any of the  
procedures in this lesson.



You may also contact us by e-mail:  
[hs0zhm@gmail.com](mailto:hs0zhm@gmail.com)  
We are always trying to improve our  
lessons. Your comments and  
suggestions are welcomed.

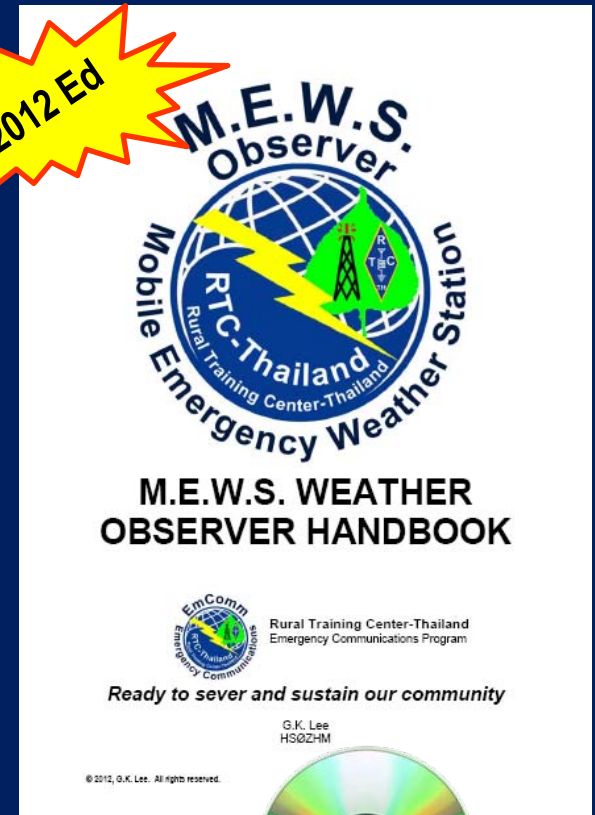


# Free Self-Study Materials by Internet

- RTC-TH Weather Observer manual
- Illustrated PDF topical lessons

**All of the lessons have been classroom and field proven.**

Send e-mail to  
[hs0zhm@gmail.com](mailto:hs0zhm@gmail.com) to request  
free training materials for non-  
commercial use only.



©2010, rev 2012. G. K. Lee  
HS0ZHM All rights reserved.

These materials are in English. Volunteer assistance for Thai translation to is welcome and will be acknowledged and cited.



# Advanced MEWS PDF Lessons

A 1: Measuring Relative Humidity and Heat Stress

A 2: Measuring Wind Speed and Wind Chill

A 3: Using Dew Point Temperature to Calculate Cloud Base Height

A 4: Measuring Rainfall

A 5: Reporting Severe Weather

A 6: Weather Forecasting

Be sure to check [www.neighborhoodlink.com/RTC-TH\\_Tech/pages](http://www.neighborhoodlink.com/RTC-TH_Tech/pages) for the latest updated editions of MEWS lessons



# Advanced MEWS PDF Lessons

2012 Ed

## Advanced MEWS Weather Observing Lesson A1: Measuring Relative Humidity and Heat Stress



## Advanced MEWS Weather Observing Lesson A2: Measuring Wind Speed and Wind Chill



## Advanced MEWS Weather Observing Lesson A3: Using Dew Point Temperature to Calculate Cloud Base Height



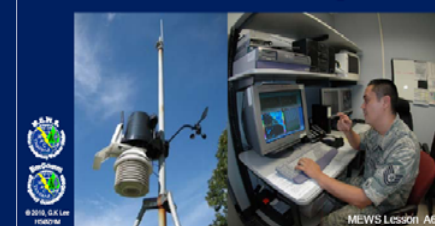
## Advanced MEWS Weather Observing Lesson A4: Measuring Rainfall



## Advanced MEWS Weather Observing Lesson A5: Reporting Severe Weather



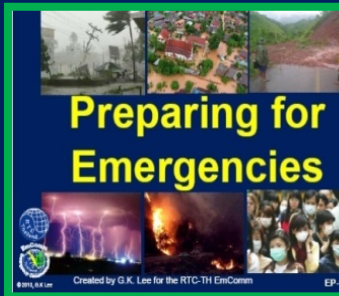
## Advanced MEWS Weather Observing Lesson A6: Weather Forecasting



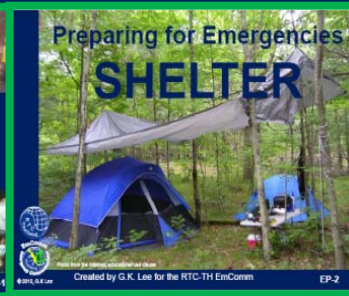
Six slide show lessons;  
Some show how to build your own weather  
equipment



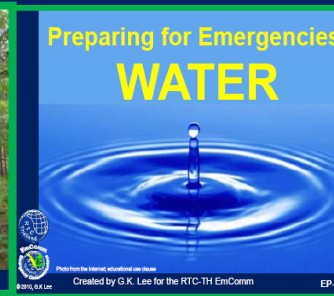
# The EP Lesson Series



EP-1



EP-2



EP-3



EP-4



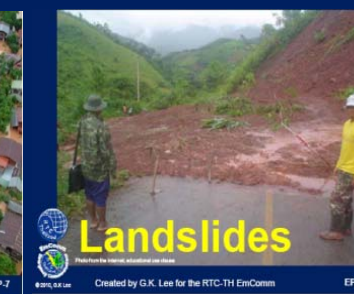
EP-5



EP-6



EP-7



EP-8



EP-9



EP-10



EP-11



EP-12



[www.neighborhoodlink.com/RTC-TH\\_Tech/pages](http://www.neighborhoodlink.com/RTC-TH_Tech/pages)



# For More Information about M.E.W.S.



**Contact**  
**Greg, HSØZHM**  
MEWS Creator / Mentor



Via E-mail  
[hsØzhm@gmail.com](mailto:hsØzhm@gmail.com)



Via Skype video  
conference call: [rtc\\_th](https://rtc_th.skype.com/join)



# Community-based Environmental Education for



## The End

Continue this slide show and learn how to make your own hygrometer.



# Make Your Own Hygrometer

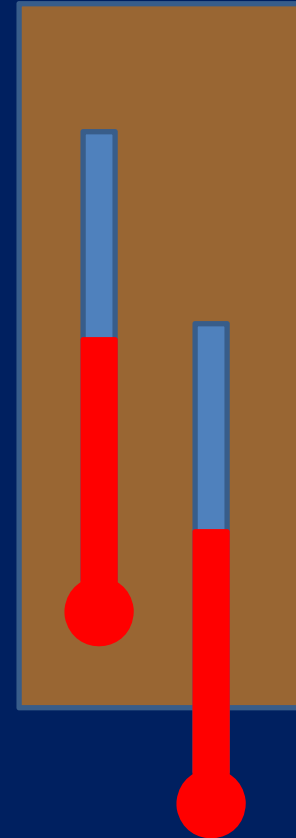
Depending on your budget, you can buy a basic hygrometer for about 230 THB.

You can make a hygrometer with basic parts: 2 thermometers, a board, some cloth, and a small empty pill bottle, and a hot glue gun.



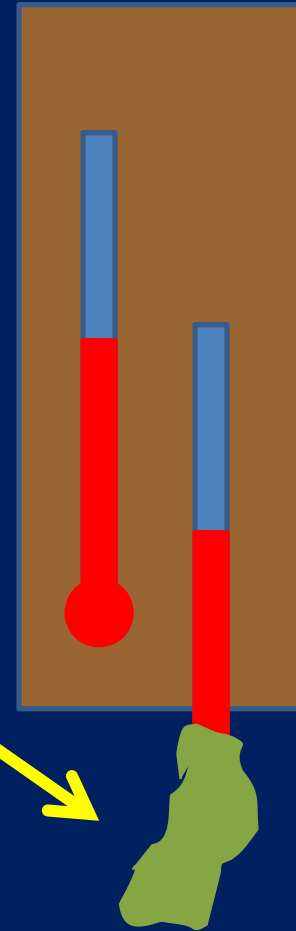
# Make Your Own Hygrometer

**Step 1.** Glue the 2 thermometers to the board. One should extend about 5 cm below the bottom edge of the board.



# Make Your Own Hygrometer

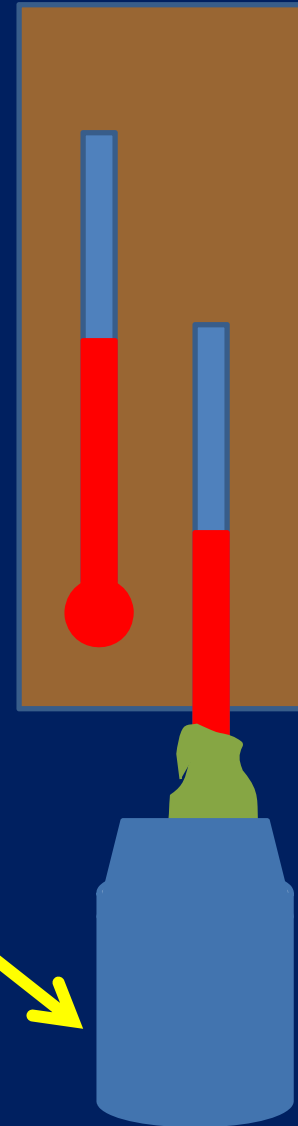
**Step 2.** Tie the cloth to the end of the “wet” bulb thermometer.





# Make Your Own Hygrometer

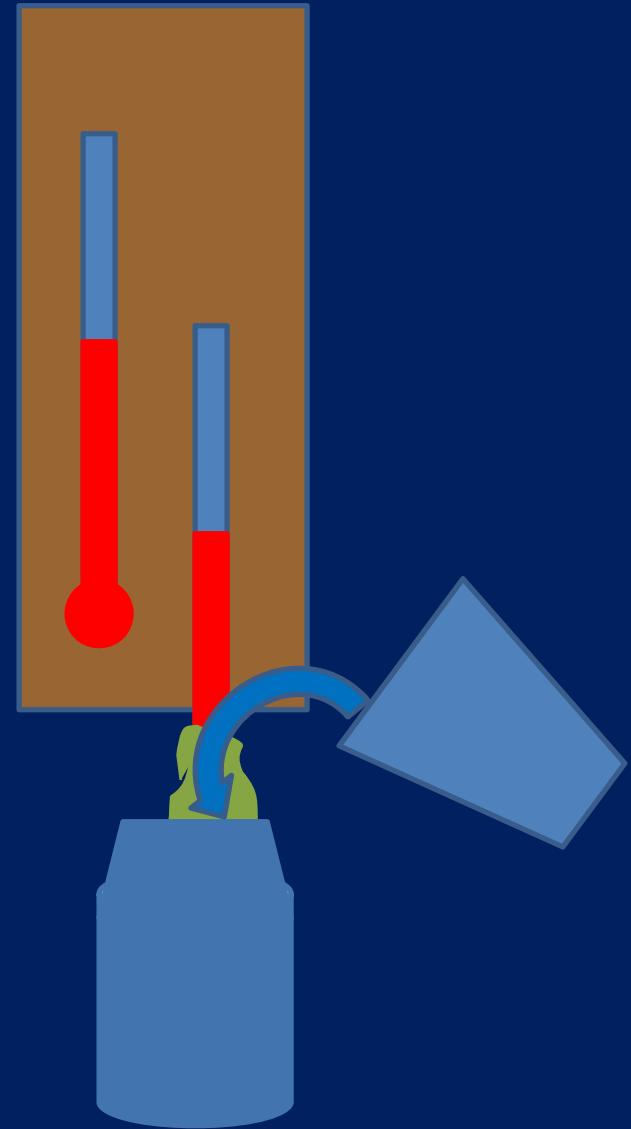
**Step 3.** Attach the pill bottle to the board so encloses the cloth covered end of the wet bulb thermometer.



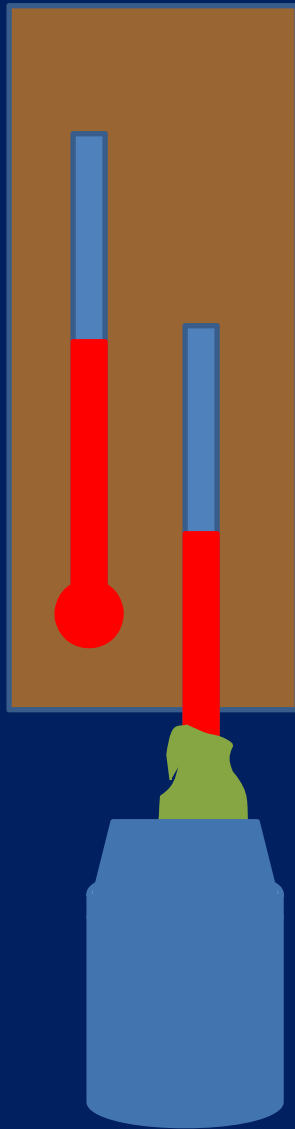
# Make Your Own Hygrometer

**Step 4.** Fill the pill bottle with water so the cloth on the end of the wet bulb thermometer is soaking wet.

Let the hygrometer sit for a few minutes to stabilize. You can watch the wet bulb temperature decrease as water evaporates from the cloth wick. When the wet bulb temperature no longer changes, you are ready to go.



# Caution: Protect Your Hygrometer



The thermometers on the hygrometer are fragile. Consider the geo-hazards in your area. Make a protective case for the hygrometer. You need to be sure it will survive with you.



# Community-based Environmental Education for



## The End

[www.neighborhoodlink.com/org/rtcth](http://www.neighborhoodlink.com/org/rtcth)

E-mail: [rtc2k5@gmail.com](mailto:rtc2k5@gmail.com)

