Rural Training Center – Thailand (RTC-TH)

REEEPP

FOCUS

An innovative, non-traditional community-based environmental education program integrating math, science, geography, English language, and technology lessons for environmental stewardship using interactive experiential learning in outdoor settings at Ban Na Fa Elementary School, Nan Province, Thailand.

Weather Observing: Measuring Wind Speed

This lesson was originally created when the RTC-TH was a program of ESSI (Earth Systems Science, Inc.), a California educational non-profit organization co-founded by Gregory Lee. In 2006, the RTC-TH was co-founded by Gregory and Saifon Lee as a separate organization.

This is an English Language Training module of

REEEPP

Rural Environmental Education Enhancement Pilot Program

presented by

The Rural Training Center-Thailand

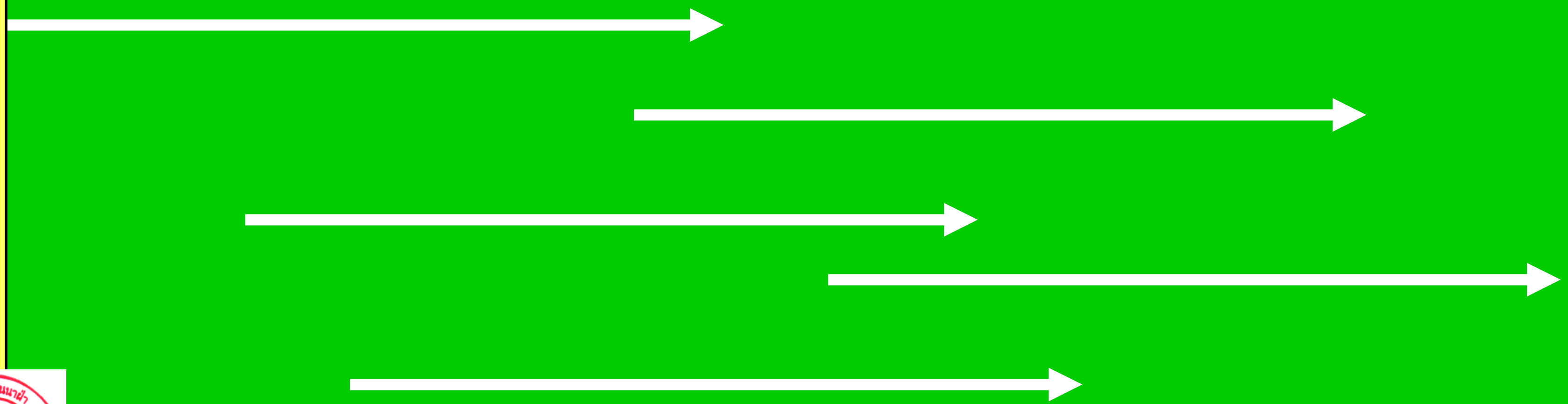
E-mail: rtc2k5@gmail.com

www.neighborhoodlink.com/org/rtcth

The RTC-TH developed this lesson as part of the NASA CERES S'COOL Project component of REEEPP

Wind

is the horizontal movement of air.



The wind can move at different speeds.

You can measure wind speed in 2 ways.

- Indirectly by observing the environment
- Directly by using a wind speed gauge

Observing the Environment

A British Admiral looked carefully at what happened in the environment when the wind blows at different speeds.

He made the Beaufort Table of Wind Effects.

BEAUFORT SCALE OF WIND EFFECTS				
Speed (mph)	Speed (kph)	Force #	Effects on Land	Official Term
<1	<1.5	0	Calm; smoke rises vertically.	Calm
1-3	1.5-6	1	Smoke indicates wind but not wind vane.	Light Air
4-7	6-12	2	Wind felt on face, leaves rustle; wind vane moves	Light Breeze
8-12	12-20	3	Leaves, small twigs move; light flags fully extended.	Gentle Breeze
13-18	21-29	4	Wind blows dust and loose papers; small branches move.	Moderate Breeze
19-24	30-39	5	Small trees w/ leaves sway; crested wavelets appear on lakes/ponds.	Fresh Breeze
25-31	40-50	6	Large branches move; phone wires whistle; umbrellas hard to use.	Strong Breeze
32-38	51-61	7	Whole trees sway; hard to walk in the wind.	Near Gale
39-46	62-74	8	Twigs break off trees; cars veer on roads.	Gale
47-54	75-87	9	Slight damage to buildings (roof shingles blow off).	Strong Gale
55-63	88-101	10	Trees uprooted; considerable damage to buildings.	Storm
64-72	102-114	11	Widespread damage caused.	Violent Storm
>73	>115	12	Widespread damage caused.	Hurricane

mph: Miles per hour. **kph:** Kilometers per hour. **Force #:** A relative numbering scale used by sailors. **Official Terms** from the World Meteorological Organization (WMO).

You can use the Beaufort Table to estimate (guess) the wind speed.

The smoke shows the wind may be about 1.5 – 6 km / hr

You can use a wind speed gauge to measure the wind.

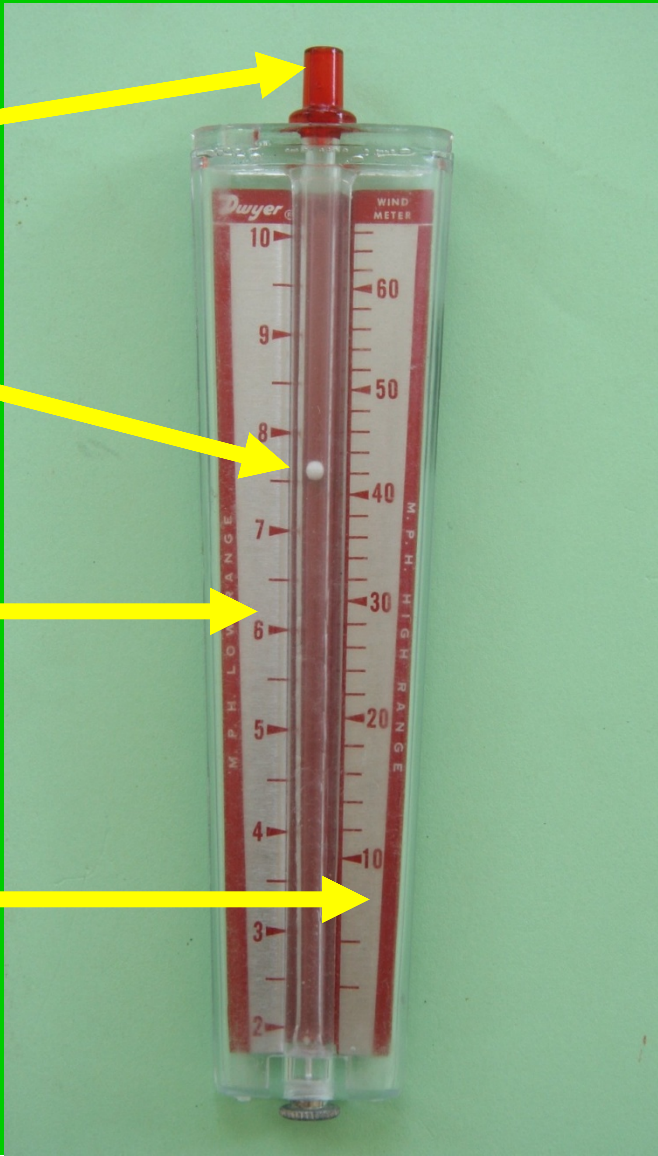
Parts of the wind speed gauge.

Speed scale adjusting tube

Indicator ball

Low speed scale

High speed scale



Do you know the parts of the wind speed gauge?

Try to answer these questions.

What is this?


Dwyer
WIND METER
10
9
8
7
6
5
4
3
2
M. P. H. LOW RANGE
60
50
40
30
20
10
M. P. H. HIGH RANGE

It is the indicator ball

What is this?


Dwyer
WIND METER
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9
8
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M.P.H. LOW RANGE
60
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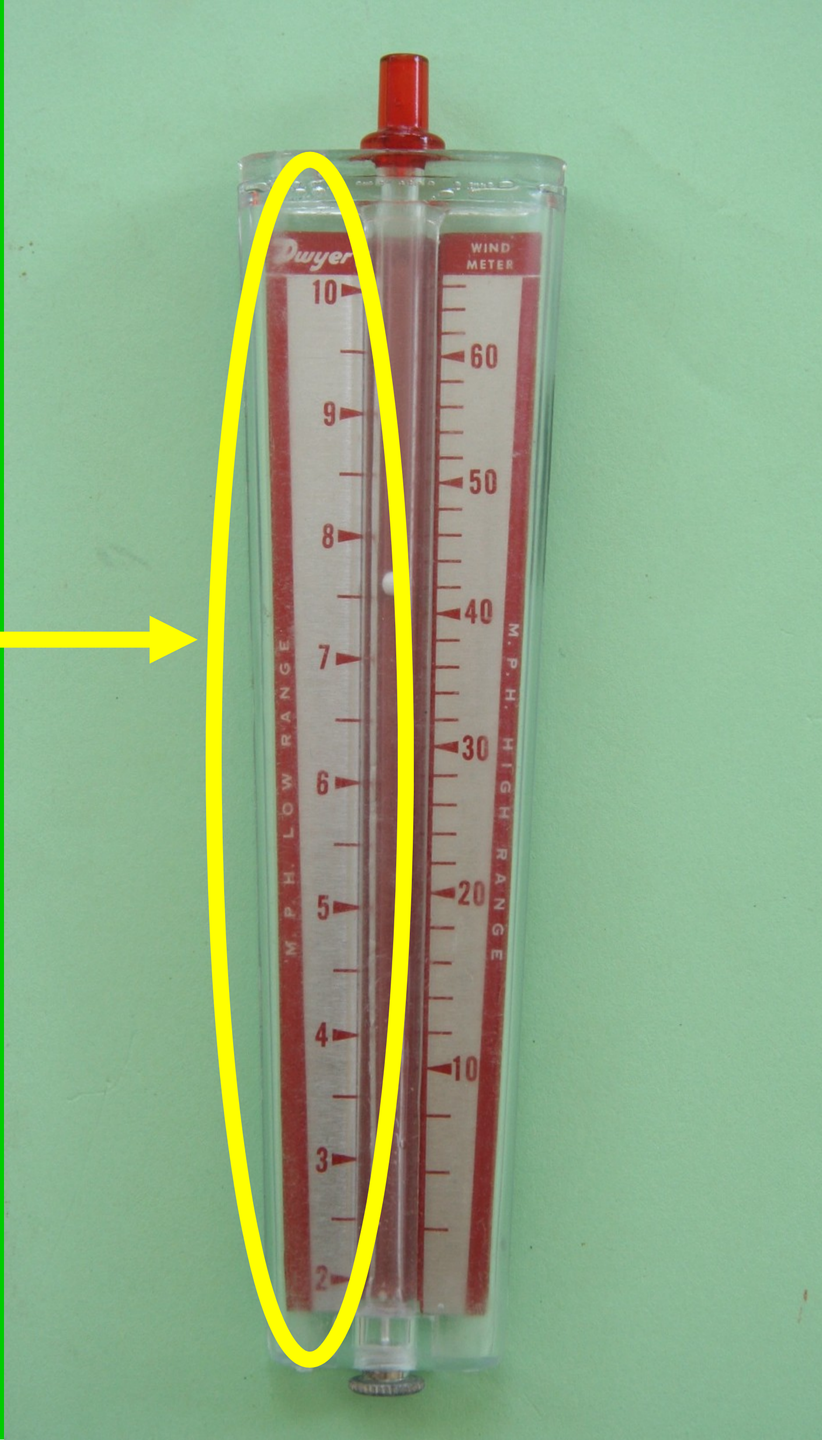
M.P.H. HIGH RANGE

It is the speed scale adjusting tube

What is this?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10
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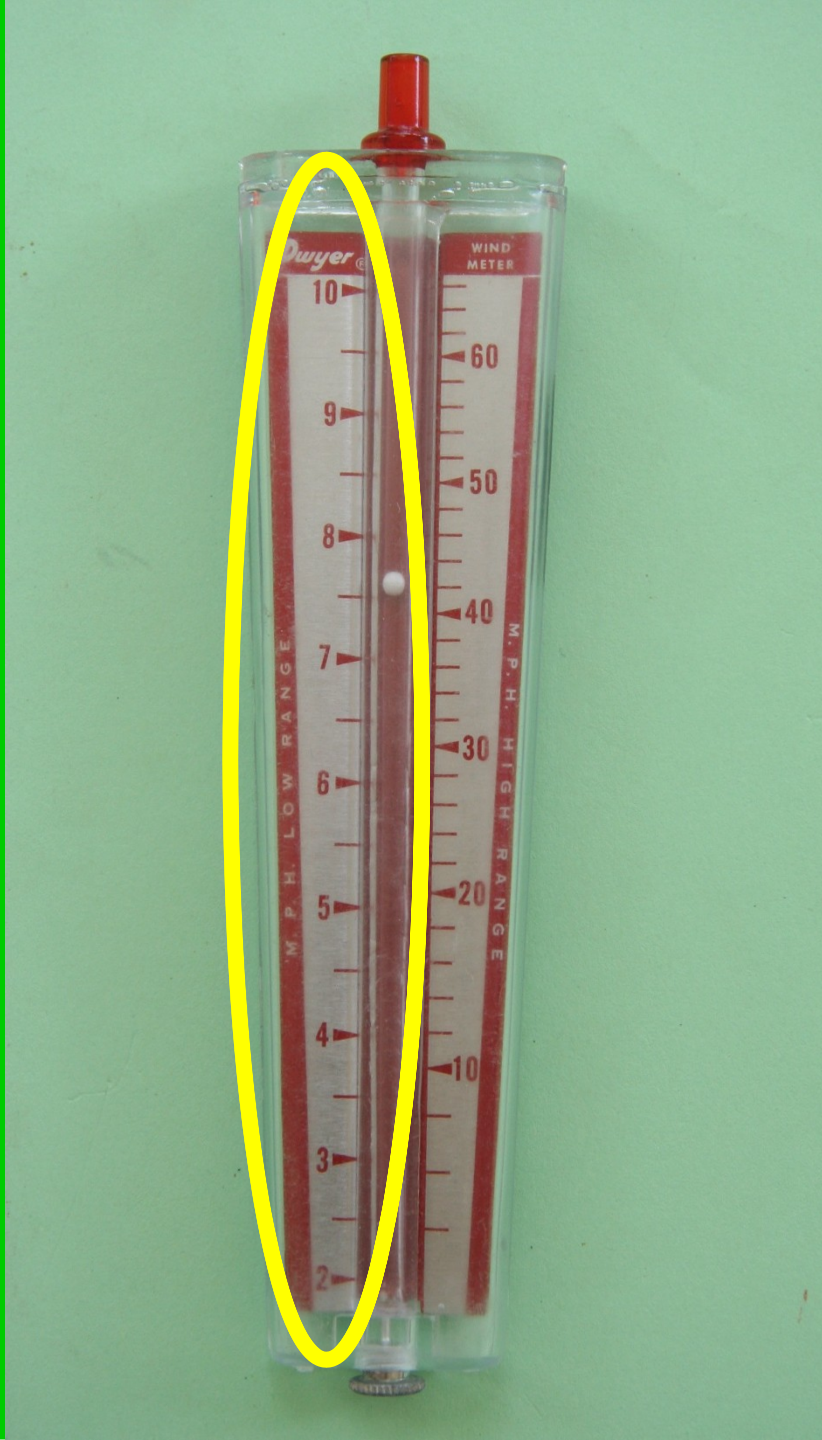
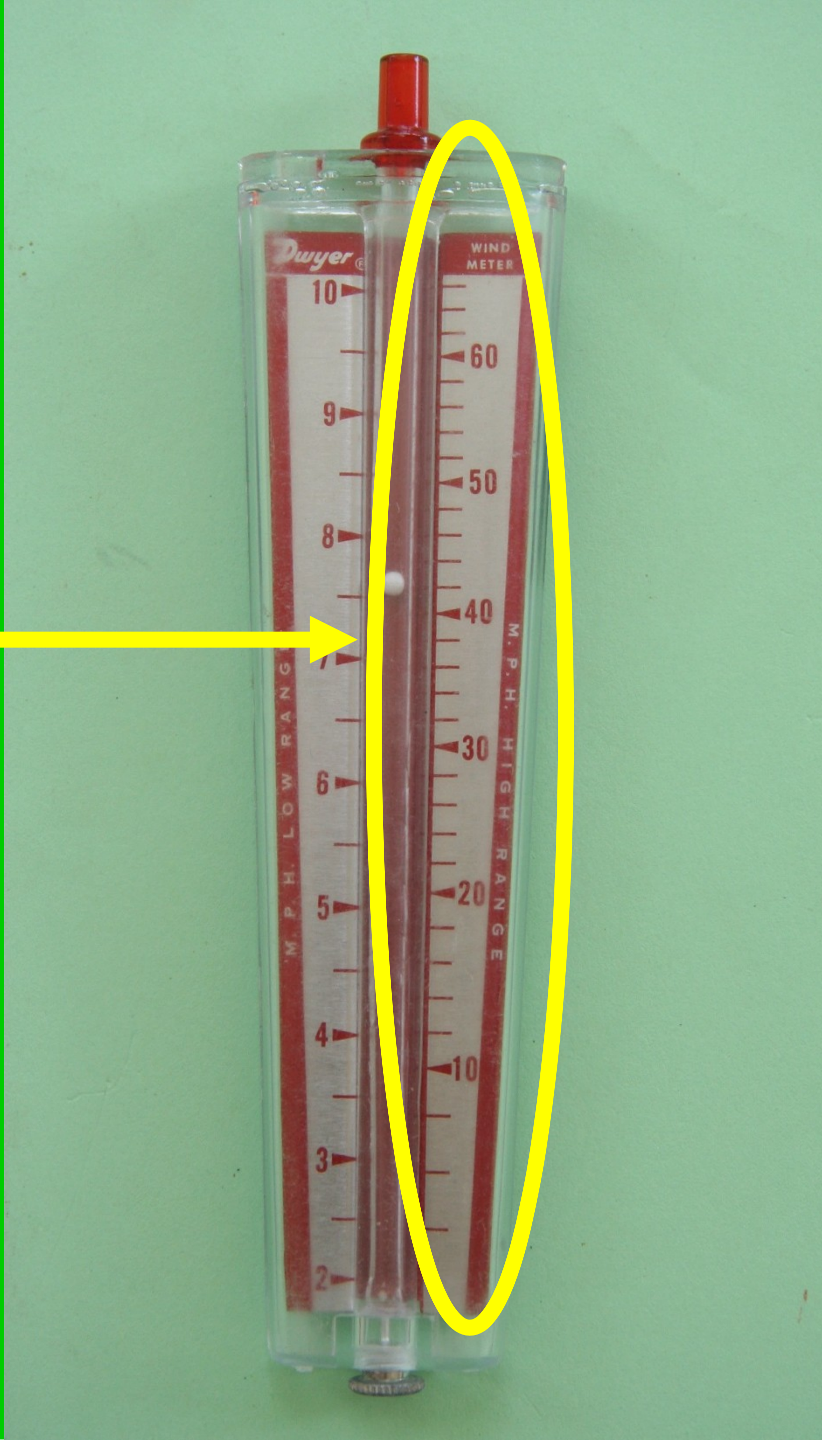
8
7
6
5
4
3
2
60
50
40
30
20
10

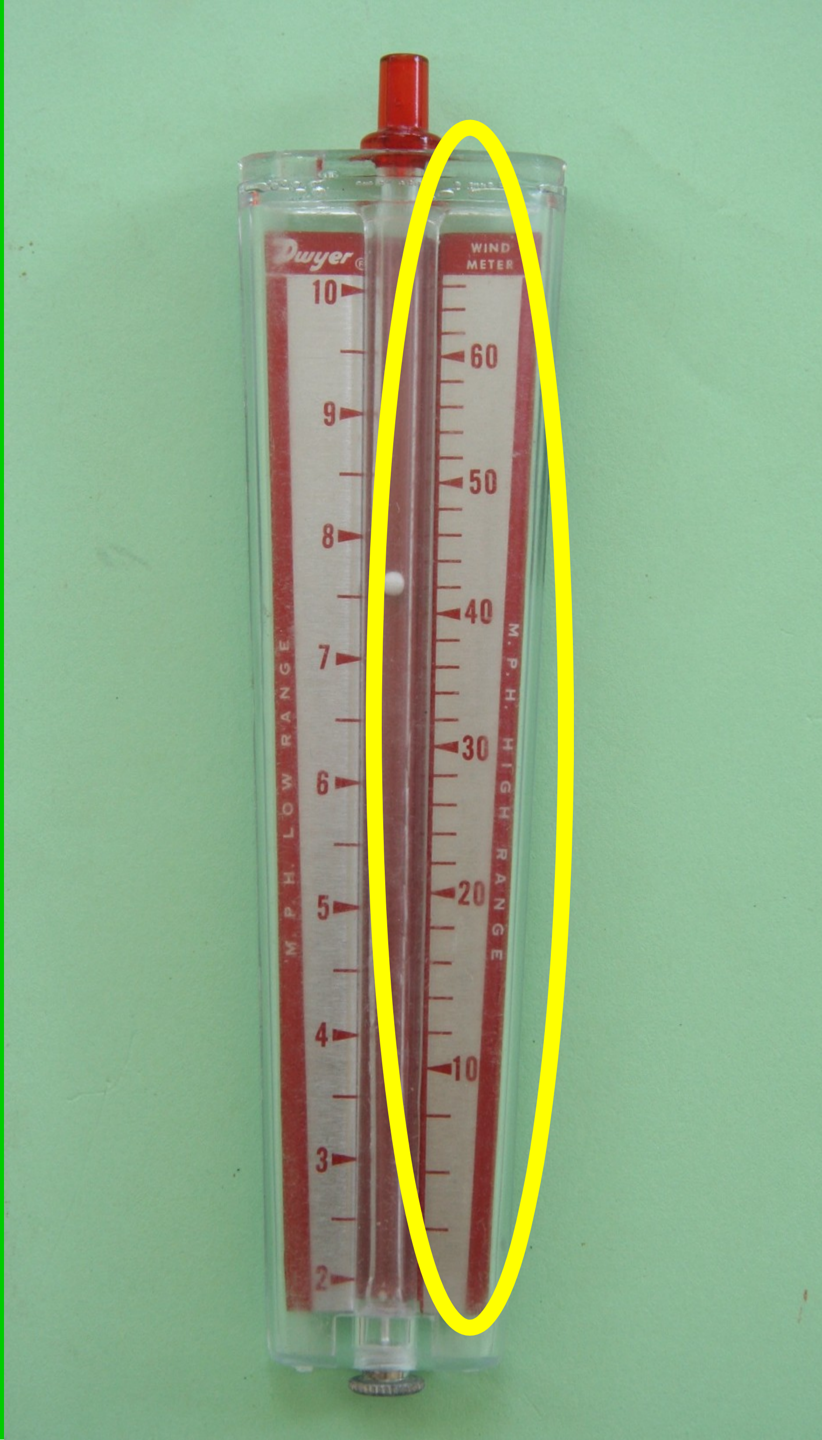
It is the low speed scale.



What is this?



It is the high speed scale.



This wind speed gauge is marked in miles per hour.

So you need to use the reference table to get the wind speed in kilometers per hour.

Miles per hour to Kilometers per hour Conversion Table					
mph	**kph**	**mph**	**kph**	**mph**	**kph**
1	1.61	6	9.66	20	32.19
2	3.22	7	11.27	30	48.28
3	4.83	8	12.87	40	64.37
4	6.44	9	14.48	50	80.47
5	8.05	10	16.09	60	96.56

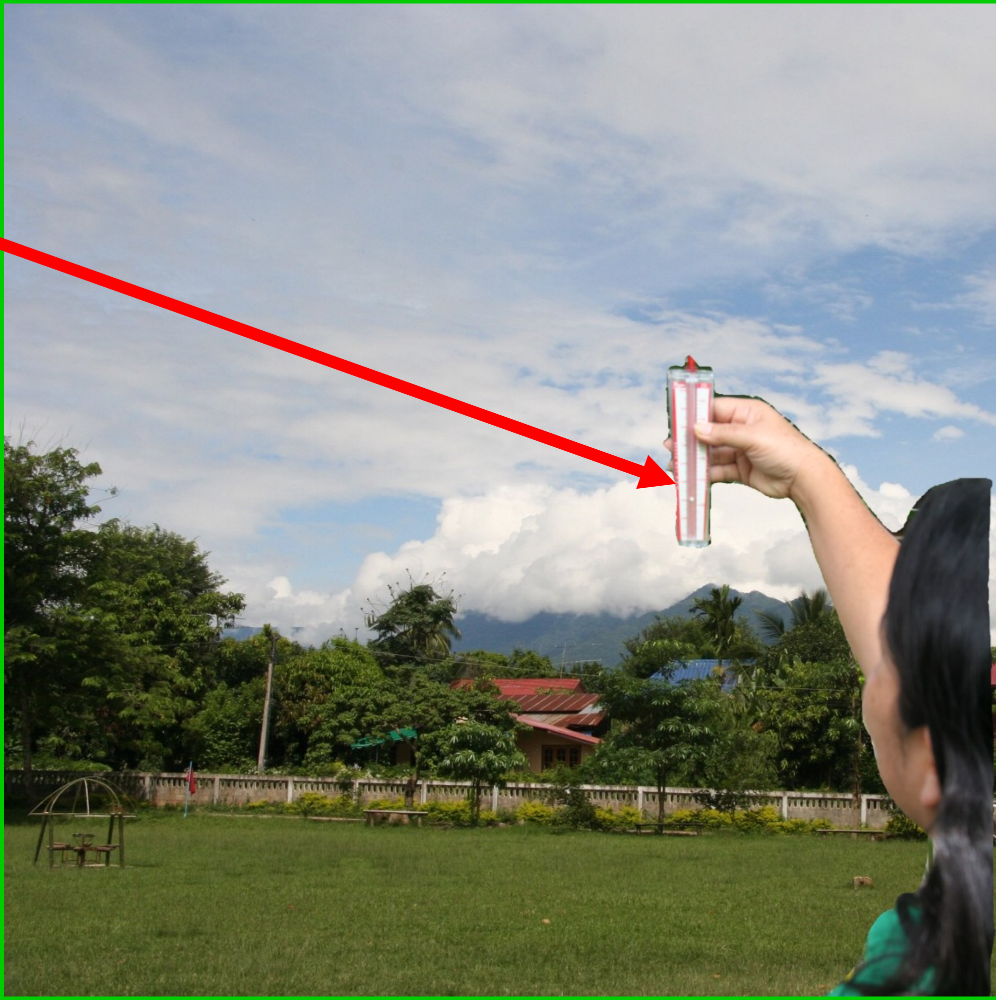
There are 5 steps to measuring the wind speed.

Step 1. Get in an open area away from buildings and trees

Step 2. Stand facing into the wind. Hold the wind speed gauge away from your body and above your head.

Step 3.

Watch the white ball as the wind blows. Use the appropriate wind speed scale.



Step 4.

Record the highest and lowest wind speeds you see. Calculate the average speed.

Step 5. Convert the wind speed from miles per hour to kilometers per hour using the reference table.

Miles per hour to Kilometers per hour Conversion Table					
mph	kph	mph	kph	mph	kph
1	1.61	6	9.66	20	32.19
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NASA CERES

Student Cloud Observation On-Line Report Form (REEEPP Version)

A 501 (c)(3) non-profit educational organization | Po Box 8042, Van Nuys, CA 91409-8042 | www.earthsystemsscience.org | Phone: (818) 343-2363 | E-mail: earthsystemsscience@yahoo.com

Community-based Environmental Education for Families and Sustainable Neighborhoods

Login ID: Promwangkhwa — Na Fa Village, Thawangpha

Latitude: 19.08 N Longitude: 100.86 E

Date: Year ______ Month _______ Day ___ **Satellite:** ☐ Terra ☐ Aqua

Time Zone: UT +7

(24-hr format) Local Time: Hr _____ Min _____ **Universal Time:** Hour ____ Min _____

CLOUD OBSERVATIONS (Required)

If more than one cloud layer exists, check the boxes to show the clouds are present.

Cloud Height	Cloud Type	Visual Opacity			Cloud Cover
		Transparent	Translucent	Opaque	• Use the Na Fa Cloud Cover Estimator Dome Worksheet to record the student observations and calculations. • Then check the box below
High	☐ Cirrus				
	☐ Cirrocumulus				
	☐ Cirrostratus				
Middle	☐ Altocumulus				☐ Overcast (95-100%)
	☐ Altostratus				
Low	☐ Cumulonimbus				☐ Mostly cloudy (50-95%)
	☐ Cumulus				
	☐ Stratocumulus				☐ Partly cloudy (5-50%)
	☐ Stratus				
	☐ Nimbostratus				☐ Clear (0-5%)
	☐ Fog				

CONTRAILS (This is optional.)

1	Can you see high into the sky?	☐ Yes, go to #2 ☐ No, why?	☐ Sky is overcast ☐ Too many clouds
2	Can you see any contrails?	☐ Yes, go to #3 ☐ No, why?	☐ None present ☐ Sky is overcast ☐ Too many clouds
3	Contrail type & count	☐ Short-lived Count? ☐ Persistent Count?	Go to #4
4	Any natural looking cirrus clouds in sky with the persistent contrails?	☐Yes, type? ☐ Cirrus ☐ Cirrocumulus ☐ Cirrostratus — Go to #5; ☐ No	Make a fist to block out the sun. Can you see a halo? ☐ Yes ☐ No
5	Estimate % sky covered by persistent contrails		

GROUND OBSERVATIONS

Surface Cover (Required) Yes No	Surface Measurements (These are optional.)		
☐ ☐ Snow / Ice	**Precipitation** ☐ mm ☐ in	**Wind**	Speed
☐ ☐ Standing water	**Temperature** ☐ °C ☐ °F		Direction ☐ True ☐ Mag
☐ ☐ Muddy	**Relative Humidity** % — Temperature ☐ °C ☐ °F	**Barometric Pressure**	
☐ ☐ Dry Ground	Dry / Wet	☐ In Hg ☐ mm Hg	Trend
☐ ☐ Leaves on trees	Difference	☐ Mb	

Report the wind speed on this part of the form

Do you know how to measure wind speed?

Try to answer these questions.

How many steps are there when measuring wind speed?

There are 5 steps.

What is Step 1?

Step 1. Get in an open area away from buildings and trees

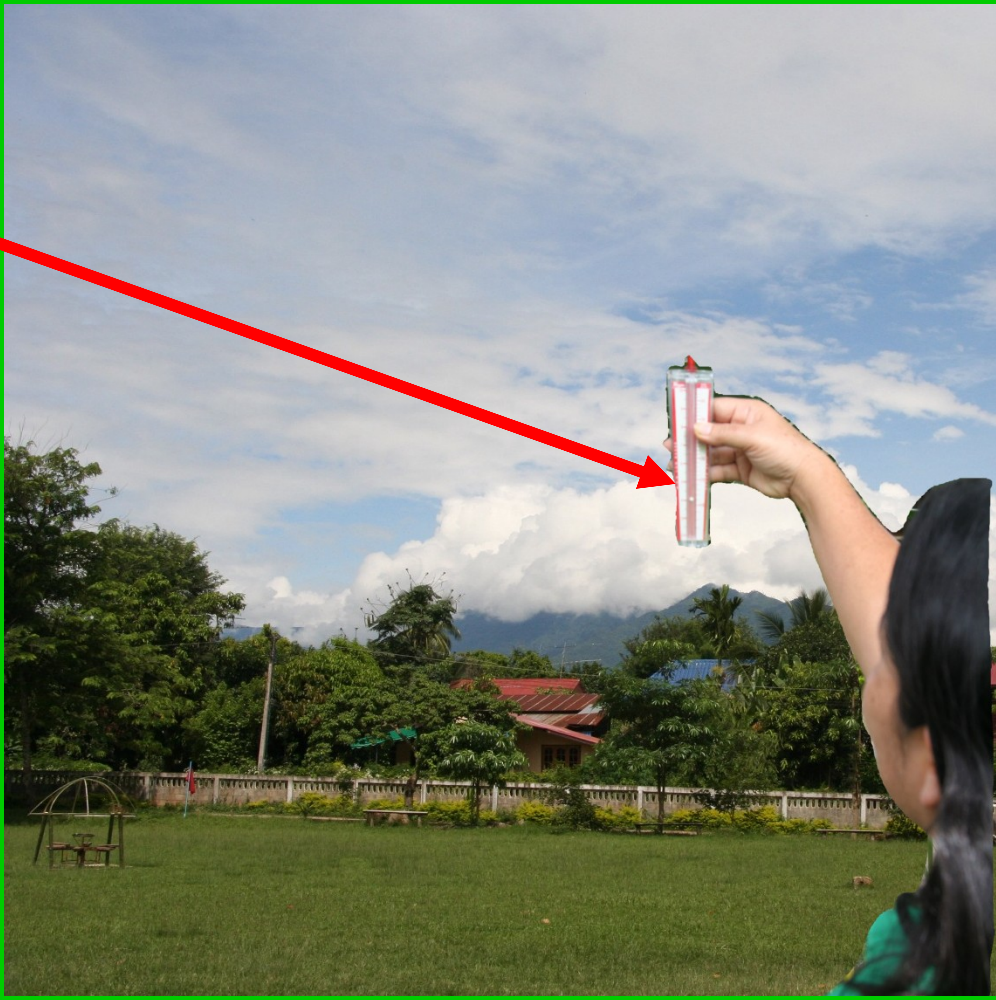
What is Step 2?

Step 2. Stand facing into the wind. Hold the wind speed gauge away from your body and above your head.

What is Step 3?

Step 3.

Watch the white ball as the wind blows. Use the appropriate wind speed scale.



What is Step 4?

Step 4.

Record the highest and lowest wind speeds you see. Calculate the average speed.

What is Step 5?

Step 5. Convert the wind speed from miles per hour to kilometers per hour using the reference table.

Miles per hour to Kilometers per hour Conversion Table					
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Now you know how to measure wind speed.

RTC-TH

Rural Training Center-Thailand

is dedicated to providing community-based environmental education for the self-sufficiency and sustainability of small rural family farms

The RTC-TH was created to honor the memory of Mr. Tang Suttisan, a father, a farmer, and a man who valued education and used it in starting his family farm

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The End