

# 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.



© 2005, rev. 2009,

G.K Lee & S. Lee

# Weather Observing: Measuring Temperature



© 2005, rev. 2009,  
G.K Lee & S. Lee

**W-1**



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.



© 2005 rev. 2009,

G.K Lee & S. Lee



# This is an English Language Training module of **REEEPP**

Rural Environmental Education Enhancement Pilot Program  
presented by

The Rural Training Center-Thailand

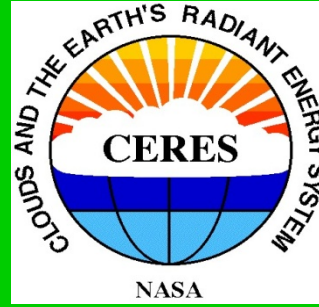
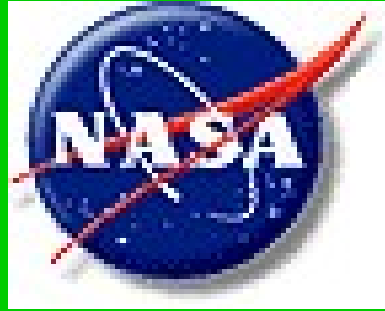
E-mail: [rtc2k5@gmail.com](mailto:rtc2k5@gmail.com)

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



© 2005, rev. 2009,

G.K Lee & S. Lee



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



© 2005, rev. 2009,

G.K Lee & S. Lee

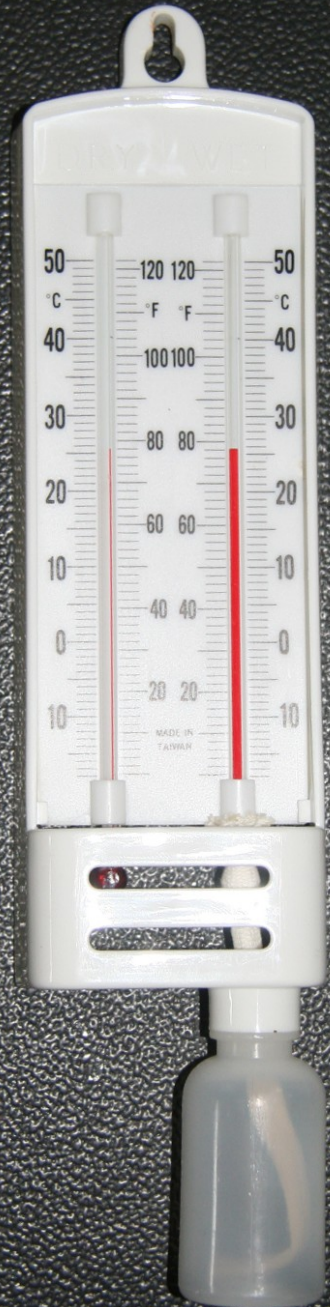


# Temperature is a measure of the amount of heat.

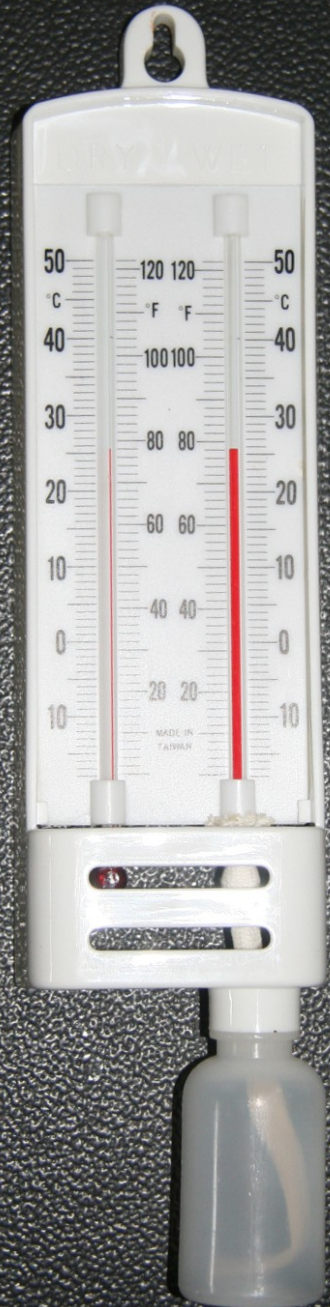


© 2005, rev. 2009,

G.K Lee & S. Lee



A  
thermometer  
is a tool to  
measure  
temperature.

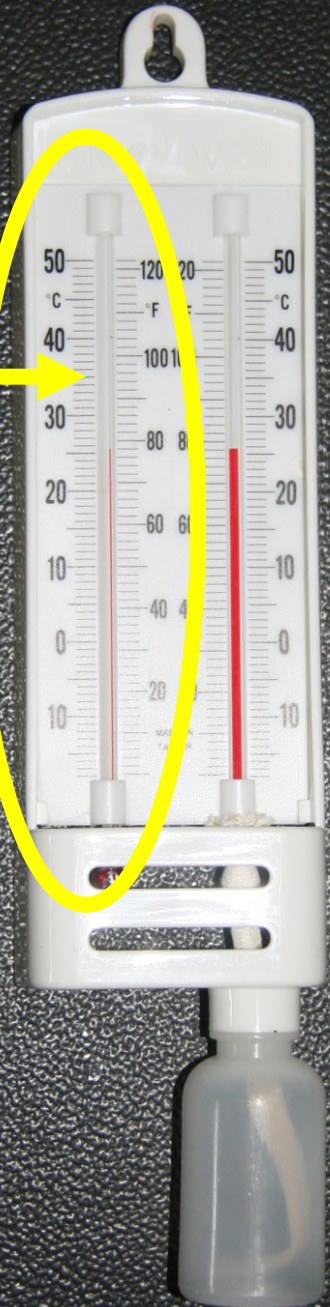


© 2005, rev. 2009,

G.K Lee & S. Lee



You can use  
the dry bulb  
thermometer  
on the  
hygrometer.

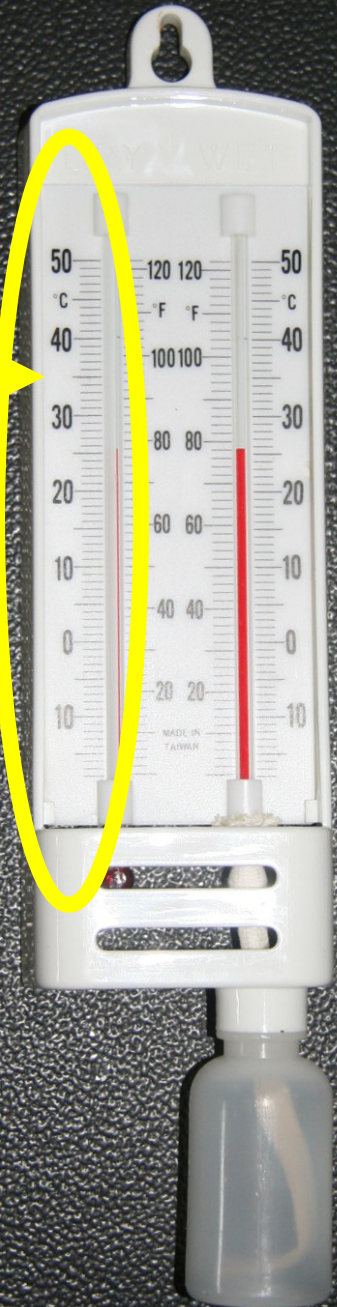


© 2005, rev. 2009,

G.K Lee & S. Lee



You should use  
the °C scale  
because it is the  
international  
standard.



© 2005, rev. 2009,

G.K Lee & S. Lee

The  
thermometer  
must be in  
the shade  
when you  
measure the  
temperature.



© 2005, rev. 2009,

G.K Lee & S. Lee



It should  
be 1.5 m  
above the  
ground.



© 2005, rev. 2009,

G.K Lee & S. Lee



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

A 561 (c)(3) non-profit educational organization | Po Box 8042, Van Nuys, CA 91409-8042 | Phone: (818) 343-2363  
 www.earthsystemscience.org | E-mail: earthsystemscience@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	
High	<input type="checkbox"/> Cirrus				• Use the Na Fa Cloud Cover Estimator Dome Worksheet to record the student observations and calculations. • Then check the box below
	<input type="checkbox"/> Cirrocumulus				
	<input type="checkbox"/> Cirrostratus				
Middle	<input type="checkbox"/> Altostratus				<input type="checkbox"/> Overcast (95-100%)
	<input type="checkbox"/> Altostratus				
Low	<input type="checkbox"/> Cumulonimbus				<input type="checkbox"/> Mostly cloudy (50-95%)
	<input type="checkbox"/> Cumulus				
	<input type="checkbox"/> Stratocumulus				<input type="checkbox"/> Partly cloudy (5-50%)
	<input type="checkbox"/> Stratus				
	<input type="checkbox"/> Nimbostratus				
	<input type="checkbox"/> Fog				<input type="checkbox"/> Clear (0-5%)

**CONTRAILS (This is optional.)**

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

**GROUND OBSERVATIONS**

Surface Cover (Required)		Surface Measurements (These are optional.)			
Yes	No	Precipitation	<input type="checkbox"/> mm <input type="checkbox"/> in	Wind	Speed <input type="checkbox"/> kmph <input type="checkbox"/> mph
<input type="checkbox"/> Snow / Ice		Temperature	<input type="checkbox"/> °C <input type="checkbox"/> °F	Direction	<input type="checkbox"/> True <input type="checkbox"/> Mag
<input type="checkbox"/> Standing water		Relative Humidity	<input type="checkbox"/> %	Barometric Pressure	
<input type="checkbox"/> Muddy		Dry		<input type="checkbox"/> In Hg	
<input type="checkbox"/> Dry Ground		Wet		<input type="checkbox"/> mm Hg	
<input type="checkbox"/> Leaves on trees		% Difference		<input type="checkbox"/> Mb	

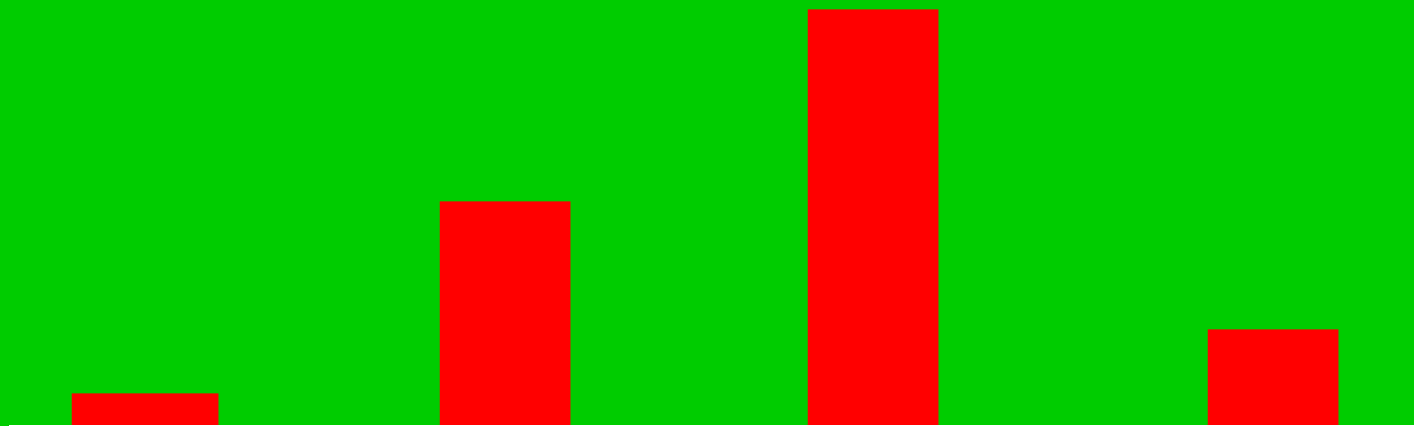
# Report the Air Temperature on this part of the form



© 2005, rev. 2009,

G.K Lee & S. Lee

# The temperature is different at different times of the day.



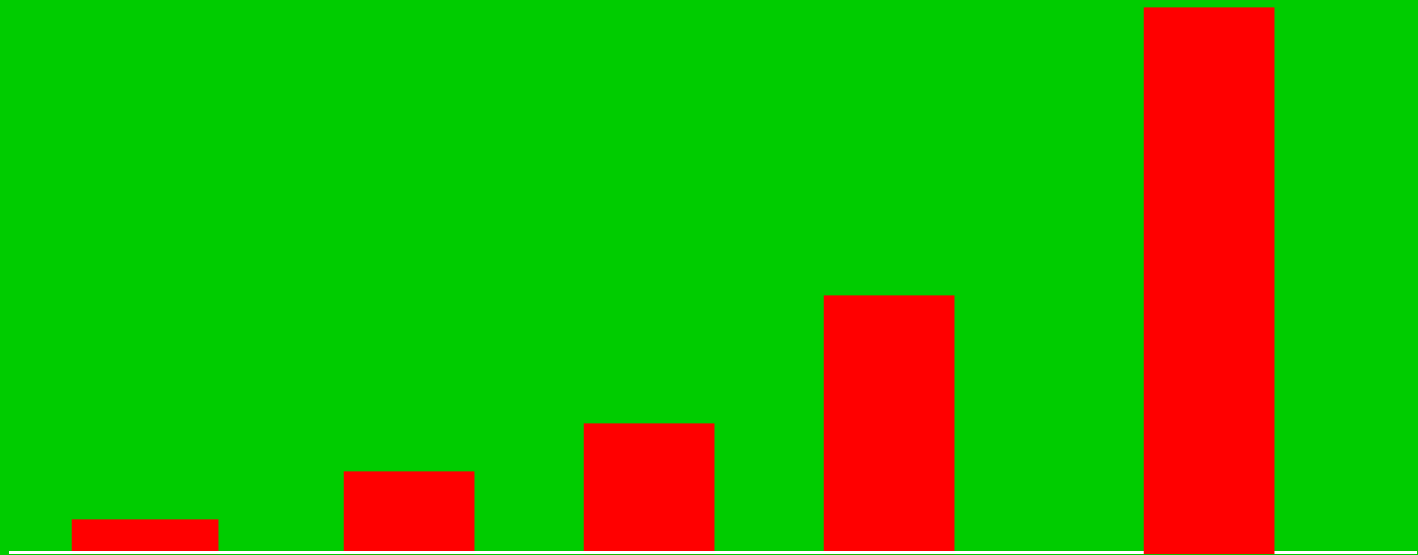
Morning Noon Afternoon Evening



© 2005, rev. 2009,

G.K Lee & S. Lee

# The temperature can be different over different surfaces.



Water Trees Grass Soil Pavement

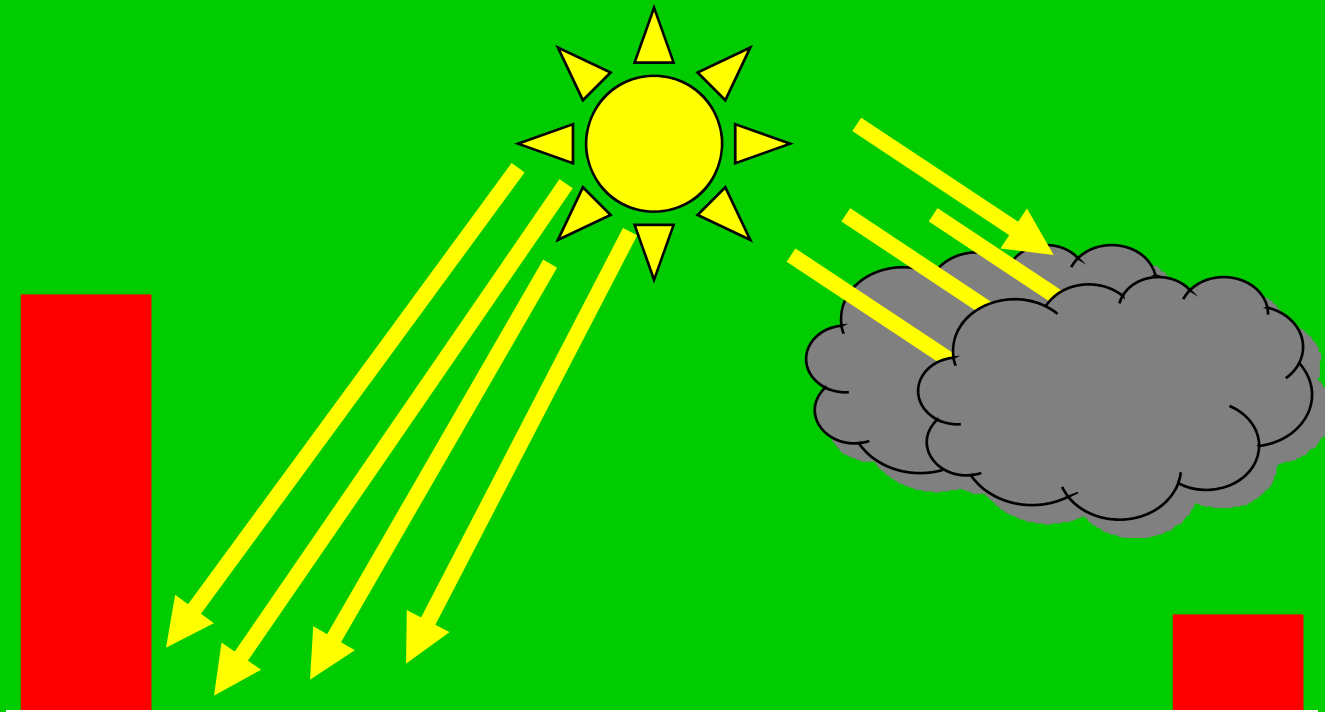


© 2005, rev. 2009,

G.K Lee & S. Lee



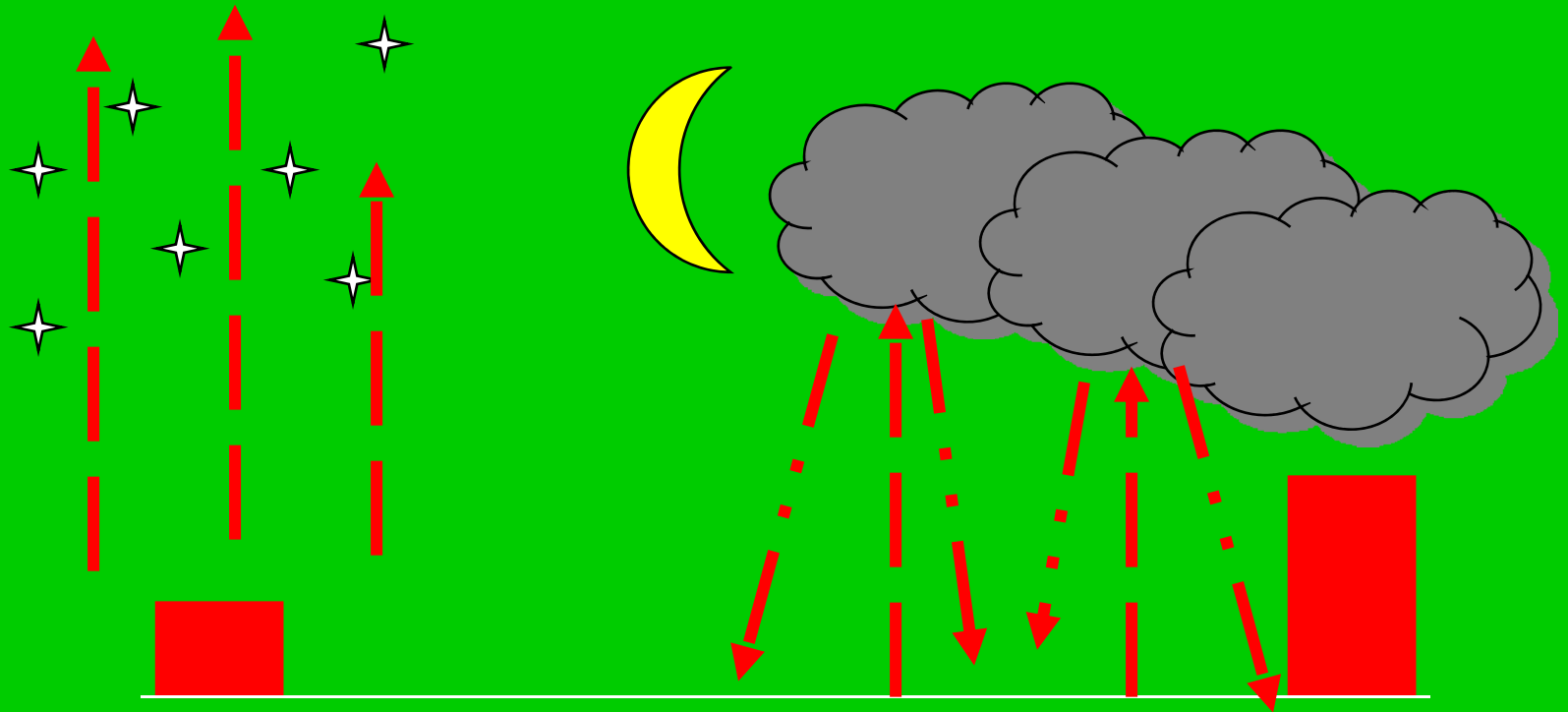
# Clouds can reduce the daytime surface temperature.



© 2005, rev. 2009,

G.K Lee & S. Lee

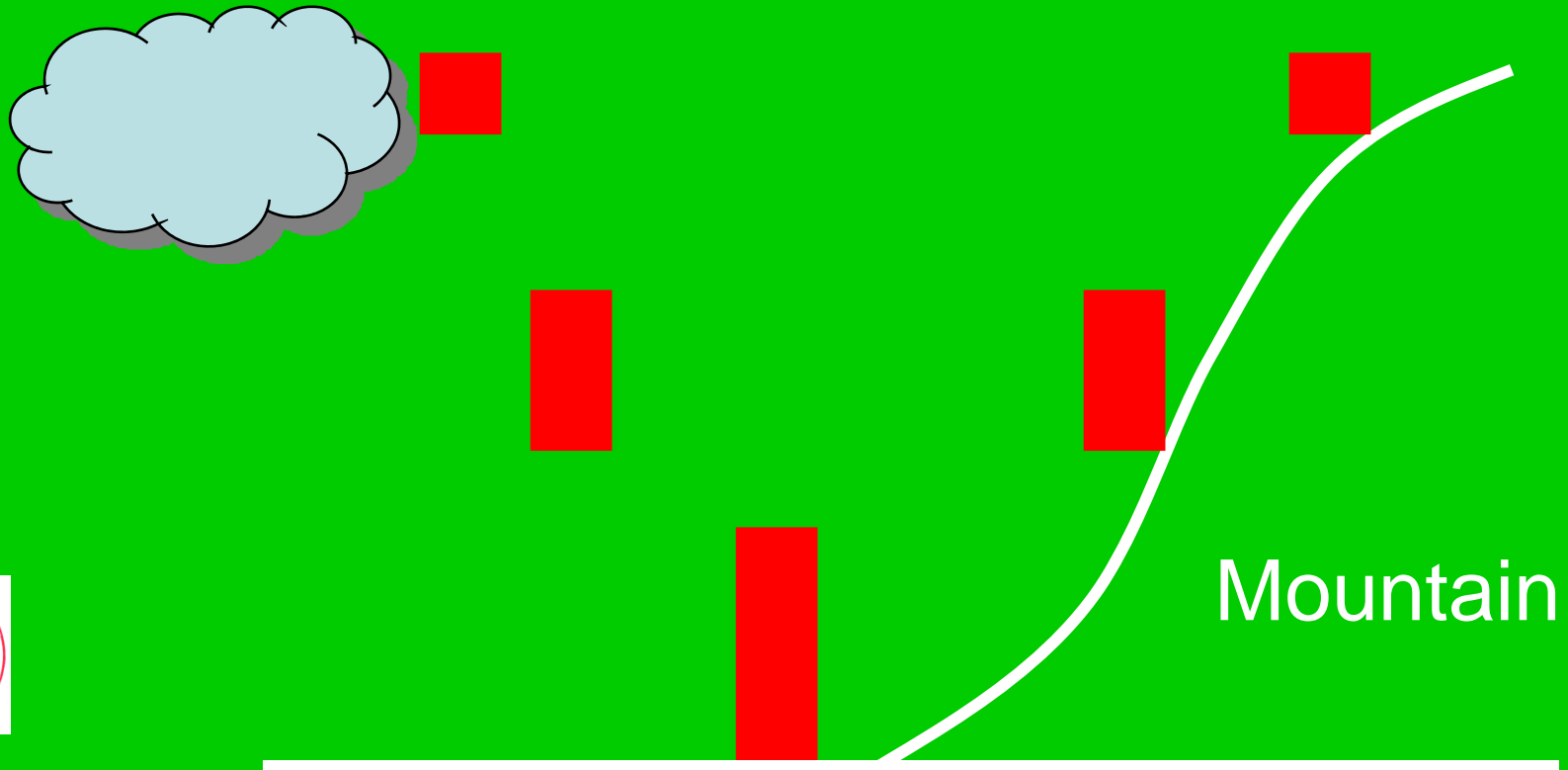
# Clouds can increase the surface temperature at night.



© 2005, rev. 2009,

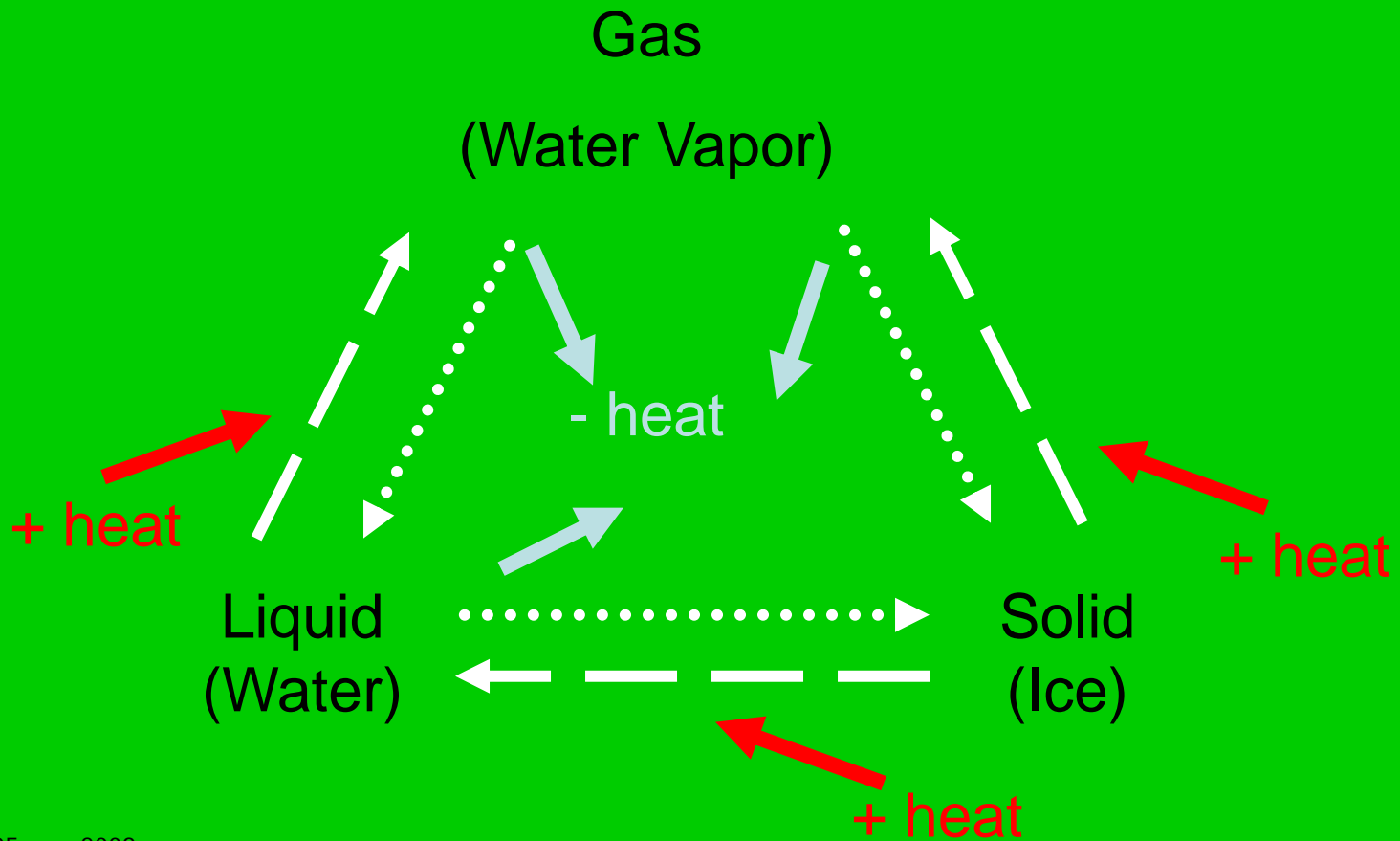
G.K Lee & S. Lee

# Air temperature decreases as altitude increases.

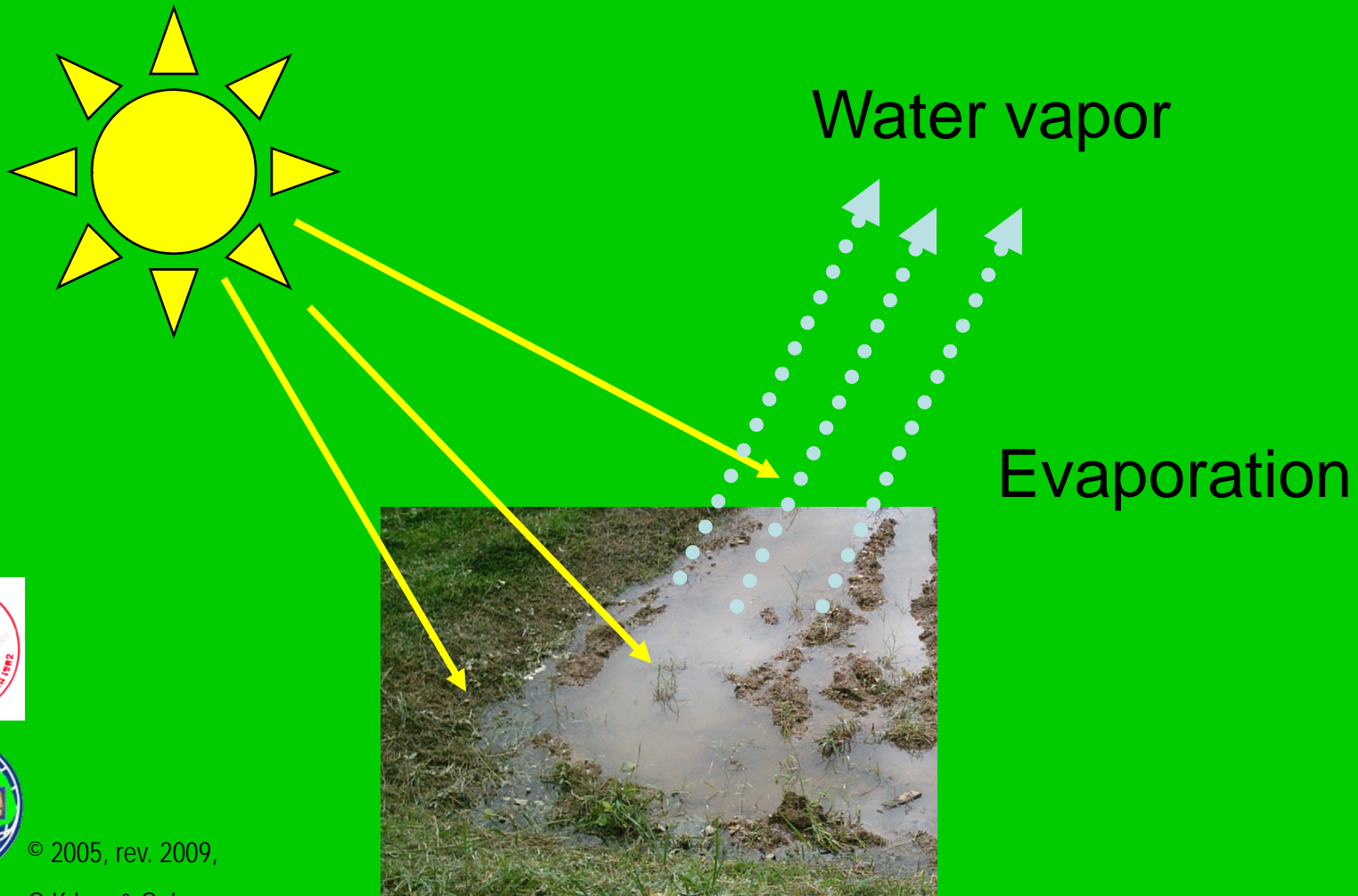




# Temperature causes water to change forms.



# Water vapor is made when water is heated at the Earth's surface.



# Clouds form when water vapor cools high in the sky.

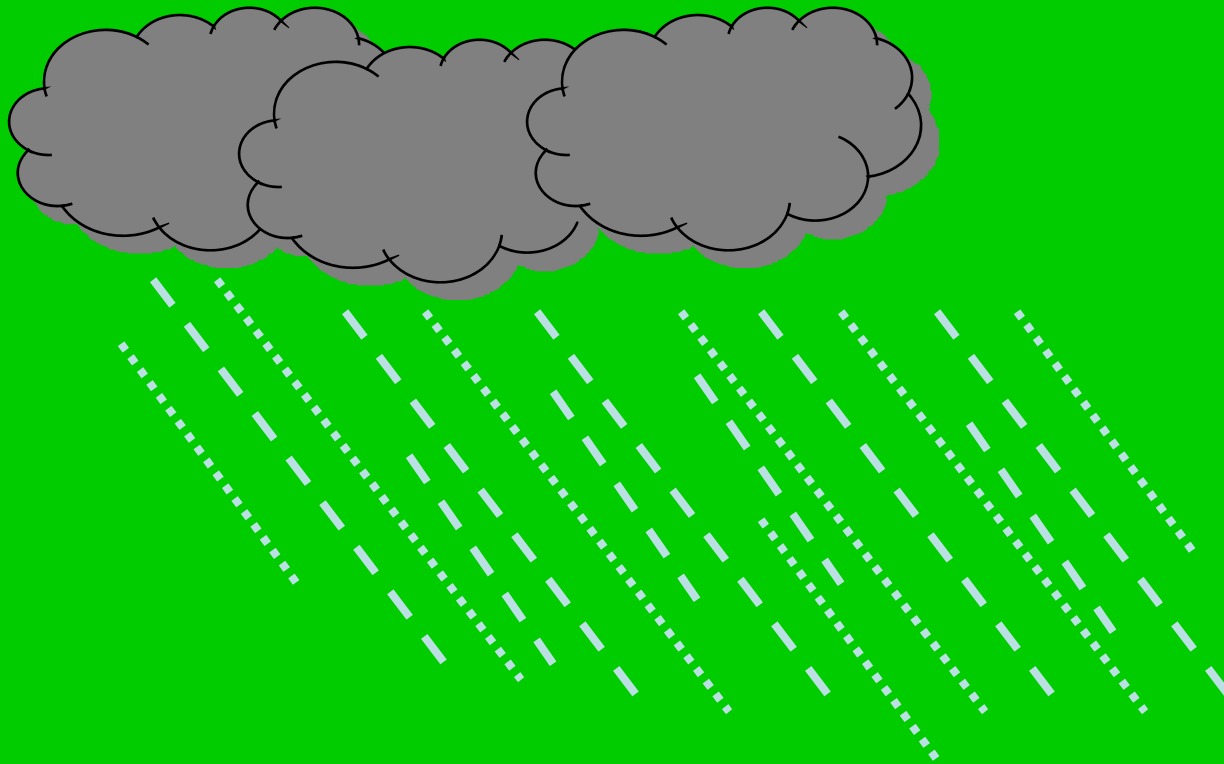


© 2005, rev. 2009,

G.K Lee & S. Lee



# Rain comes when the clouds are cooled.



© 2005, rev. 2009,

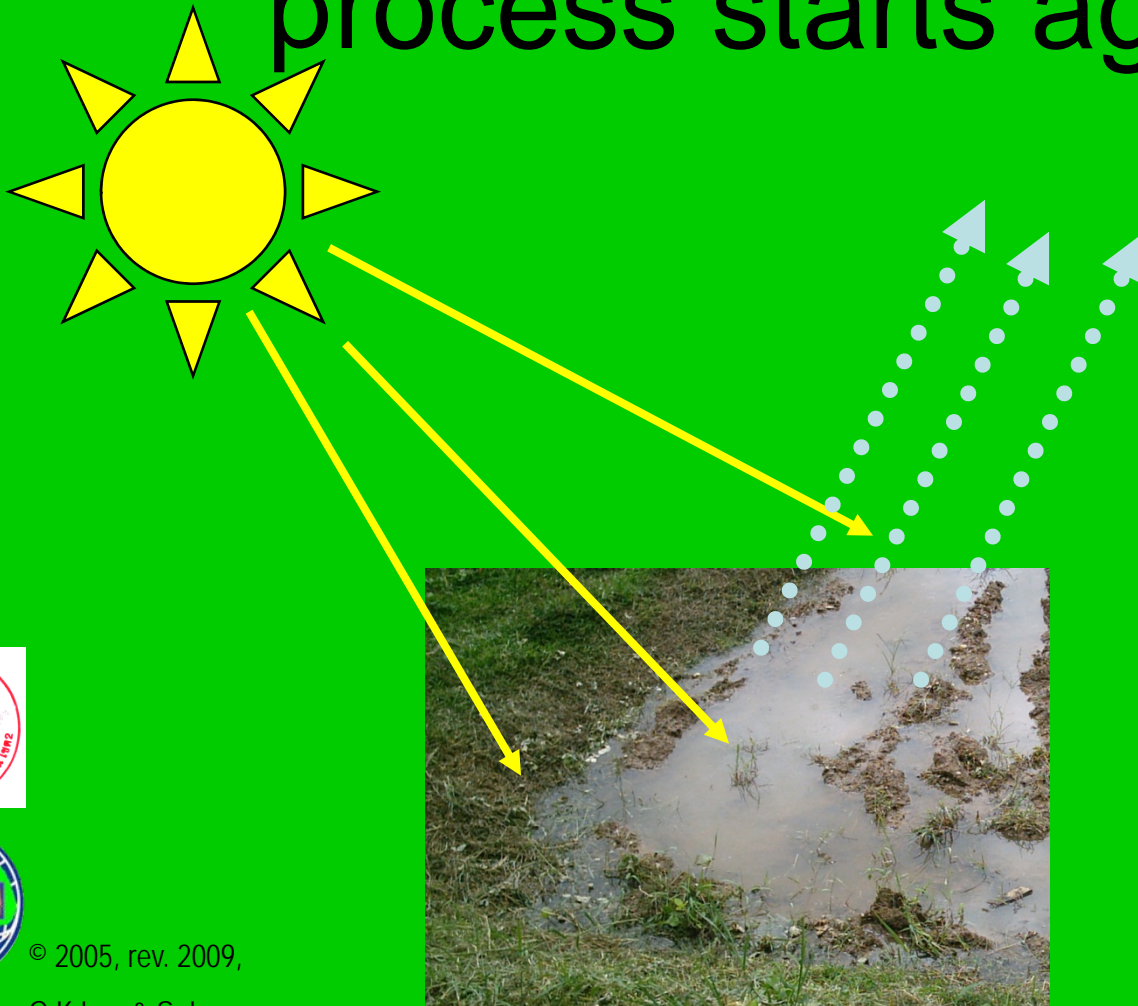
G.K Lee & S. Lee

# Rain puts water into rivers and streams.



© 2005, rev. 2009,  
G.K Lee & S. Lee

# The sun heats water on the Earth's surface, and the process starts again.

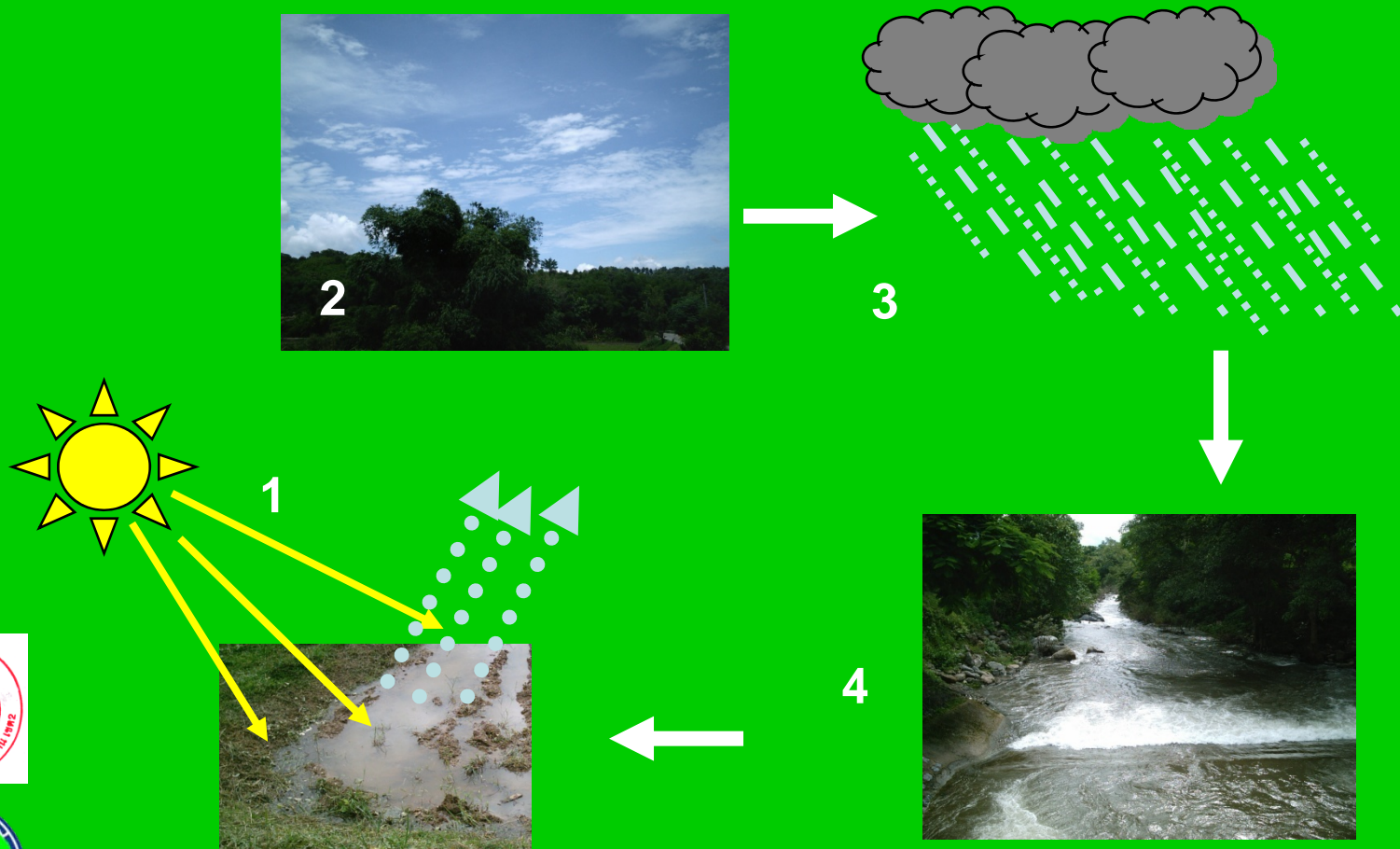


© 2005, rev. 2009,

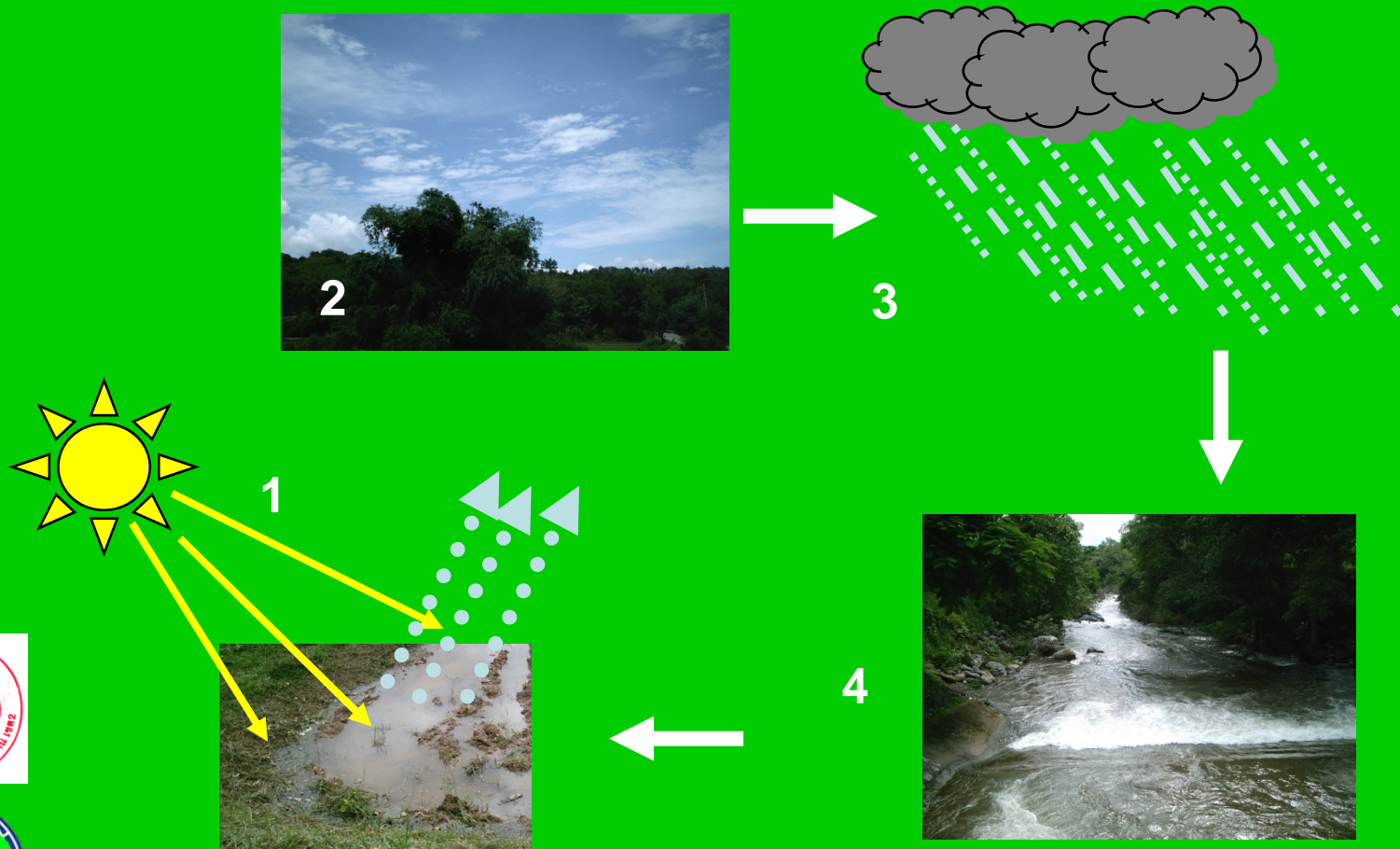
G.K Lee & S. Lee



# A process that happens again and again is called a cycle.



# Since this cycle is about water, it is called the Water Cycle.

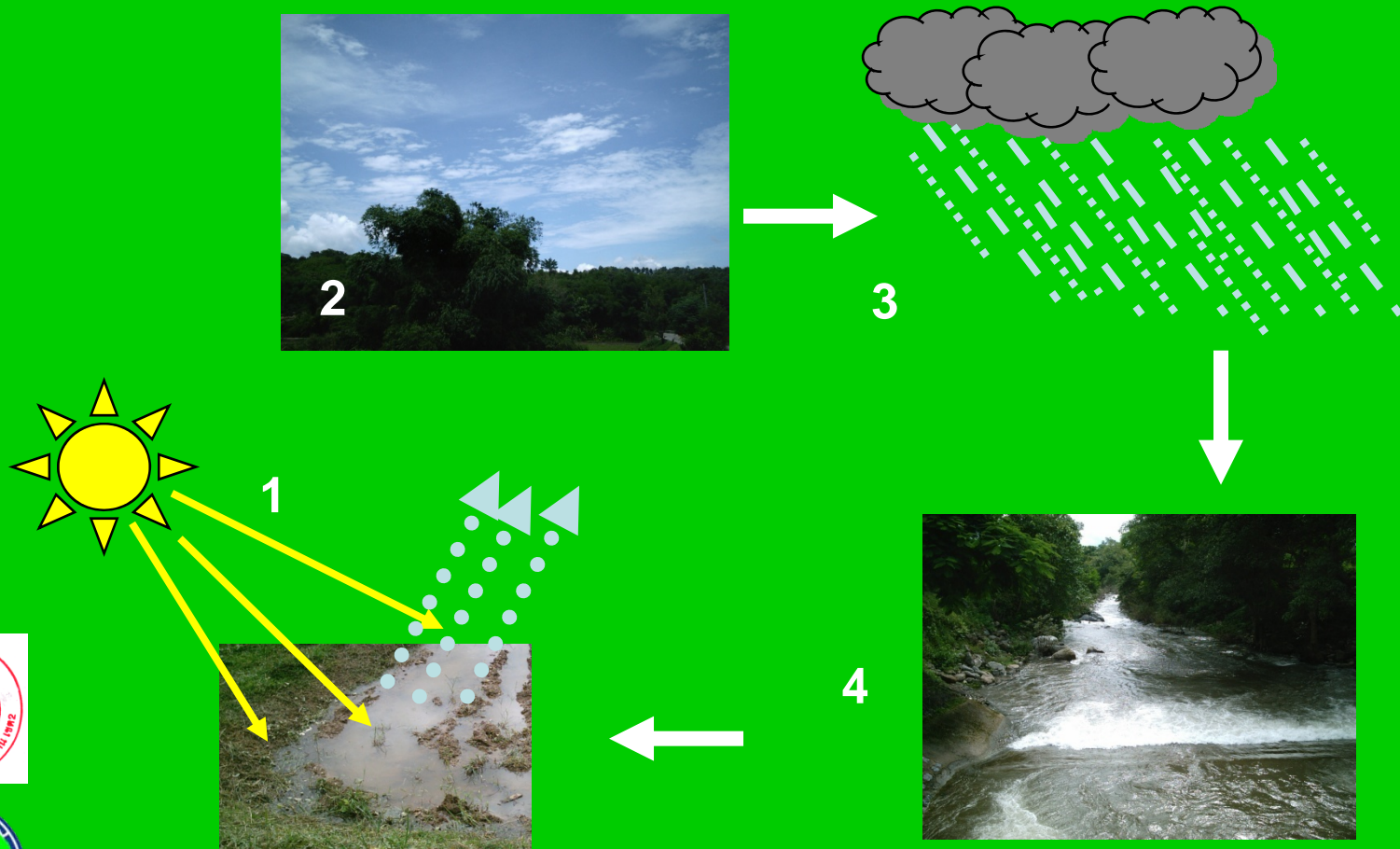


© 2005, rev. 2009,

G.K Lee & S. Lee



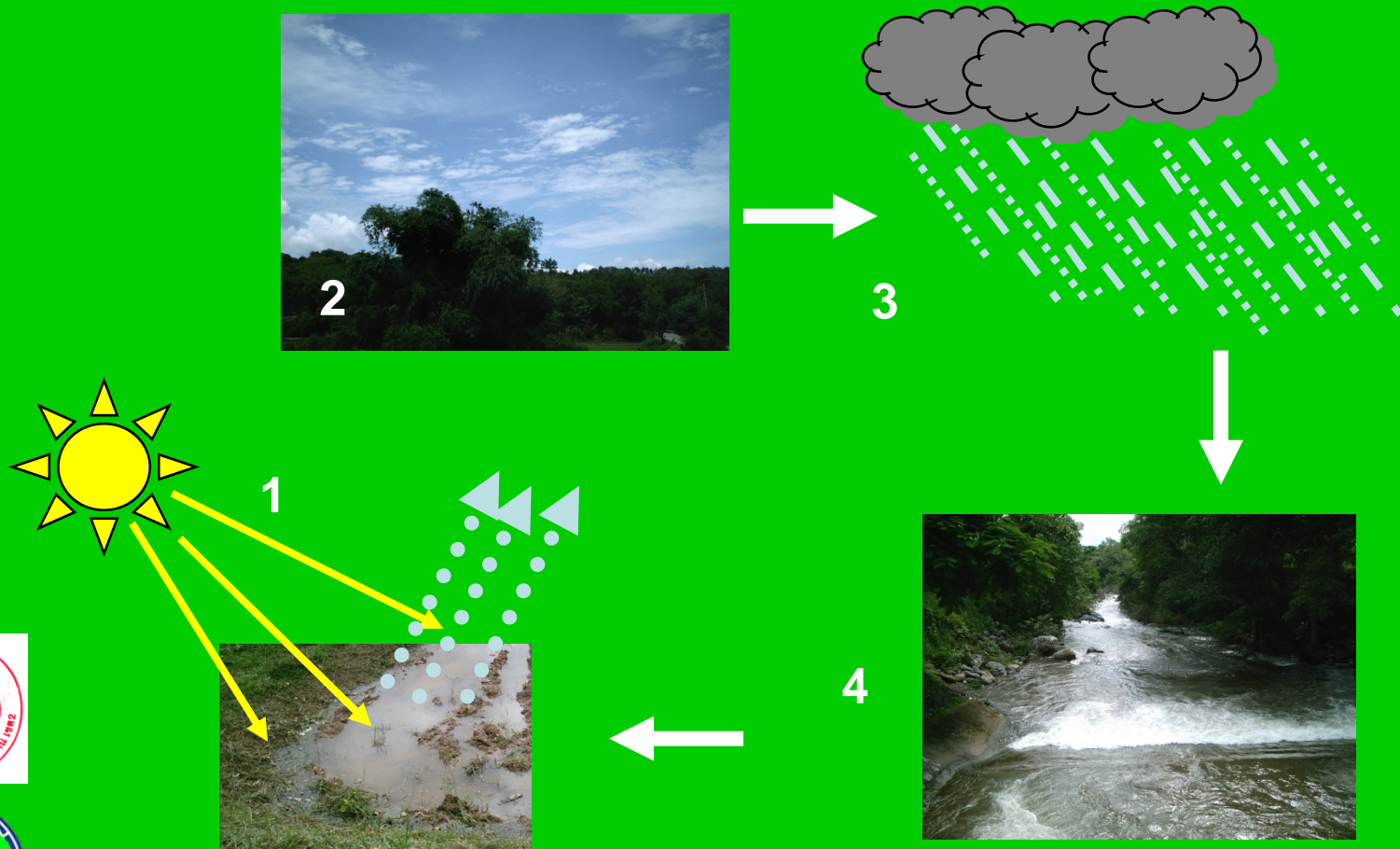
# Heat is an important part of the Water Cycle.



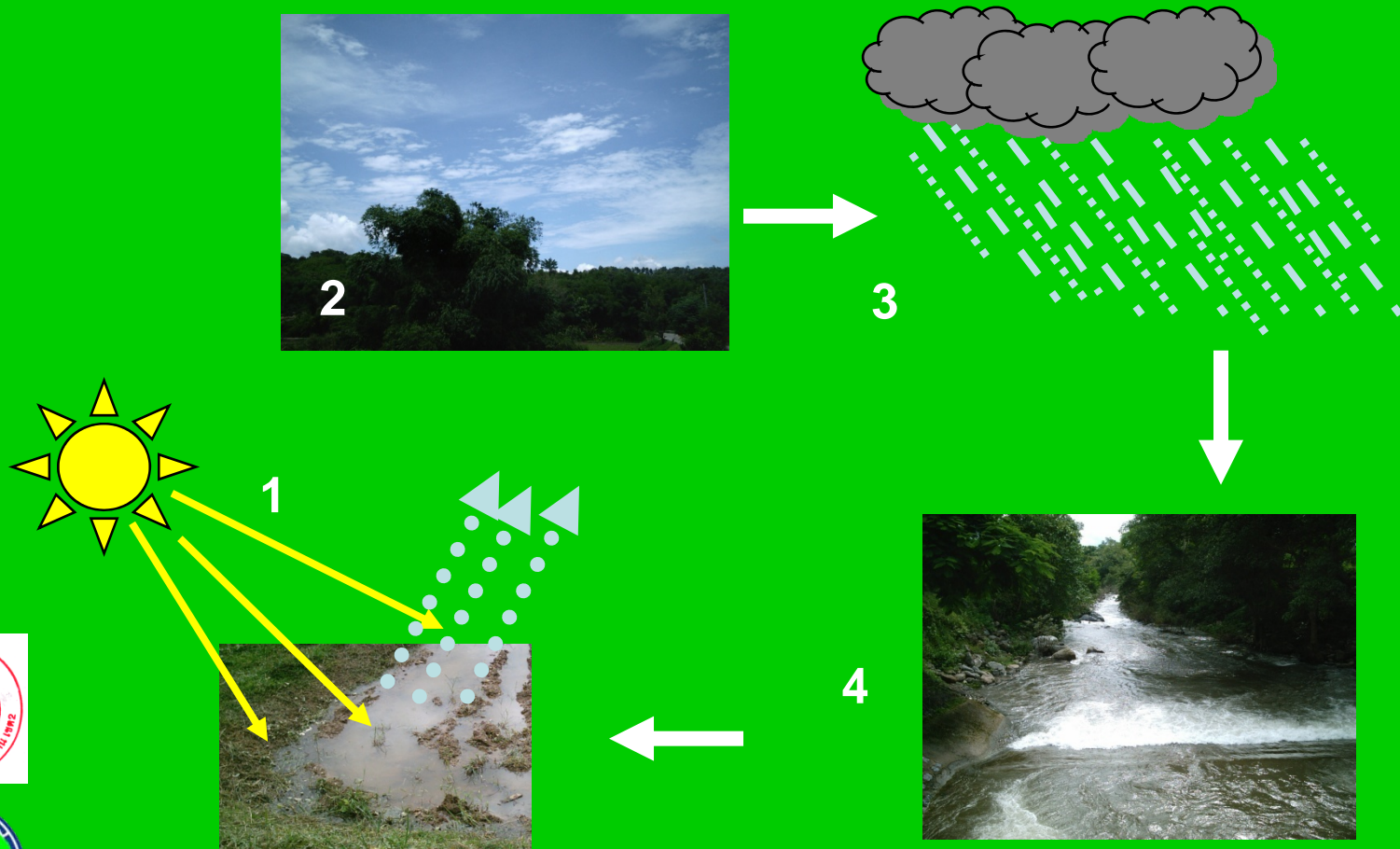
© 2005, rev. 2009,

G.K Lee & S. Lee

# The Water Cycle is an important part of weather.



# So it is important to measure heat when studying the weather.





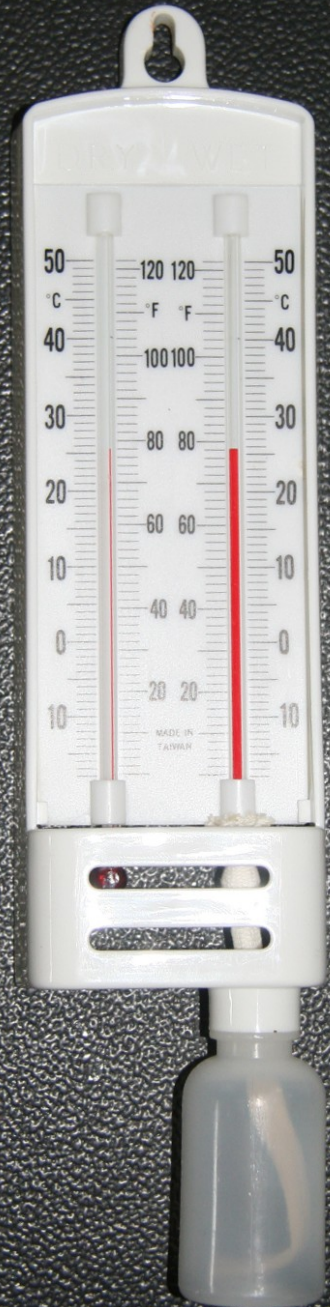
# Do you know about temperature and heat?

Try to answer  
these questions.



© 2005, rev. 2009,

G.K Lee & S. Lee



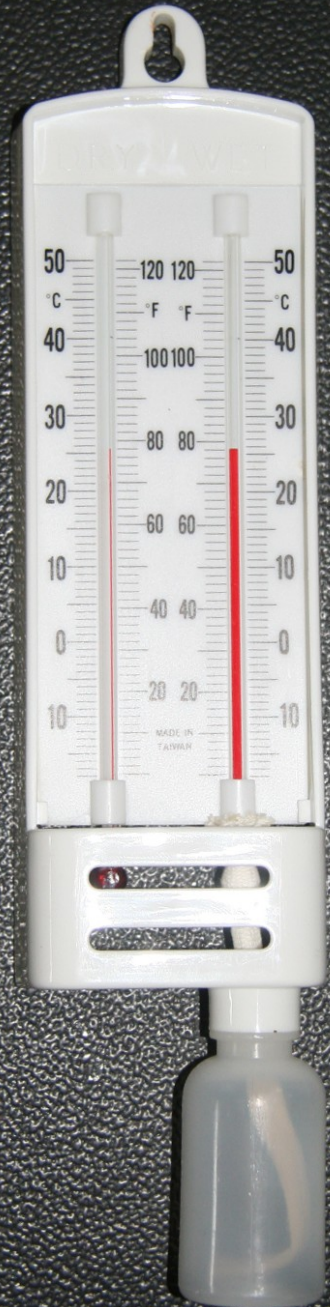


# What is temperature?



© 2005, rev. 2009,

G.K Lee & S. Lee

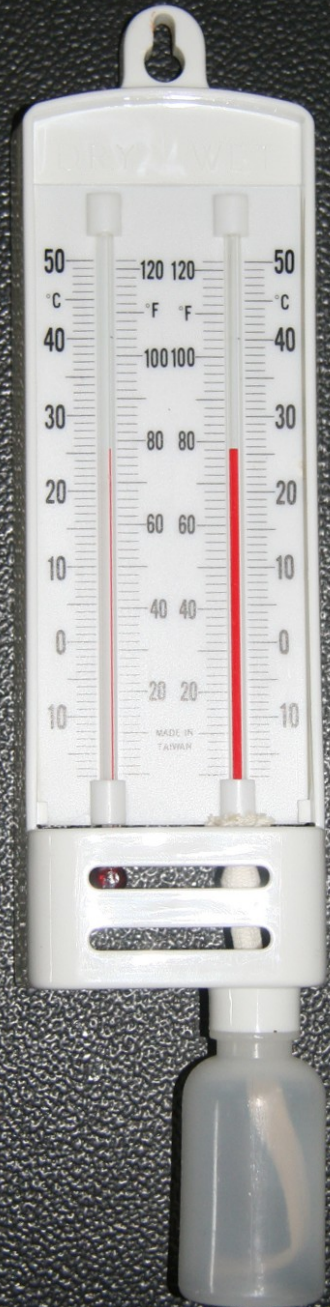


# Temperature is a measure of the amount of heat.



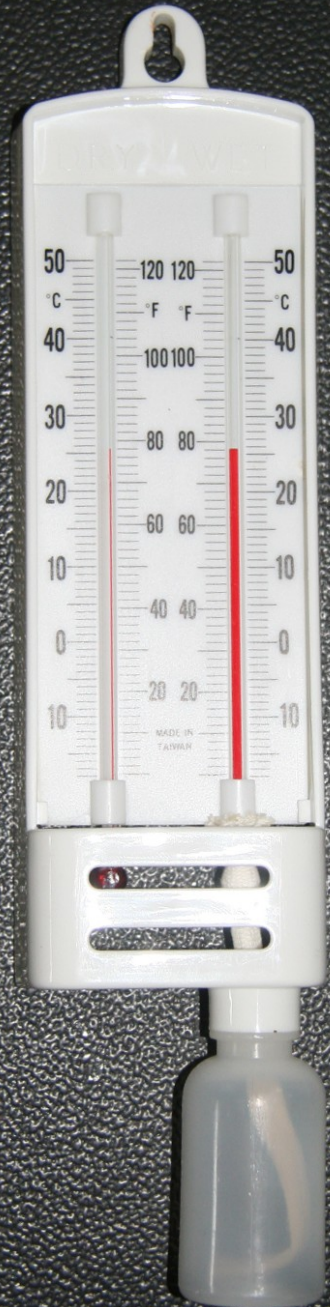
© 2005, rev. 2009,

G.K Lee & S. Lee





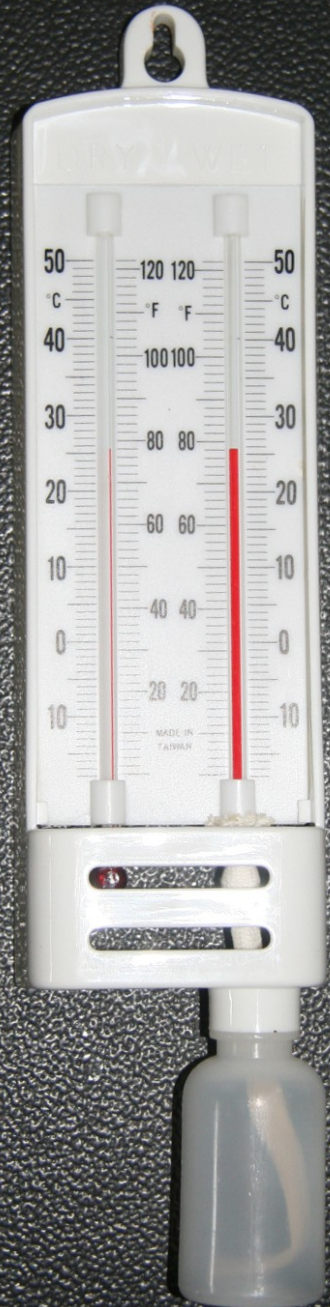
# What can you use to measure heat?



© 2005, rev. 2009,

G.K Lee & S. Lee

A  
thermometer  
is the tool we  
use to  
measure heat.



© 2005, rev. 2009,

G.K Lee & S. Lee

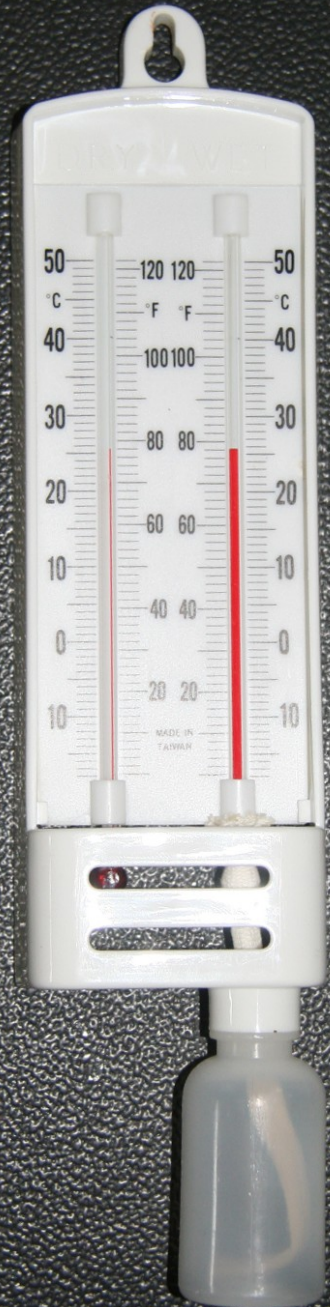


# Where should you put the thermometer?



© 2005, rev. 2009,

G.K Lee & S. Lee



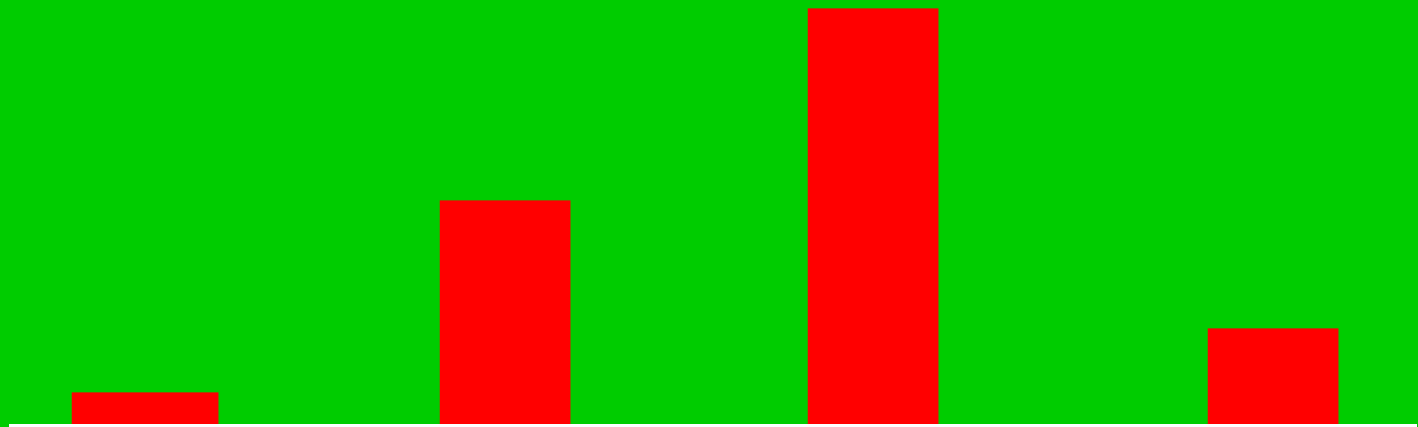
The  
thermometer  
must be in  
the shade. It  
should be  
1.5 m above  
the ground.



© 2005, rev. 2009,

G.K Lee & S. Lee

# When should you measure the temperature each day?



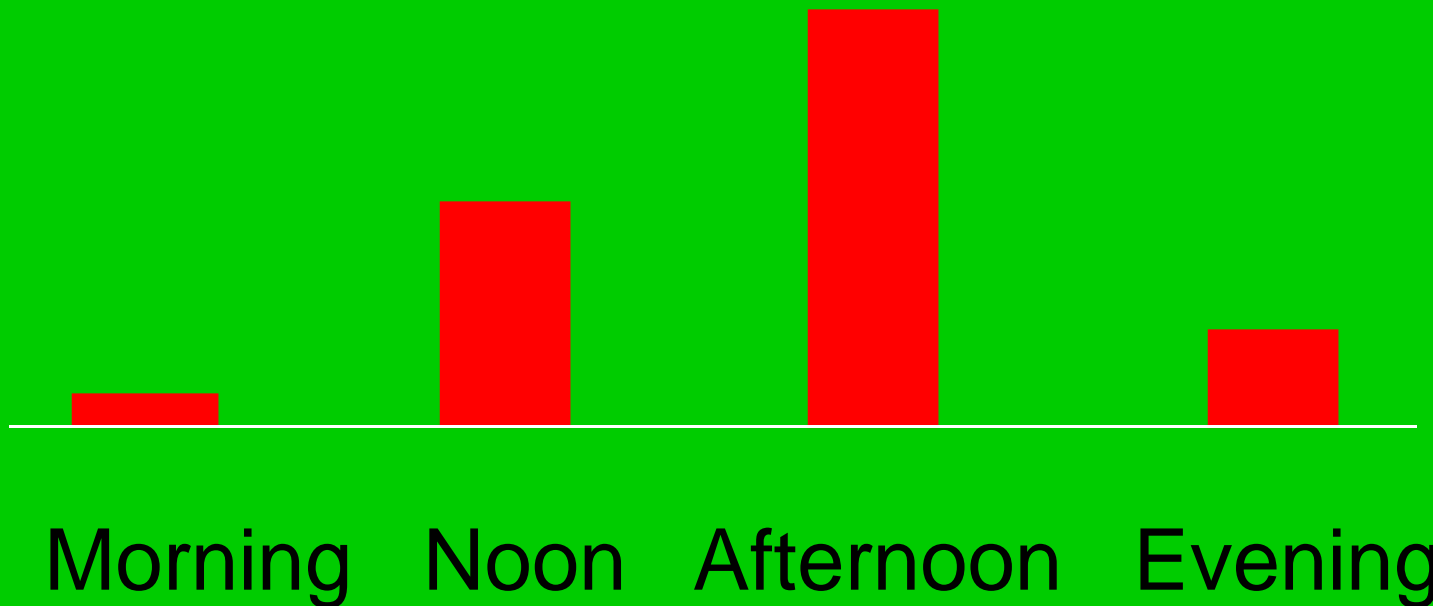
Morning Noon Afternoon Evening



© 2005, rev. 2009,

G.K Lee & S. Lee

To get the lowest and the highest daily temperature, you should take measurements in the early morning and in the middle of the afternoon.



© 2005, rev. 2009,

G.K Lee & S. Lee



Now you  
know how to  
measure  
temperature.  
You are ready  
to begin  
making basic  
weather  
observations.



© 2005, rev. 2009,

G.K Lee & S. Lee

# 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



© 2005, rev. 2009,

G.K Lee & S. Lee



**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**



© 2005, rev. 2009,

G.K Lee & S. Lee

# REEEPP

## Rural Environmental Education Enhancement Pilot Program



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..



© 2005, rev. 2009,

G.K Lee & S. Lee



# The End



© 2005, rev. 2009,

G.K Lee & S. Lee