

Carolina Biological Supply Company

Go APES! Carolina's™ AP® Environmental Science Series

David Heller
Product Developer

NSTA 2009
New Orleans, LA

Questions to Focus Session

- What is your APES knowledge level? Beginner, intermediate, or expert?
- Do you meet the needs of your students through laboratory and field investigations?
- What topics interest you most in AP® Environmental Science?

Objectives

- To introduce Carolina's newly revised and improved line of APES lab kits
- To demonstrate the wide variety of APES topics offered for laboratory investigation
- To use materials and procedures from 5 different Carolina™ AP® Environmental Science Kits

Carolina's AP® Environmental Science Kits

Newly Revised and Improved!

- Carolina™ Exploring Biodiversity Kit
- Carolina™ Primary Consumer Energy Flow Kit
- Carolina™ Population Growth in *Lemna minor* Kit
- Carolina™ Exploring Air Pollution Generated by Fossil Fuel Combustion Kit
- Carolina™ Wastewater Treatment Kit
- The Coriolis Effect and Atmospheric Circulation Kit
- Carolina™ Acid Deposition Kit
- Carolina™ Soil Formation and Properties Kit
- Carolina™ Testing Soil Productivity Kit
- Carolina™ Water Quality of Natural Waters Kit

Jigsaw Activities

Group A:

Exploring the Quality of Natural Waters

Group B:

Soil Productivity

Group C:

Soil Formation and Properties

Group D:

Acid Deposition

Group E:

Coriolis Effect and Atmospheric Circulation



Safety

- **Most procedures suggest the use of safety glasses, aprons, and gloves**
 - Acids, stains in use
- **Disposal**
 - Follow instructions in handout for proper disposal procedure for your activity



Reporting Out: Attendee Ideas

- APES topics covered
- How materials met your needs
- How you would use them in your own classroom
- Value to students
- Need for classroom

Group A: Turbidity Testing

Activity Objective

To use the Carolina Turbidity Tube to measure the relative turbidity levels of 2 water samples.

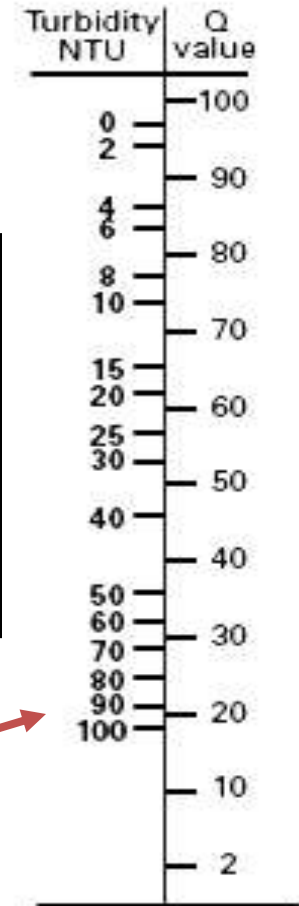
Adapted from the Carolina™ Water Quality of Natural Waters Kit, Cat. No. 18-1020



Group A: Turbidity Testing

1. Calculate average NTU, or nephelometric turbidity unit.

Sample	Test #	NTU	Avg.
A	1		
	2		
	3		



2. Use the chart to determine turbidity Q value for water sample.
3. Calculate a T value = $(Q \text{ value})(\text{Weighting Factor})$

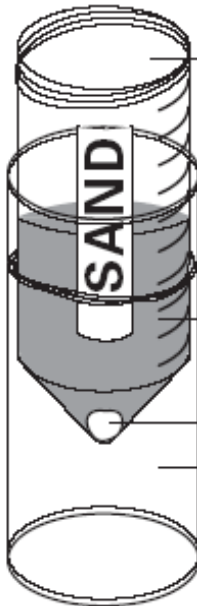
Group B: Ion Exchange Capacity

Activity Objective

To compare the relative abilities of the soil samples to absorb ions

Adapted from the Carolina™ Testing Soil Productivity Kit, Cat. No. 18-1049

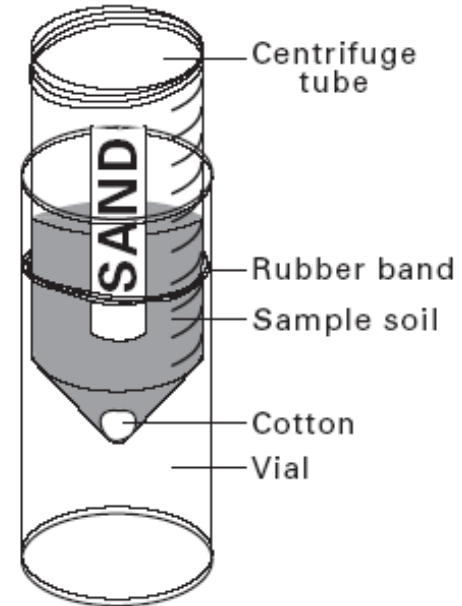
SAND



SAND/CLAY



SAND/HUMUS



Group B: Ion Exchange Capacity

1. Record volume of water added at point of visible color in filtrate.
2. Record intensity of color.
3. Use key to determine IEC.

	Crystal Violet	
	Volume of Water Added	Color Intensity of Water (Light, Medium, or Dark)
Sand		



Ion Exchange Capacity Key

Low	Medium	High
1–20 mL of water and dark color	1–10 mL of water and light color	15–20 mL of water and medium color
1–10 mL of water and medium color	10–15 mL of water and medium color	10–20 mL of water and light color

Group C: Mechanical Weathering

Activity Objective

To examine and then calculate the rate of weathering for different rock types

Adapted from Carolina™
Soil Formation and
Properties Kit,
Cat. No. 18-1048

Effects of Mechanical Weathering on 3 Rock Types

Rock Type	Weight				
	Initial	3 min	6 min	9 min	12 min
Granite					
Basalt					
Marble					

Which rock type seems most affected by mechanical weathering?

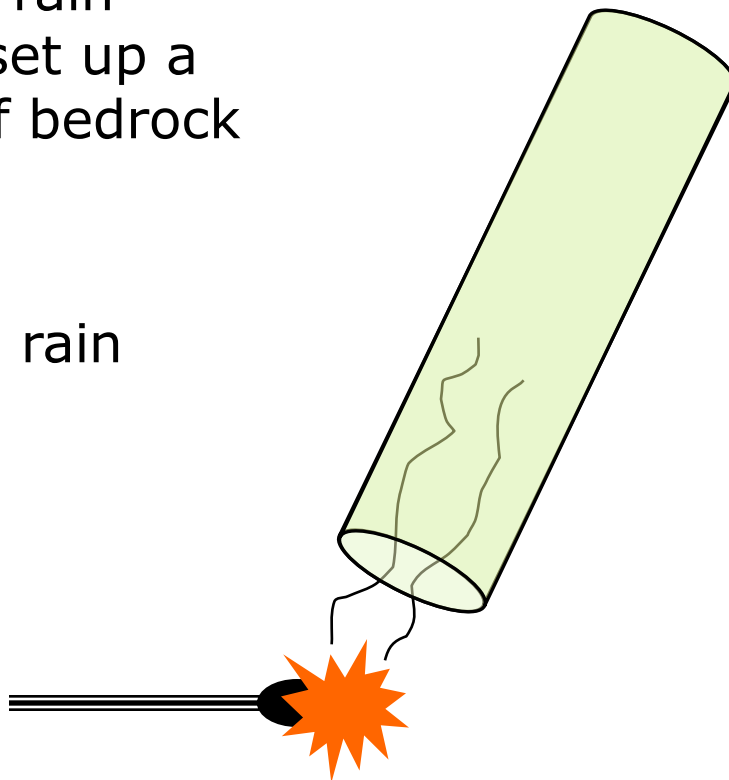
Group D: Investigating Acid Rain

Activity Objective

To determine the pH of unpolluted and acid rain samples, and then set up a test of the effects of bedrock on acid rain.

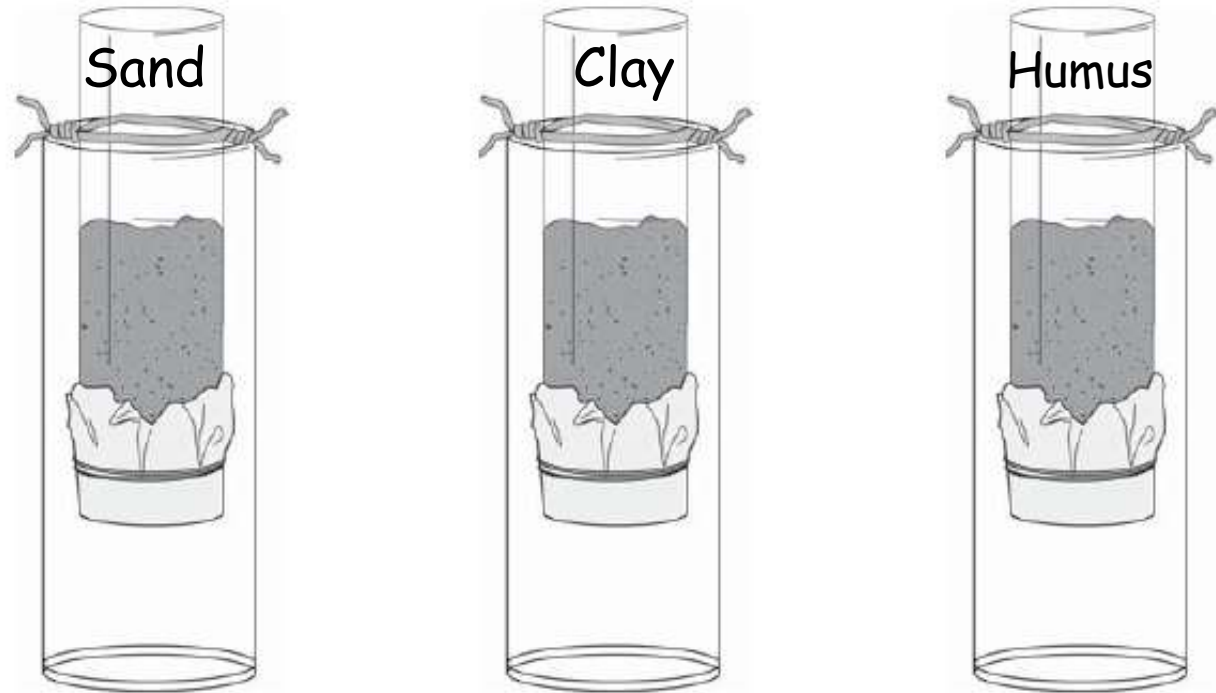
1. pH of unpolluted rain
2. pH of acid rain

Adapted from
Carolina™ Acid
Deposition Kit,
Cat. No. 18-1060



Group D: Investigating Acid Rain

3. Effects of bedrock on acid rain



- Add acid rain solution to each and let sit overnight.
- Measure the pH of the acid rain drained from each column.

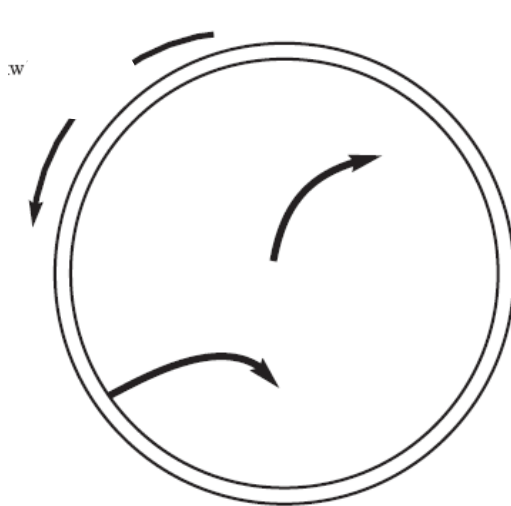
Group E: Observing Earth's Rotation and Atmospheric Circulation

Activity Objective

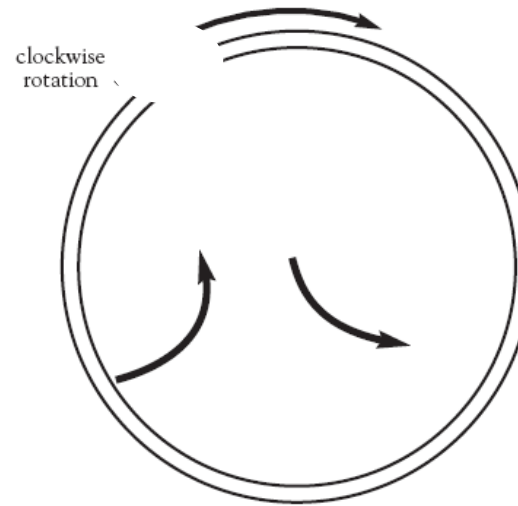
To develop an understanding of the Coriolis effect and its influence on global air circulation

Adapted from The Coriolis Effect and Atmospheric Circulation Kit, Cat. No. 18-1105

Rotation in 2 Dimensions



Counterclockwise



Clockwise

Group E: Observing Earth's Rotation and Atmospheric Circulation

Rotation in 3 Dimensions

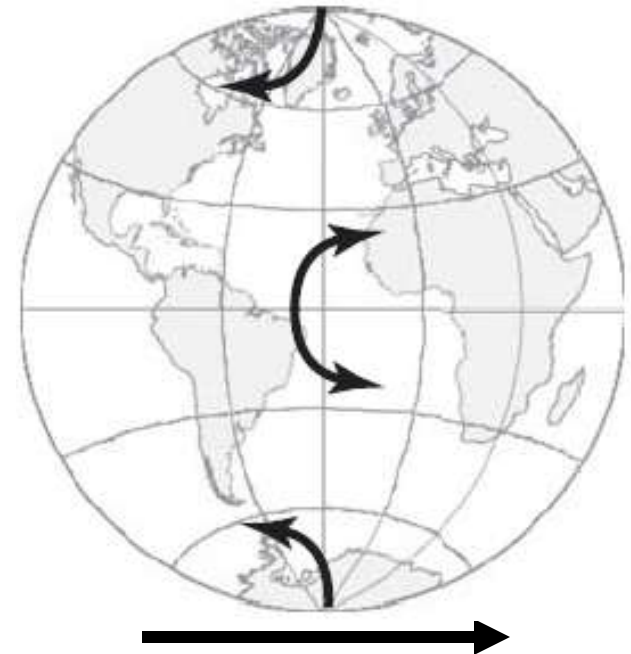
Direction of Air Masses

North Pole to the equator →

Equator to the North Pole →

Equator to the South Pole →

South Pole to the equator →



ROTATION

How might the Coriolis effect influence global air circulation?

What Kits Have You Seen Today?

- The Coriolis Effect and Atmospheric Circulation Kit, Cat. No. 18-1105
- Carolina™ Acid Deposition Kit, Cat. No. 18-1060
- Carolina™ Soil Formation and Properties Kit, Cat. No. 18-1048
- Carolina™ Testing Soil Productivity Kit, Cat. No. 18-1049
- Carolina™ Water Quality of Natural Waters Kit, Cat. No. 18-1020



Consider These Quality APES Kits



- Carolina™ Exploring Biodiversity Kit, Cat. No. 18-1051
- Carolina™ Primary Consumer Energy Flow Kit, Cat. No. 18-1102
- Carolina™ Population Growth in *Lemna minor* Kit, Cat. No. 18-1030
- Carolina™ Exploring Air Pollution Generated by Fossil Fuel Combustion Kit, Cat. No. 18-1000
- Carolina™ Wastewater Treatment Kit, Cat. No. 18-1015

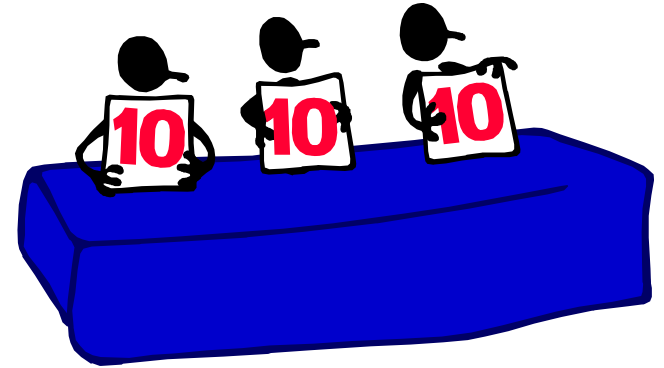
Summary

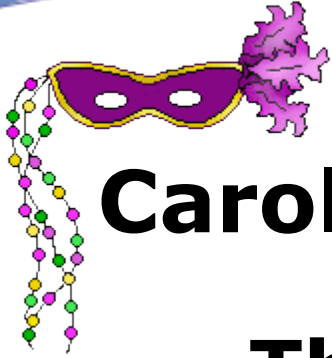
- **Carolina's kits address a wide variety of AP® Environmental Science topics.**
- **Newly revised kits provide an inquiry-based learning method.**
- **Materials are high quality and easy to use.**



Evaluations: Share Your Thoughts!

- Scale = 1 to 10
- **10 = Outstanding**
- **9 = Above Average**
- **8, 7 = Average**
- **6, 5, 4 = Below Average**
- **3, 2, 1 = Well Below Average**
- **Please provide comments!**





Carolina Biological Supply Company

**Thank you for investing your
time in our training program.**

**For all of your classroom
needs, check out our website,
www.carolina.com.**

**Enjoy the rest of the
conference!**