Carolina Biological Supply Company

Keep Calm and Chemistry On: Successful Lab Activities for the New Chemistry Teacher

#carolinaNSTA

CAROLINA®
www.carolina.com

Workshop Overview

- View and learn how to perform engaging demos
- Discuss phenomena and students connecting to the lesson
- Learn how to repurpose demos as 3D-instruction phenomena
- Showcase Carolina's chemistry kit offerings:
  - Carolina ChemKits®
  - Carolina Chemonstrations®
  - Carolina Digital Resources

Building Toward 3-Dimensional Learning

Scientific and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• Developing and using models • Planning and carrying out investigations • Analyzing and interpreting data • Constructing explanations	**PS 1:** Matter and its interactions **PS 3:** Energy	• Cause and effect: Mechanism and explanation • Scale, proportion, and quantity • Systems and system models • Energy and matter: Flows, cycles, and conservation[1]

1. NGSS Lead States, *Next Generation Science Standards: For States, By States* (Washington, DC: The National Academies Press, 2013), retrieved from www.nextgenscience.org or ngss.nsta.org.

Workshop Safety
Featured Digital Content

Carolina General Safety Video

CAROLINA®
www.carolina.com

Whoosh Bottle
Phenomenon or Phenomenal?

Whoosh bottle video webinar segment 4:41–6:22

CAROLINA®
www.carolina.com

Aspects of Phenomena

1. Real world
2. Relevant
3. Potentially puzzling
4. Specific (has context)
5. Meaningful
6. Instructionally productive

CAROLINA®
www.carolina.com

Whoosh Bottle Video Segment 6:18–8:03

Aspects of Phenomena

1. **Real world**
   Connects to an event or experience
2. **Relevant**
   The demo itself is relevant or can be made relevant to the student
3. **Potentially puzzling**
   Doesn't give itself away; students have something to figure out
4. **Specific (has context)**
   More than student entertainment
5. **Meaningful**
   Students will see value in figuring out the phenomenon
6. **Instructionally productive**
   Builds toward performance expectations

Workshop Reminders

- PowerPoint® presentation for this workshop available at www.carolina.com
- Chemistry webinar available at www.carolina.com; type "webinar" in the search bar

Highly Visual Chemistry Phenomena for 3D Instruction - Web

44:30

Presenters: Matt Bostic and Chris Petersen, Carolina Product Developers
Grades: 6–12

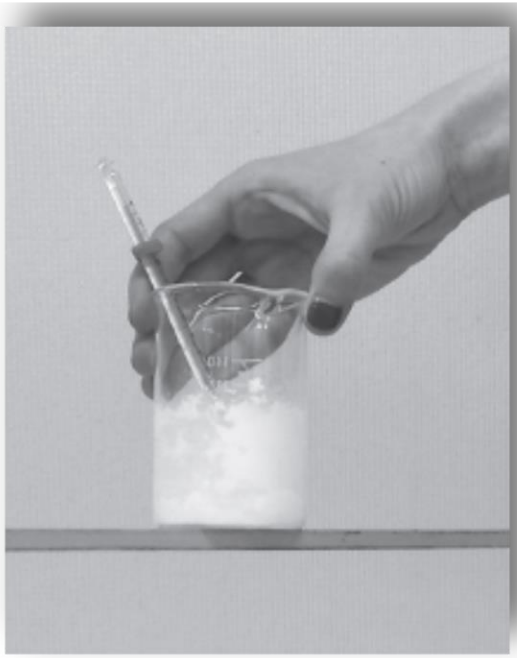
What are the aspects of good phenomena? How can you redesign classic, tried-and-true chemistry demos to support 3-dimensional learning? Find out in this webinar.

- Handout includes all demos and activities from the workshop, including Whoosh Bottle

Demo Guide Green Beaker
Carolina Chemistry in Progress

An extreme endothermic reaction

Solid barium hydroxide octahydrate and solid ammonium chloride



This reaction may reach a temperature as low as –30° C.

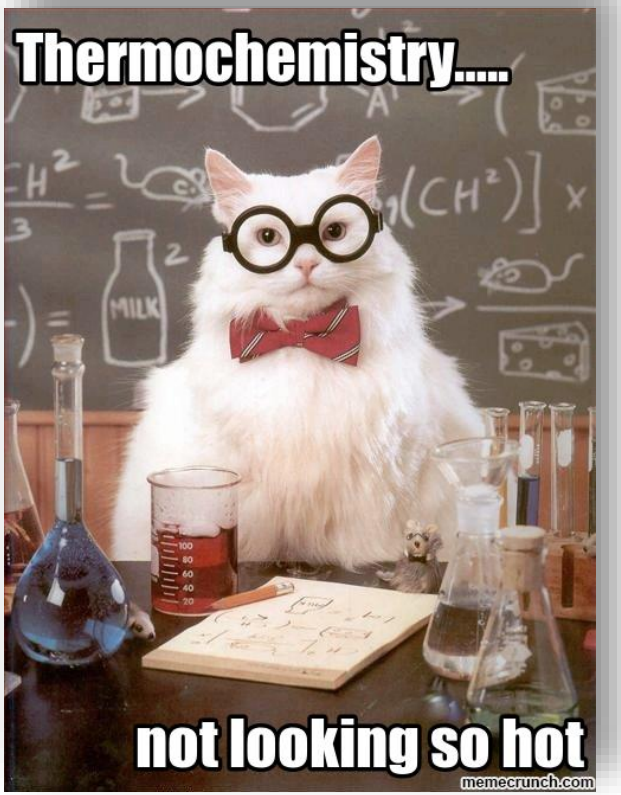
Featured Digital Content

- **Student guide copy master**
- **Fill-in answer sheets**
- **Editable assessment questions**
- **Whiteboard resources**

CAROLINA®
www.carolina.com

Demo: Frozen Beaker

An extreme endothermic reaction



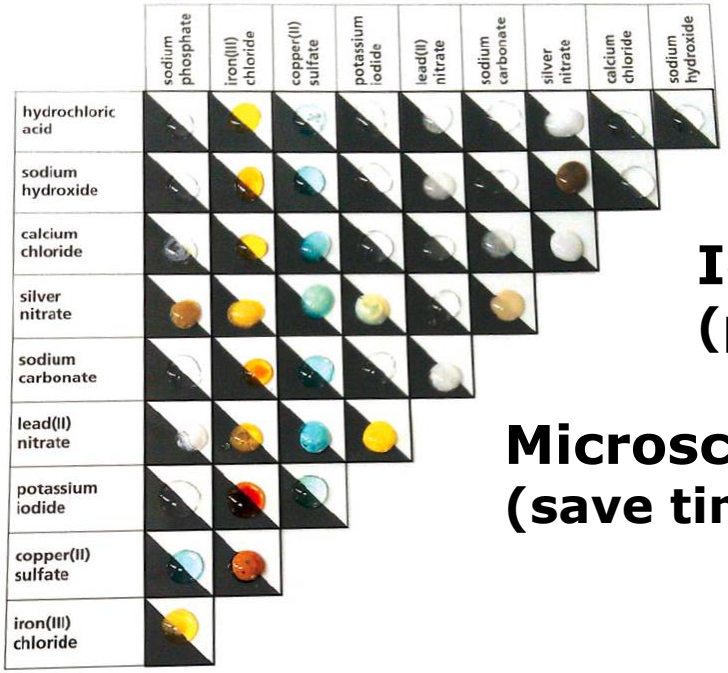
Curriculum connections:

- **Laws of thermodynamics**
- **Energy changes**
- **Endothermic vs. exothermic reactions**

Possible discussion questions:

- **What would be some practical real-world applications of an endothermic reaction?**
- **Could you measure the heat of reaction in this demo? If not, why?**
- **Are heat and temperature the same thing?**

Lab: Mystery Chemical Reactions



Explore scientific phenomena

Identify visible signs of reaction (precipitate, gas, and/or color change)

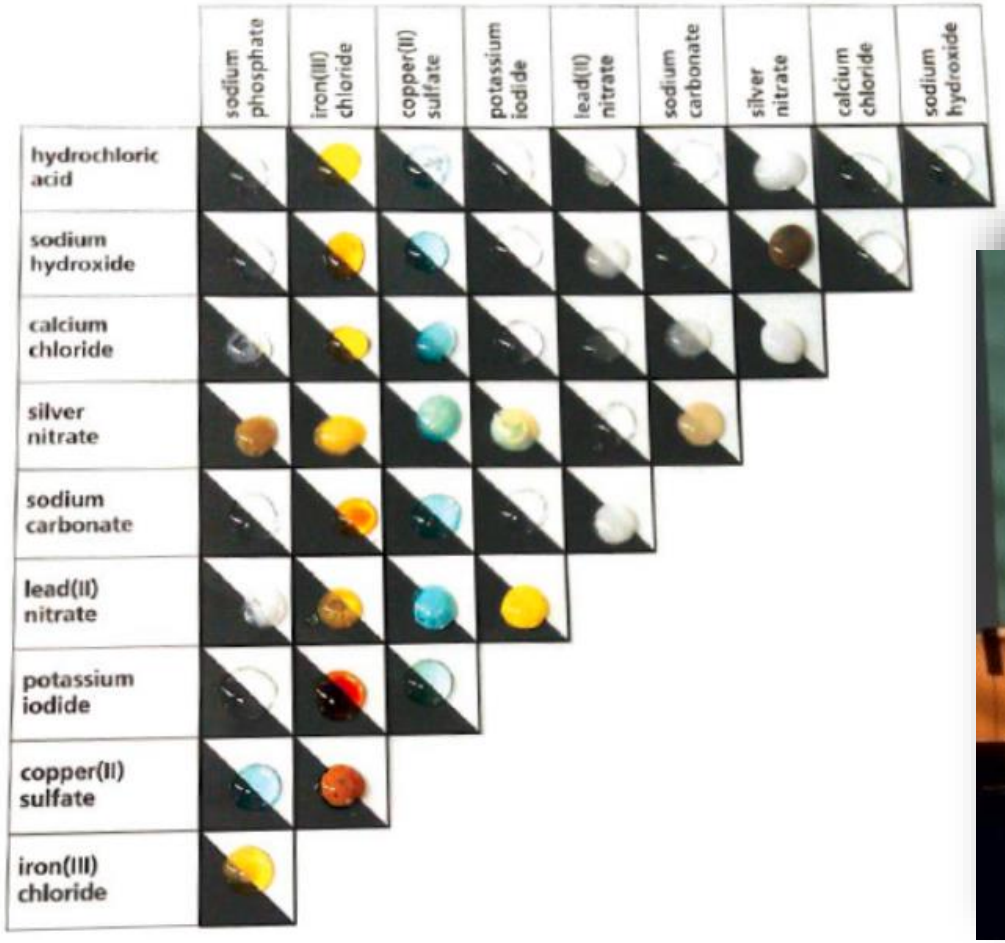
Microscale chemistry benefits (save time and money; reduce waste)

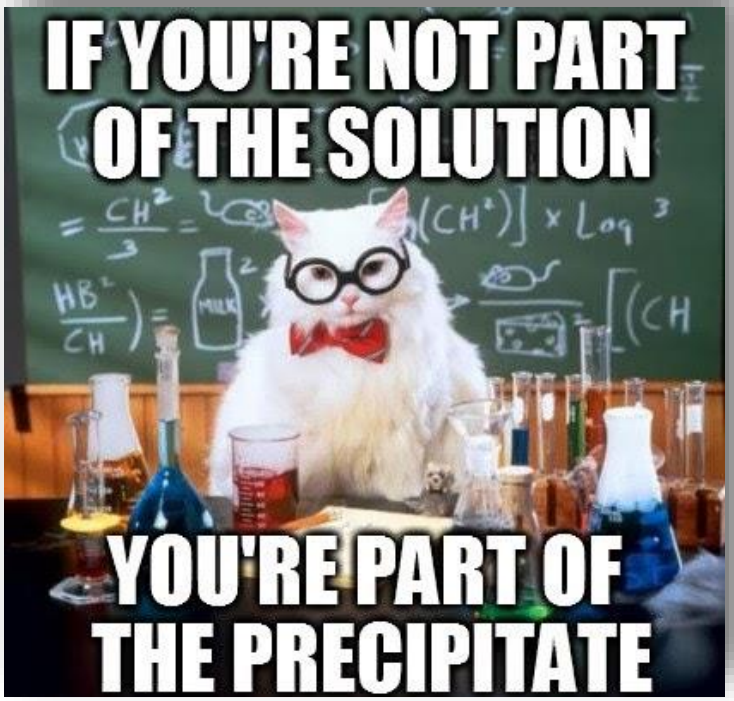
Featured Digital Content

- **Interactive lessons**

CAROLINA®
www.carolina.com

Lab: Mystery Chemical Reactions

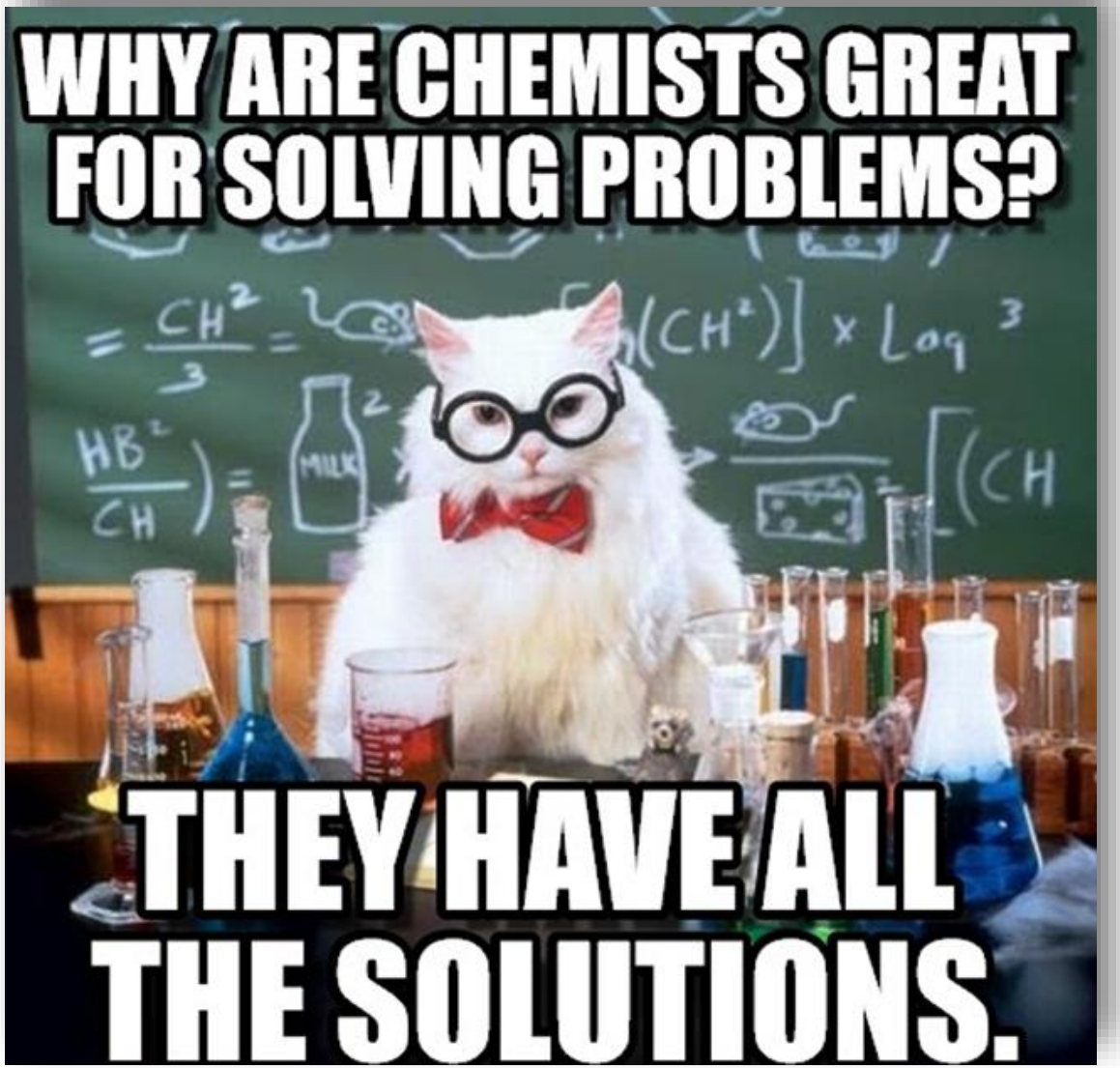




Lab: Balancing Chemical Equations

A tactile introduction to stoichiometry

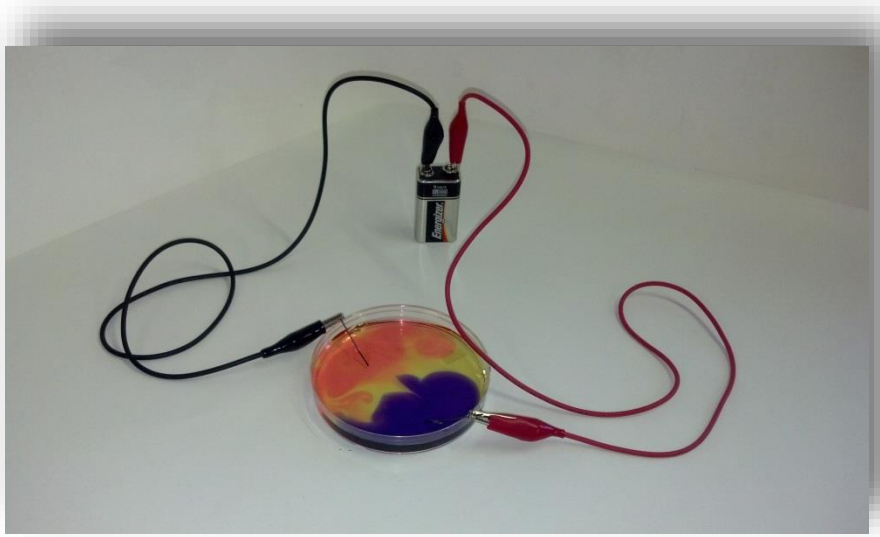
- **Understand the Law of Conservation of Mass**
- **Understand the difference between coefficients and subscripts in chemical equations**


WHY ARE CHEMISTS GREAT FOR SOLVING PROBLEMS?
THEY HAVE ALL THE SOLUTIONS.

Lab: Petri Dish Electrolysis

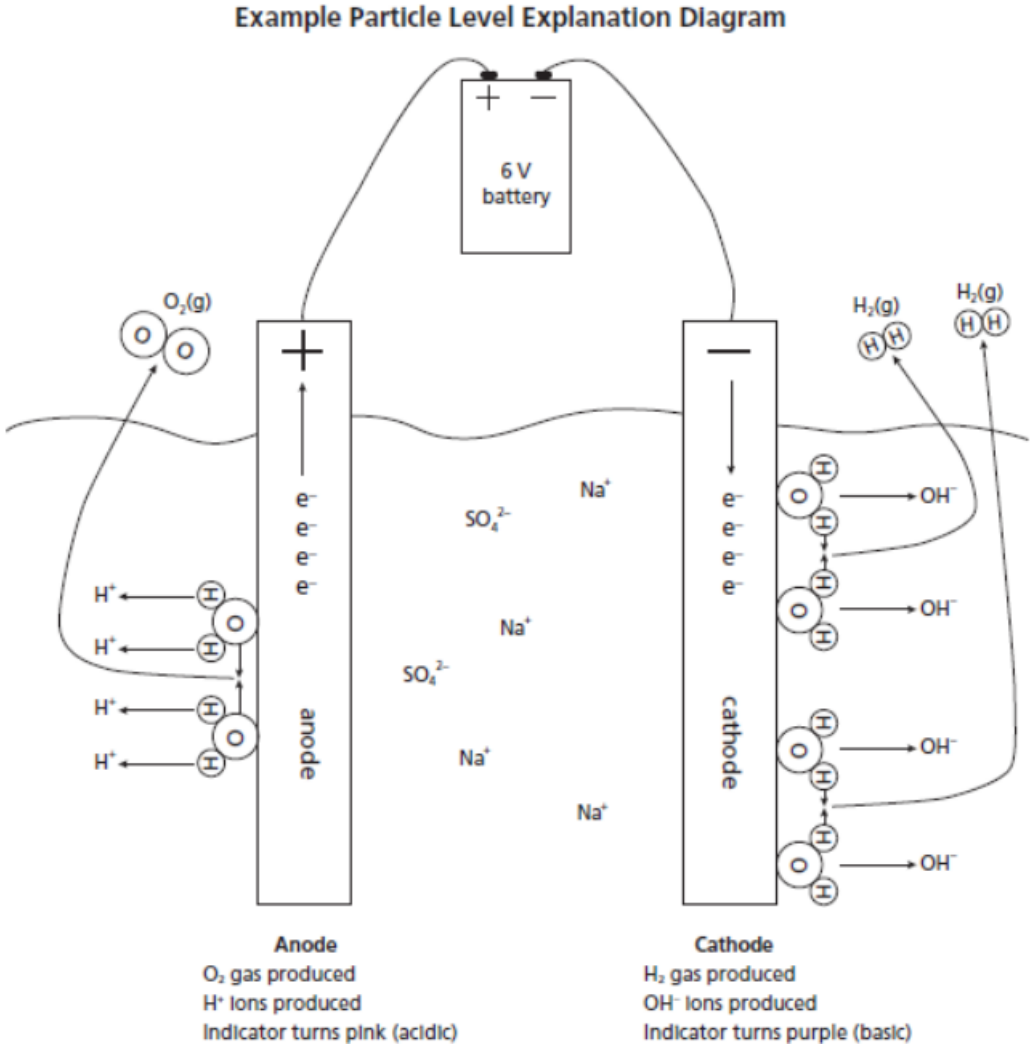
Can we destroy water?

- **Explore redox reactions**
- **Discover electrolysis and identify the products of water electrolysis**
- **Learn about electrolytes and pH indicators**
- **Observe visible signs of decomposition**



Lab: Petri Dish Electrolysis

- **Color** = pH at electrode
  - Purple is basic, OH^- ions produced
  - Pink/orange is acidic, H^+ ions produced
- **Bubbles** at electrodes
  - Higher volume is H_2
  - Lower volume is O_2
- **Reduction** happens at the cathode; H^+ is reduced to H_2
- **Oxidation** happens at the anode; OH^- is oxidized to O_2
- ***Put together the evidence:***
  - Purple electrode with more bubbles = Cathode
  - Pink/orange electrode with fewer bubbles = Anode



Workshop Kit Review

Carolina Chemonstrations®: Beaker Freezer Item # 840378

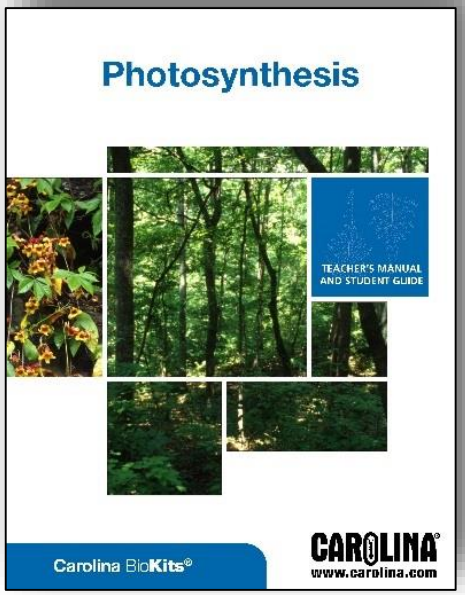
Carolina ChemKits®: Mystery Chemical Reactions Item #840660

Carolina ChemKits®: Petri Dish Electrolysis Item #840830

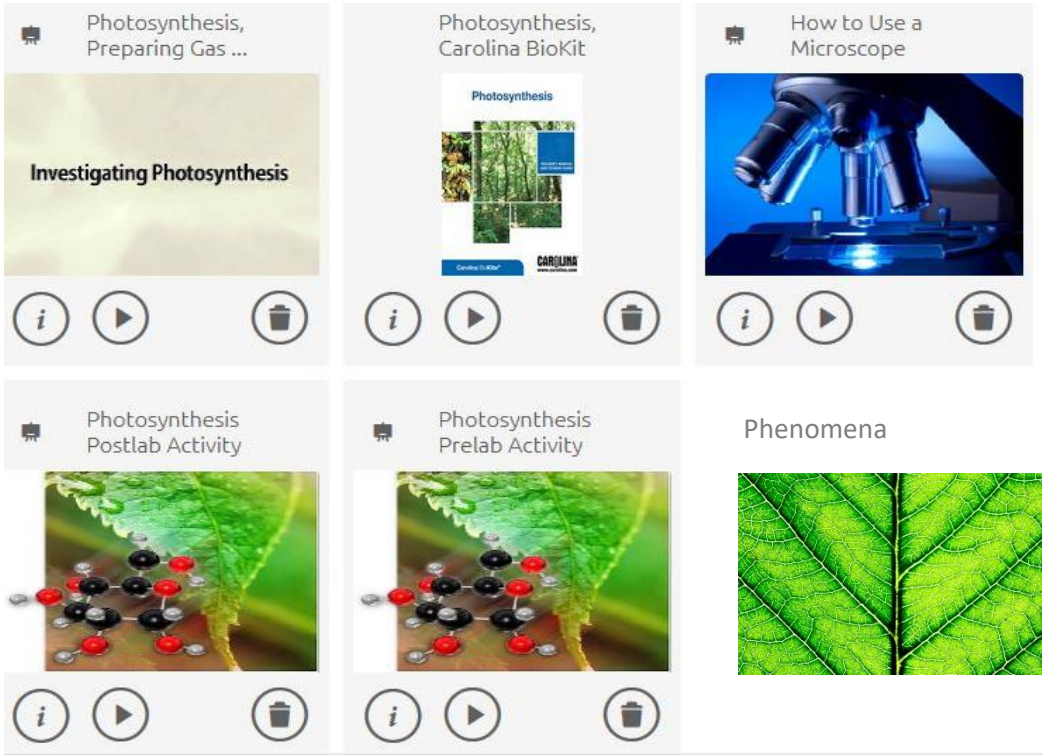
Carolina ChemKits®: Balancing Chemical Equations Item #840656

CAROLINA®
www.carolina.com

Kit Manuals & Digital Content Highlights



Digital Assets



- **Start with phenomena**
- **"Stop & Think," scaffolding**
- **Teacher tips**
- **Address NGSS**
- **Easy-to-follow format**

- **Digital teacher's manual**
- **Student guide copy master**
- **Fill-in answer sheets**
- **Editable assessment questions**
- **Whiteboard resources**
- **Phenomena videos**

- **Procedure/intro videos**
- **Pre-lab activity**
- **Post-lab activity**
- **Assessments**
- **Simulations**
- **Safety videos**

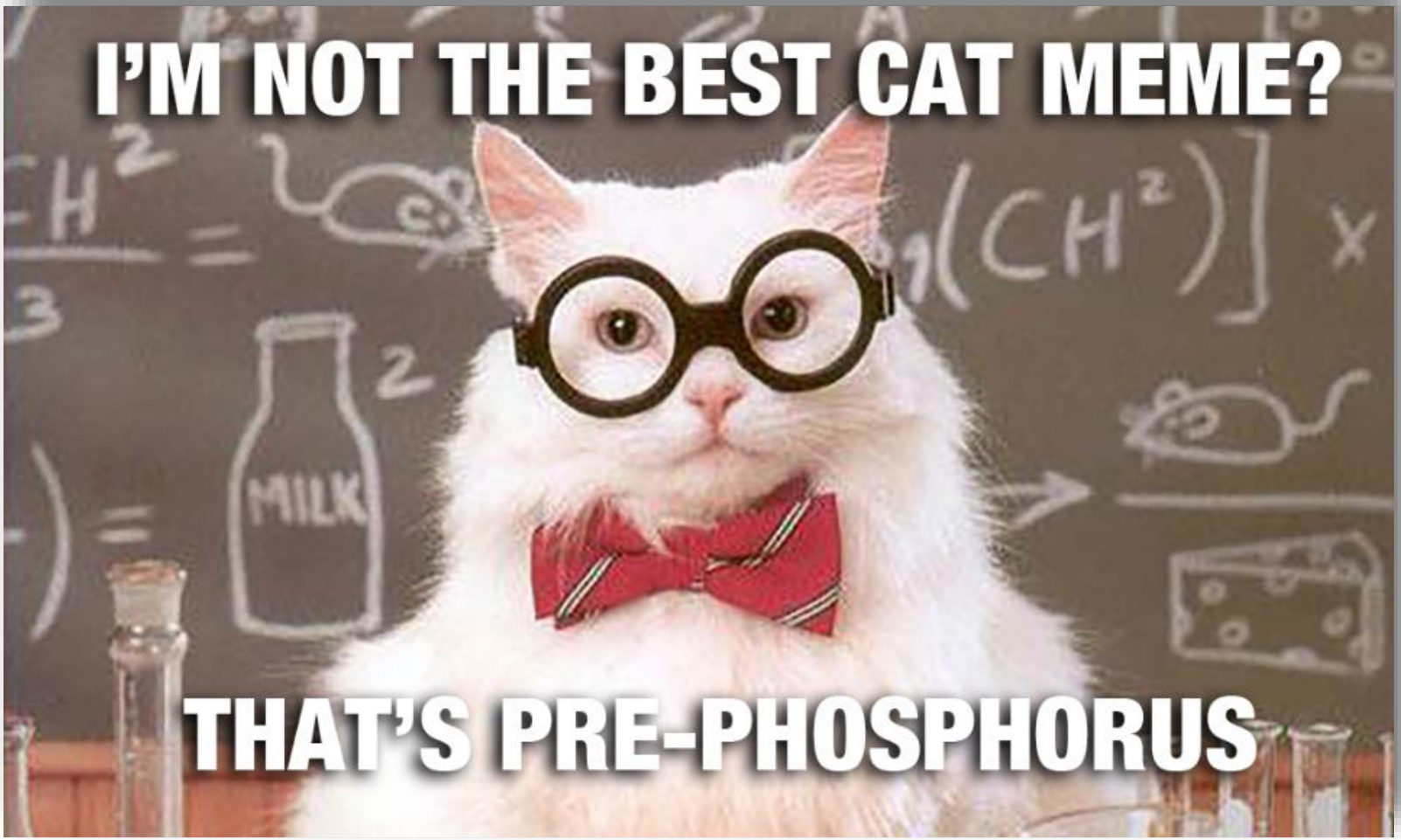
CAROLINA®
www.carolina.com

Introducing . . .

Carolina® Spectroscopy Chamber
(item #653355)

- Works with Android™ and iOS® devices
- Uses free RGB color analyzer apps
- Does not require special optical glass tubes
- Affordable introduction to spectral analysis

CAROLINA®
www.carolina.com


I'M NOT THE BEST CAT MEME?
MILK
THAT'S PRE-PHOSPHORUS

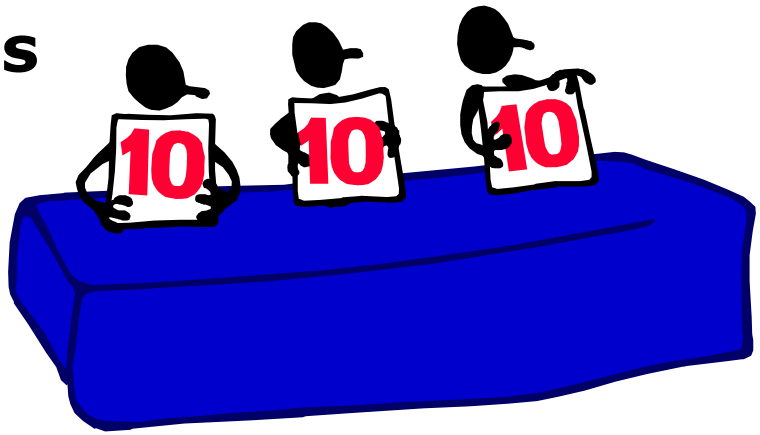
Carolina Offers Free Resources to Support Teachers

carolina tips®

CAROLINA®
www.carolina.com

Evaluations: Share Your Thoughts!

We are striving to make our workshops great!



Please evaluate this session and presenter on a scale from 0 to 10 (10 = best).

Please help us reset the room by gathering your belongings and exiting between sessions.

THANK YOU!