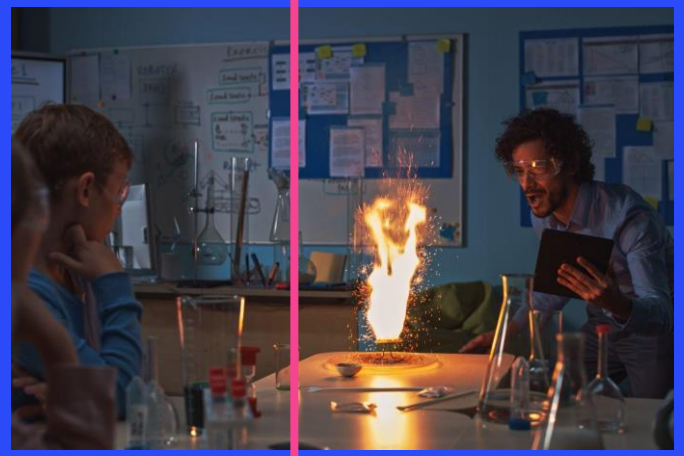

Keep Calm and Chemistry On: Successful Lab Activities for the New Chemistry Teacher

Correlation to Next Generation Science Standards* (NGSS)

Science 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

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Workshop Safety

Demo: Frozen Beaker
An extreme endothermic reaction

Solid barium hydroxide octahydrate and solid ammonium chloride react in a spontaneous endothermic reaction.

$$\text{Heat} + Ba(OH)_2 \bullet 8H_2O(s) + 2NH_4Cl(s) \rightarrow BaCl_2(aq) + 2NH_3(g) + 10H_2O(l)$$

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

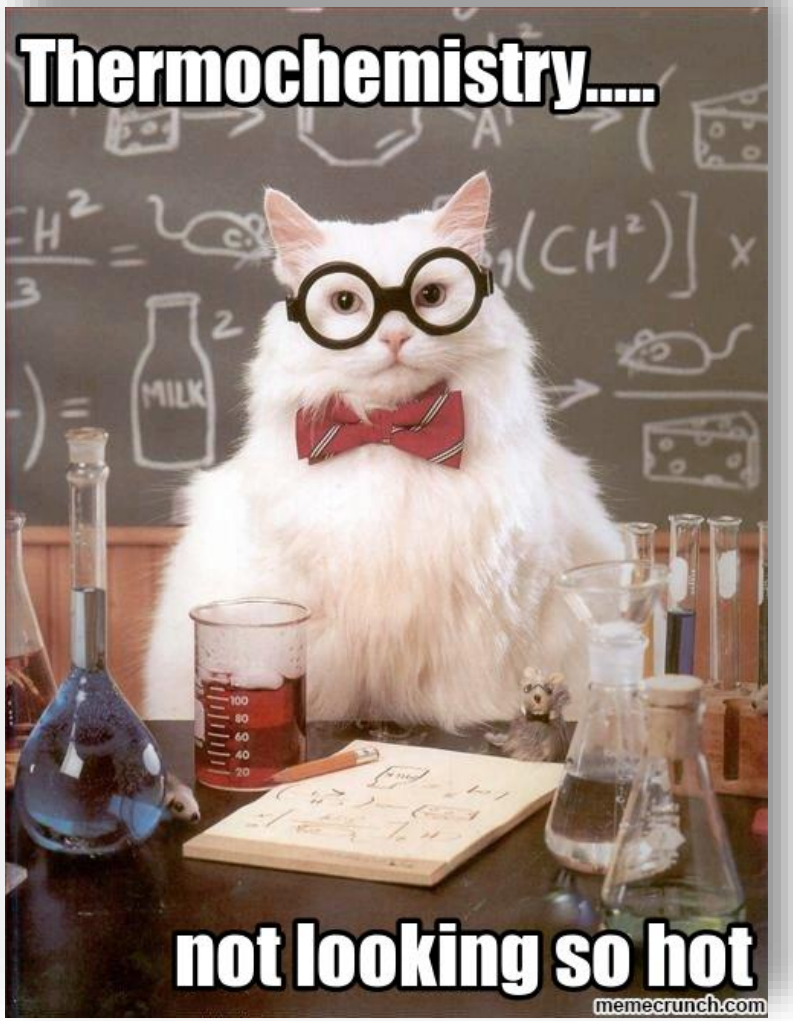
Predict

Observe

Explain

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

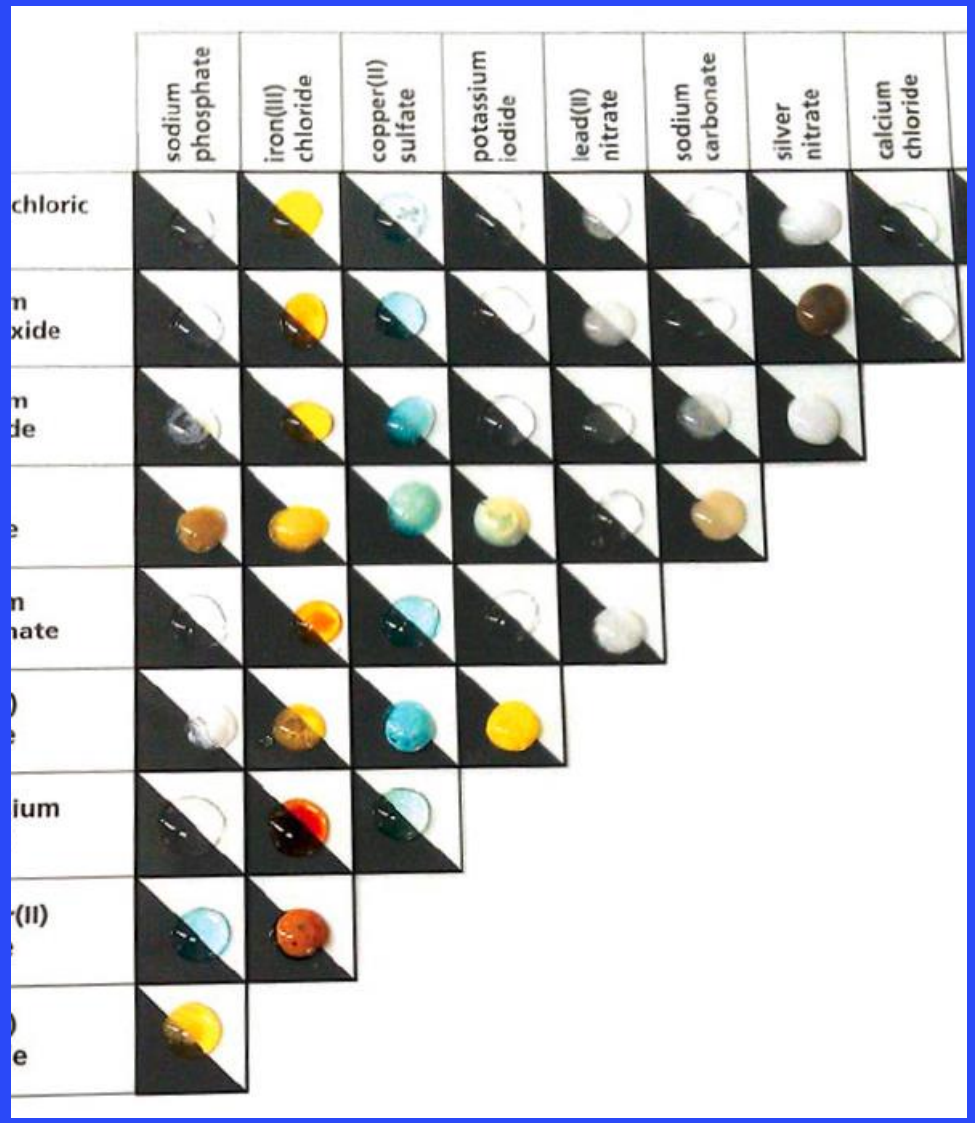
Explore scientific phenomena

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

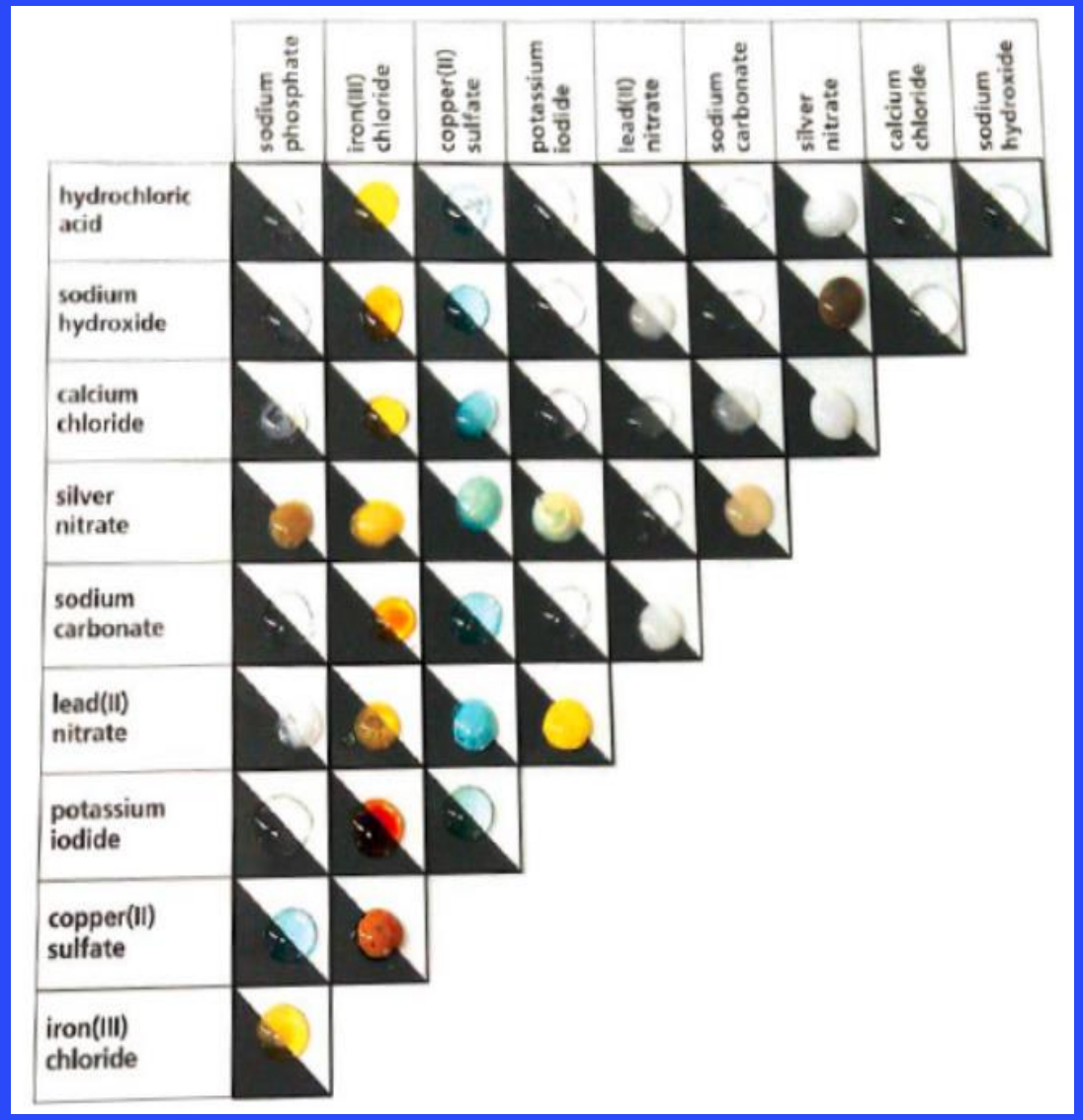
Microscale chemistry benefits (save time and money; reduce waste)

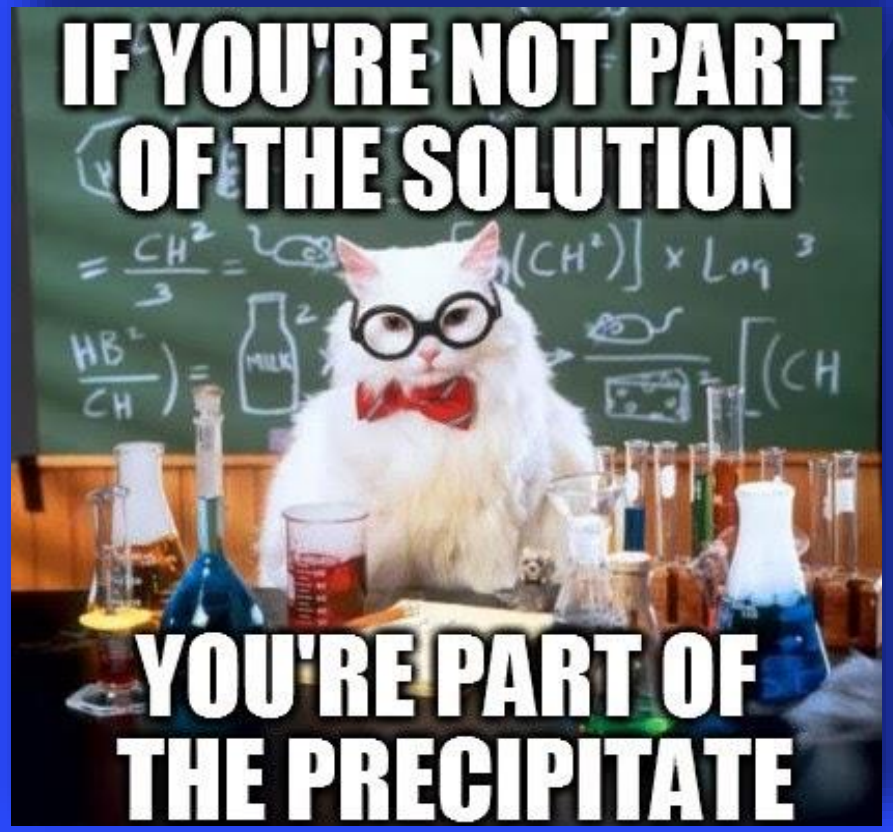
Featured Digital Content

- **Interactive lessons**



Lab: Mystery Chemical Reactions



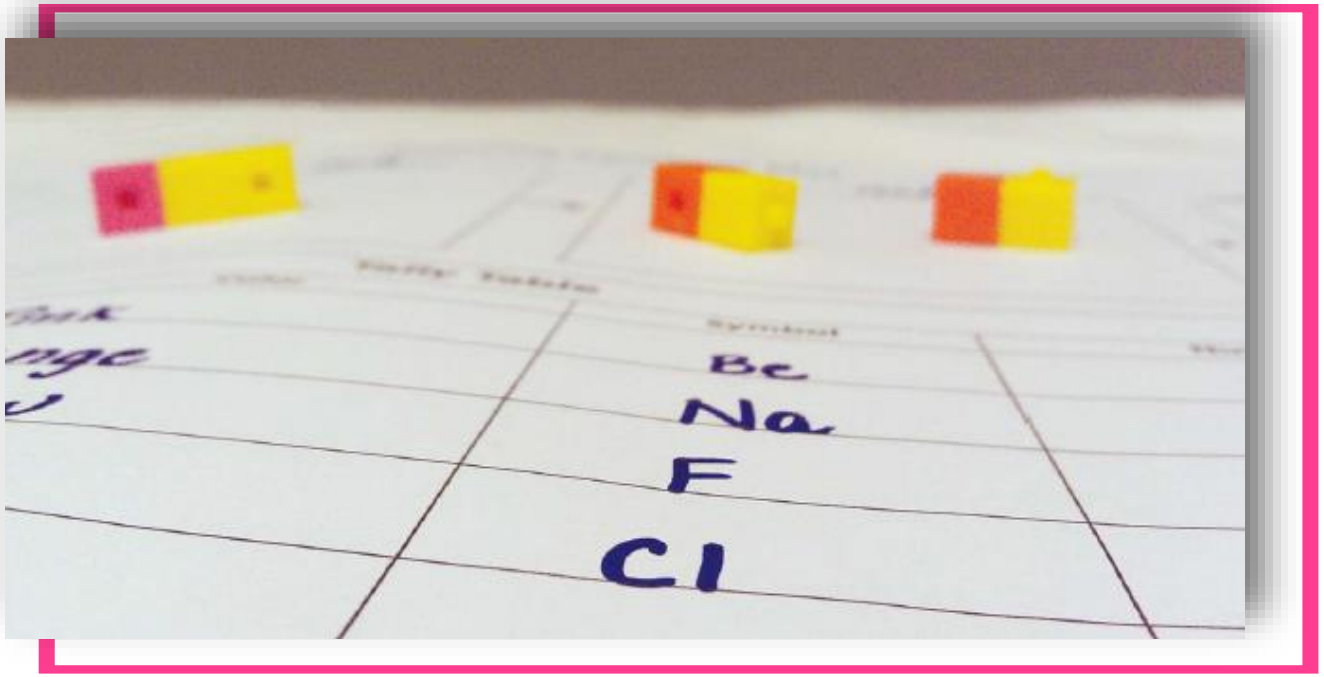


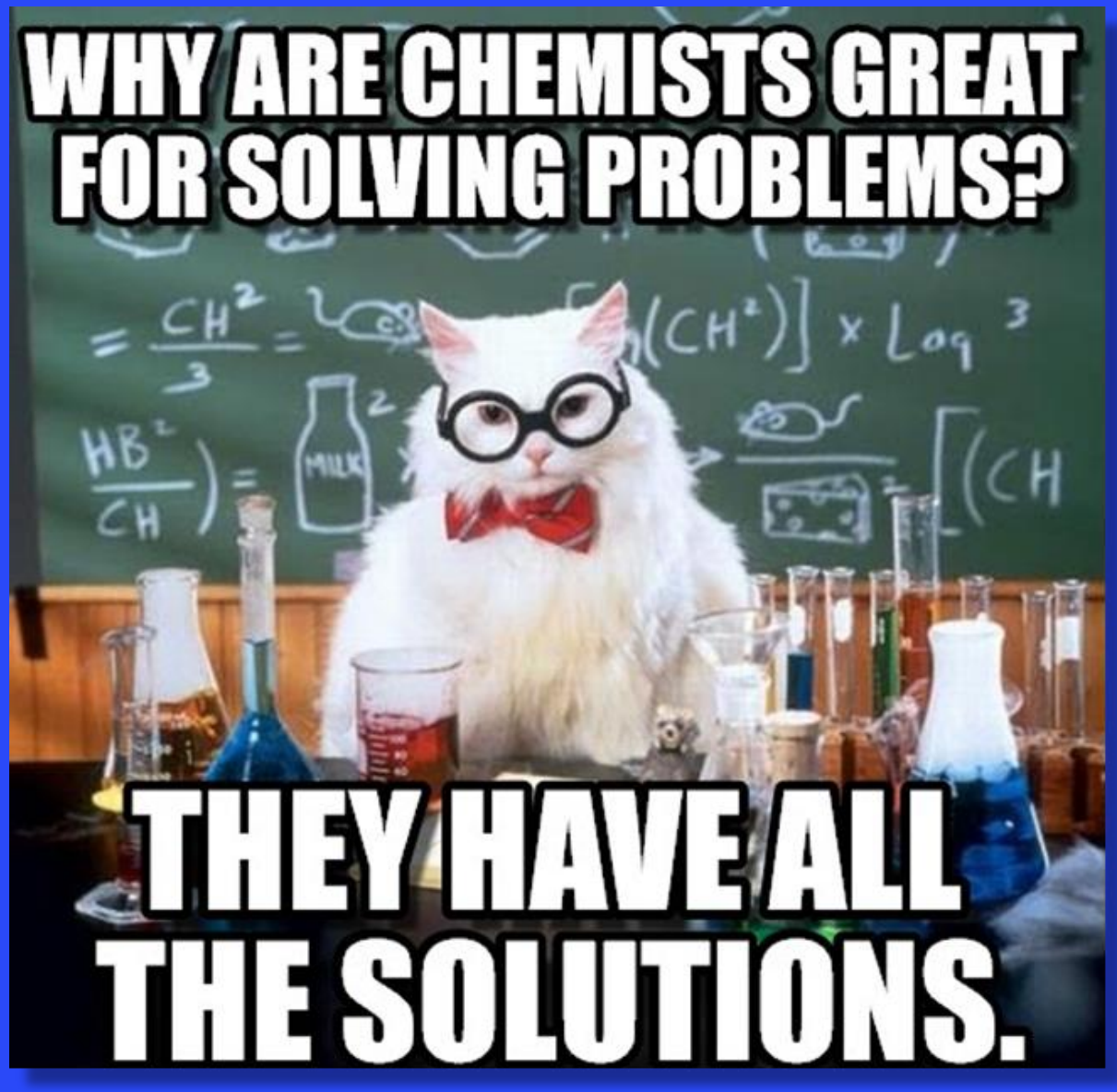
Lab: Balancing Chemical Equations

A tactile introduction to stoichiometry

- **Understand the Law of Conservation of Mass**

- **Understand the difference between coefficients and subscripts in chemical equations**





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