Ideas for the first day of chemistry

Josephine Parlagreco <jparlagreco@bellmore-merrick.k12.ny.us>
W.C. Mepham High School, 2401 Camp Avenue, Bellmore NY 11710

The first day of school, I start with a lab from Bob Becker (my chemistry idol). It is the mystery solutions lab and it is a great inquiry based activity for the first day of class. This lab is also a Flinn Activity called “Match the Mystery Solutions”, a Guided Inquiry Laboratory Kit by: Bob Becker, Kirkwood High School, Kirkwood, MO. http://www.flinnsci.com/store/scripts/ck_prodList.asp?Index=10955

The other activity students enjoy is the Bracelet lab. This idea is from Ron Perkins from Educational Innovations and you can order these UV beads from his website, www.teachersource.com. Basically, given five beads on a string bracelet, students are asked to determine what causes them to change color.

Mystery solutions lab

Students will work in pairs. One student in each pair is given three pipets labeled A, B, and C. The second student is given three pipets labeled 1, 2, and 3. The beral pipets contain the same solutions but in a different order. Through careful mixing, observing, reasoning, and recording, they work together to match the lettered solutions to their matching numbered solutions. Below is a sample student handout.

Materials

- Beral pipets (6 per group)
- Acetate sheets cut into 2.5” x 4” rectangles
- Black construction paper cut into 3” x 5” rectangles
- 200 mL of 2% by mass solution of KAl(SO₄)₂ or NH₄Al(SO₄)₂ (alum — A and 2)
- 200 mL of 2% by mass solution of baking soda (B and 3)
- 200 mL of vinegar (C and 1)

Safety: Observe normal ACS safety guidelines.

Procedure – Teacher

1. Label one set of pipets A, B, and C (enough for half the class). Label a second set of pipets 1, 2, and 3 (enough for the other half of the class).
2. Fill the pipets labeled A and 2 with alum solution, fill the pipets labeled B and 3 with baking soda solution, and fill the pipets labeled C and 1 with vinegar solution.
3. Have the students pair off. Explain the objective of the lab and allow them to discuss how they will solve the problem. They should record their ideas on a new lab sheet.
4. Seat each pair back to back or across the room from each other. Explain that they will only be able to communicate with one another through written messages — no talking! Re-emphasize that the goal is to get the correct match-ups for the solutions.
5. Allow the students to work. If the groups are across the room, you will need to be the messenger.
6. At the end, discuss the method and reasoning process as an entire class.

Explanation

Results: A + B = cloudy white
A + C = no visible reaction
B + C = bubbles
1 + 2 = no visible reaction
1 + 3 = bubbles
2 + 3 = cloudy white

Therefore A = 2, B = 3, and C = 1. B and 3 were the only ones involved in both the cloudy white and the bubbling reaction. C and 1 were the other solution involved in making bubbles. By process of elimination, A must be 2.

There are other ways to reason the answer. Allow all groups to explain how they arrived at their answer.

ChemMystery solution lab: Can you and your lab partner solve this puzzle?!

One of you will be given solutions labeled 1, 2, and 3. The other, solutions A, B, and C. They are the same three solutions but not in the same order.

Your task is to determine which lettered solution corresponds to which numbered solution by looking at their physical and chemical properties. Example: Is A the same as solution 1, 2, or 3? Complete all work on separate page.

Procedure: What will your procedure be? There is more than one way to solve this puzzle. Work together. Clearly list the steps. The first one is done for you.

1. Put on goggles.

Data: Record your data in a table format when possible.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion: What do you know and how do you know it?
Bracelet lab

What causes the beads to change color?

Data:

Describe the beads before the change.

Describe each experiment you try and the result ("no change" is a result so record it) in the given table.

Conclusion:
What causes the beads to change color? Describe in detail (step-by-step) how you know this is true.

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chemical brain-teaser

This month's puzzle was sent in by Avi Ornstein. Avi has a book, *Increase Your Brain Power*, with similar brain-teasers. Not all are chemistry related, but they should get your students prepared for the challenges of chemistry. See page 13 for Avi’s first day of school suggestions. This month’s prize will be the coveted Chem Clock from Educational Innovations.

1) Name this chemical: HiJKLMnO.
2) What are B, C, I and P that A and J are not?

If a student’s name is selected as one of the winners, **the student’s teacher will also win this great prize**. Send in the correct solution by October 31, 2011, to *Chem 13 News*, Chemical brain-teaser, Department of Chemistry, University of Waterloo, Waterloo ON N2L 3G1 or fax to: (519)888-9168. Please indicate teacher’s name and school. Go to www.teachersource.com to find out more about the prize and other products available at Educational Innovations.