



Reacting to Chemistry Facilitator Outline

Materials:

Food Coloring	Milk	Dawn Dish Soap	Q-tips	shallow dishes (7) or pie plates
Baking Soda	cornstarch	water		plastic disposable bowls
1 2 liter bottle of diet coke	1 roll Mentos Candies		measuring spoons (7)	pencils
Record keeping handouts (1 per student)	crayons		paper cups	7 metal spoons

Note:

These are three very common experiments that many students have already done in other classes or activities. Challenge your participants to really think like scientists. Have them observe carefully. Ask them to really think about what is happening. Discuss what they see and guess what is happening.

Facilitators may find it easier to make the Ooblek ahead of time for younger students. It is made **from 1 cup of water, 1.5 to 2 cups of cornstarch and a few drops of food coloring.**

This is a good workshop to do outside, at picnic tables and on the ground.

Do	Say	Materials	Time
<p style="text-align: center;"><i>Welcome & Introduction</i></p> <p>Break the group into small groups of three.</p>	<p>“We are going to make some chemical reactions today. Your job as scientists is to pay very close attention to what is happening. Be able to describe it. Be able to make some guesses as to what is going on.” “As you observe today’s experiments, record what you see. You may write words, or draw a picture; whatever works best for you.”</p>	<p>Handout pencils and record keeping handouts</p>	<p>5 min</p>



<p>Part 1: Chemical Reaction – Vinegar and Baking Soda</p> <p>This is a popular reaction that most kids have seen.</p> <p>Have one person in the group measure one tablespoon of baking soda. Explain the chemical nature of baking soda.</p> <p>Helpers then go to each group (make sure the group is ready to watch!) and measures out $\frac{1}{4}$ cup of vinegar. Older students may select one person to pour the vinegar into the cup with the baking soda.</p> <p>The reaction is almost immediate, but make sure the students watch and observe from the beginning to the very end.</p> <p><i>This is messy, so be sure the groups do this activity on the ground or picnic table where the spillover is not a problem.</i></p> <p>Students discuss and record what they have seen.</p> <p>Facilitator shares the reaction that has just taken place (see leader references): two molecules</p>	<p>“What happens if we combine baking soda and vinegar?”</p> <p>These two substances are opposite in their chemical make-up.</p> <p>Baking soda is a bicarbonate and vinegar is acetic acid. What usually happens when you combine two very different things?”</p> <p>“Write or draw what you saw when these two substances were combined.</p>	<p>Paper cups Baking soda Measuring spoons</p> <p>1 or 2 measuring cups vinegar</p>	<p>10 min</p>
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<p>exchange atoms and form CO₂ in the process. CO₂ is a gas so the mixture foams and bubbles.</p>			
<p>Part 2: Chemical Reaction – Milk and Dishsoap</p> <p>Each group gets a shallow plastic dish or pie pan.</p> <p>Students or the helper places four dots of food coloring on the milk, spread far apart from one another.</p> <p>A student or the staff helper then places a DROP of Dawn dish liquid in the dish of milk. Students watch carefully what is happening.</p> <p>This reaction takes a long time. Let the students watch for a while to see what happens.</p> <p>If the facilitator wishes, students may be given a q-tip to move the color around in the milk.</p> <p>Students should discuss with each other what they observe, and record it.</p> <p>Facilitator shares the reaction that has just taken place (the soap molecules are trying to isolate the fat molecules in the milk. The fat</p>	<p>“Most chemical reactions are happening with molecules so small the human eye cannot see them happening. What we DO see is the effect of the reaction.</p> <p>In this experiment, we can see the reaction occurring by using color to track it.”</p> <p>“Watch carefully when we drop the dish soap in the pan. Try to explain what is happening.”</p> <p>“In this reaction, the soap molecules are trying to bind with the fat molecules in the milk. The fat molecules twist and turn while the soap goes after them. The colors have tinted the milk so we can see this reaction taking place.”</p>	<p>Milk Shallow dishes or pans Food coloring Dawn dish soap Cotton swabs</p>	<p>15 min</p>



<p>molecules bend and twist in all sorts of ways while the fat molecules chase and bind with them.</p>	<p>“Draw or write what you have observed.”</p>		
<p>Part 3: Chemical Solution- The Ooblek Polymer</p> <p>Combine 1 cup of water and 1.5 to 2 cups of cornstarch. Add a few drops of food coloring to the mixture.</p> <p>Older students may mix their own for the group.</p> <p>Have students pull apart the Ooblek (if they can) so they each have a piece. What happens when it is pulled apart? It usually snaps.</p> <p>Let the students watch the mixture and try to figure out if it is a solid or a liquid.</p> <p>Refer to Leader References for descriptions about how these molecules are behaving with one another.</p>	<p>“Some of you may have made this before and called it Ooblek.</p> <p>This is what chemists call a polymer.</p> <p>The molecules of cornstarch act with the water molecules in a very special way. They do not combine or react; they slowly slide back and forth between each other.</p> <p>When force is applied, the cornstarch molecules line up and isolate the water, creating resistance.”</p> <p>“What do you think? Is this a solid or a liquid? Why?</p> <p>It actually has properties of both. Draw or write what you have observed in your science Scientist’s Records.”</p>	<p>Water Cornstarch Plastic bowl spoon</p>	<p>15 min</p>



Part 4: Soda and Mentos

Gather all the students in a large circle. Do a quick debrief about all the great things that were created with chemistry.

Explain that you will now demonstrate one final chemical reaction. Ask the students to look carefully when they see it, and see what other experiment it is similar to.

Be sure that this is done in a wide open space on a flat surface. Be sure the students are far enough away from the bottle, but can still see it. The fountain may get as high as 30 feet in the air.

Open the soda. Open one end of the Mentos. Very quickly, invert the open tube of Mentos dumping it quickly into the soda and **GET OUT OF THE WAY!**

The entire contents will fountain up into the air. Soda gets everywhere so use diet so you will not make a sticky mess or attract ants or other pests.

Students may draw what they see if there is time.

“Chemists and chemistry give us all kinds of things that we use every day:

Toothpaste, shampoo, crayons, what else?”

“Before we finish, we are going to do one final chemistry experiment.

It is important for you to stay seated throughout the experiment. Be sure to watch carefully!”

5 min