

## Chemistry experiments performable at home with adult supervision

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### Science at Home

<https://www.weareteachers.com/easy-science-experiments/>

<https://redtri.com/classic-science-experiments/>

<https://billnye.com/home-demos>

<https://www.iflscience.com/chemistry/unfinished-20-fun-science-experiments-you-can-do-home/>

[https://www.thehomescientist.com/manuals/Illustrated Guide to Home Biology Experiments.pdf](https://www.thehomescientist.com/manuals/Illustrated%20Guide%20to%20Home%20Biology%20Experiments.pdf) (biology)

<https://californiasciencecenter.org/funlab/stuck-home-science>

<https://www.reekoscience.com/>

<https://science4fun.info/>

<https://householdquotes.co.uk/science/>

<http://www.homeadvisor.com/article.show.Science-Experiments-for-All-Around-Your-Home.17372.html>

<https://www.seacoastsciencecenter.org/explore-and-learn/your-learning-connection/>

<https://www.cademuseum.org/cade-at-home.html>

<https://omsi.edu/at-home/activities>

<https://www.sciencefun.org/kidszone/experiments/>

<https://mommypoppins.com/kids/50-easy-science-experiments-for-kids-fun-educational-activities-using-household-stuff>

<https://curiodyssey.org/activities/science-experiments-for-kids/>

<https://www.noguiltmom.com/very-simple-science-experiments/>

<https://blog.prepscholar.com/easy-science-experiments-for-kids-at-home>

<https://www.playdoughtoplato.com/20-kids-science-experiments-can-home/>

<https://www.stevespanglerscience.com/lab/categories/experiments/at-home-science/>

<https://www.sciencekids.co.nz/experiments.html>

[https://www.3m.com/3M/en\\_US/gives-us/education/science-at-home/science-experiments-for-kids/](https://www.3m.com/3M/en_US/gives-us/education/science-at-home/science-experiments-for-kids/)

Google "Science at Home" for more

## Chemistry at Home

<http://murov.info/chemhome.pdf> **see next pages**

<http://www.reachoutmichigan.org/funexperiments/agesubject/chemistry.html>

[http://a2zhomeschooling.com/explore/chemistry\\_kids/chemistry\\_experiments\\_at\\_home/](http://a2zhomeschooling.com/explore/chemistry_kids/chemistry_experiments_at_home/)

<http://www.chem4kids.com/>

<http://www.sciencebob.com/index.php>

<http://www.acs.org/content/acs/en/education/whatischemistry/adventures-in-chemistry.html>

<http://science-mattersblog.blogspot.com/>

<https://thehomeschoolscientist.com/awesome-chemistry-experiments/>

<https://www.fizzicseducation.com.au/category/150-science-experiments/kitchen-chemistry-experiments/>

<https://www.pinterest.com/ricekris/chemistry-experiments/>

[https://www.123homeschool4me.com/30-incredible-chemistry-experiments\\_85/](https://www.123homeschool4me.com/30-incredible-chemistry-experiments_85/)

<https://www.science-sparks.com/brilliant-chemistry-experiments/>

Google "Chemistry at Home" for more

# CHEMISTRY AT HOME

## Observation

I. Observations



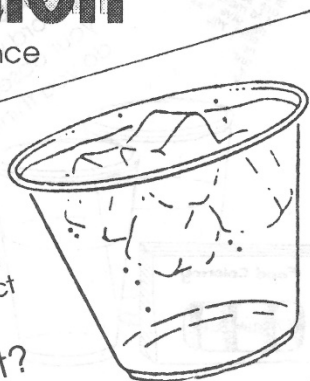
What do you observe in the two pictures ?

The key to good science

You have observed almost everyday that ice floats in water. But is this what you should really expect to happen?

Sink or Float?

II. Observations



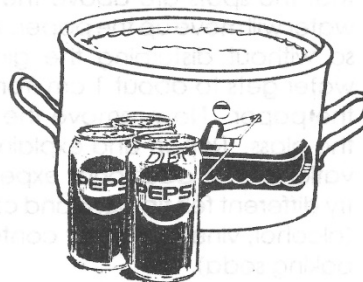
Cola Boat?

**Materials:** pot of water, several cans of a cola and its diet version ( eg. Pepsi and Diet Pepsi)

Put cans of cola in pot and see which ones sink or float. Can you explain your observations?



Experiment 1



## Experiments

Modesto Junior College

Developed by Carolyn and Steven Murov, [murovs@mjcc.edu](mailto:murovs@mjcc.edu), <http://murov.info/>

Web sites of selected science supply companies.

Arbor Scientific - <http://www.arborsci.com/>

Edmund Scientific - <http://www.scientificsonline.com/>

**Educational Innovations** - <http://www.teachersource.com/>

Exploratorium - <http://www.exploratorium.edu/store>

Flinn Scientific - <http://www.flinnsci.com/>

Museum Tour - <http://www.museumtour.com/>

Nasco West - 4825 Stoddard Rd, Modesto, 209 545-1600 - <http://www.enasco.com/>

Oriental Trading Company - <http://www.orientaltrading.com>

Raft - <http://www.raft.net/>

Sargent-Welch - <http://sargentwelch.com/resources/a/47/>

Sempco, Inc. - <http://www.sempcoinc.com/>

**Steve Spangler** - <http://www.stevespanglerscience.com/>

K-12 Science Directory for Stanislaus County, CA - <http://murov.info/science.htm>

Climate change directory - <http://murov.info/climatechange.htm>

Powerpoint pre-shows and quizzes - <http://murov.info/PPTPreshows.htm>

Try tearing the paper vertically and then horizontally. Repeat the experiment several times. What do you observe and why?



Experiment 3

## Color the Water

**Materials:** 2 colorless identical glasses,  
temperature water, very hot water, food coloring

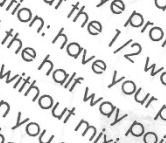
that whenever you are doing chemical  
ould be wearing eye protection. Put  
lass to about the 1/2 way point. Pour  
(Caution: have your eye protection  
about the half way point. Pour  
glass without stirring. Can you

Experiment 3

## Color the Water

**Materials:** 2 colorless identical glasses, room temperature water, very hot water, food coloring

Remember that whenever you are doing chemical experiments you should be wearing eye protection. Pour cool water into one glass to about the 1/2 way point. Carefully pour the second hot water to about the half way point. Add 1 drop of the second hot water to each glass without mixing. Observe and record your observations. (Just for fun, how many molecules of food coloring are in the glass?)



Put about 3 spots of colored (or different

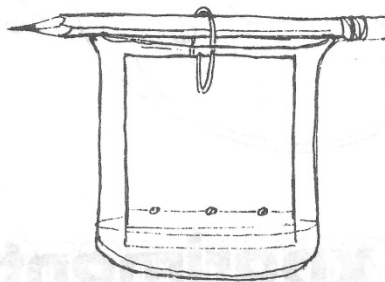
Experiment 4

## What is it?

Allow several minutes for mixing to occur.

## What is in it?

**Materials:** colorless glass, Whatman #1 filter paper (some coffee filters will work), pencil, jumbo paper clip, water, felt tip pens



Wear safety glasses!! Put about 3 spots of ink from different colored (or different brands) felt tip pens on a piece of filter paper about 2 cm (3/4") up from the bottom and 1 cm apart. Put water into the glass about 1 cm up from the bottom. Force the jumbo paper clip onto the pencil and hang the paper from the paper clip. Insert the paper into the glass being sure that the paper reaches into the water but that the spots are above the water. The water will move up the paper. Allow it to do so without disturbing the glass until the water gets to about 1 cm from the top of the paper. Now remove the paper from the glass. Report and explain your observations. For additional experimentation, try different felt tip pens and other solvents (alcohol, vinegar, water containing some baking soda).

Try Vis a Vis wet erase felt tip pens and also food coloring.

### Experiment 5



### Acid or Base?

**Materials:** Red cabbage, filter paper (coffee filter paper should work), household solutions such as vinegar, lemon juice, glass cleaner with ammonia, aqueous baking soda.

**Instructions:** Place several leaves of red cabbage leaves in a small pan and cover with water. Bring water to a boil and immerse filter paper into the now purple colored liquid. Allow the paper to dry and test with different solutions.

### Experiment 6 Let It Foam

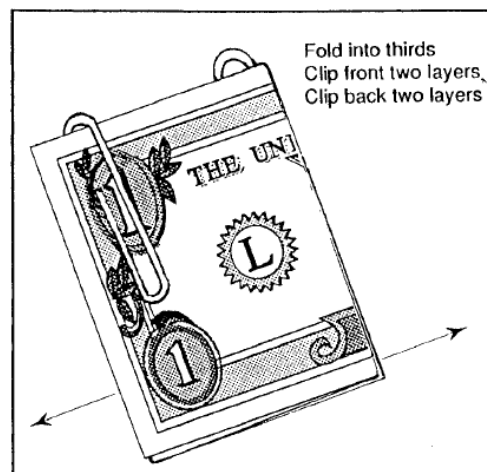
**Materials:** Glass half filled with water, baking soda, vinegar, liquid dishwasher detergent

Wear safety glasses!! To avoid a possible mess, put the glass in a sink. Add a teaspoon of baking soda and a squeeze of dishwasher detergent into the glass and mix. Now pour a little vinegar into the glass, and observe.

**Experiment 7. Preparation of a type of slime.** Add 20 mL of water to 20 grams of Elmer's glue. Add 20 mL of borax solution (1 teaspoon borax/cup of water) and stir or several minutes. Try the following experiments with your *slime*:

- Pull the *slime* slowly and record your observations.
- Pull the *slime* quickly and record your observations.
- Mount a funnel in a ring on a ringstand. Put some *slime* into the funnel and push it through the funnel. Record your observations as the *slime* comes out of the funnel.
- Try some other safe experiments, describe them, and record your observations

**Experiment 8. Modeling a catalyst.** Catalysts are often needed to cause polymerizations to occur. To model the use of a catalyst, fold a dollar bill into thirds like a fan. Place two paper clips on the dollar bill as illustrated in the figure with one paper clip clipping the first two thirds and the second clipping the last two thirds. Grab the two ends of the dollar bill with your left and right hands and quickly pull in opposite directions. Explain how the dollar bill in this "magic trick" serves as a model for a catalyst and comment on the quality of the analogy. (I want to thank Dr. Alan McCormack of California State University at San Diego for sharing this analogy.)





# Explanations

**I. Observations** - For the description of the 2<sup>nd</sup> drawing you should have said that it appears to be a bald man from one perspective and a rat from another. For the 1<sup>st</sup> figure, it appears to be an old woman from one angle and a young woman from another. Did you make careful, alert observations and notice both in each drawing or did you stop after seeing

one image. The lesson is that observations should include all possibilities - don't stop until you are sure you have not overlooked anything that later may turn out to be significant.

**II. Observations** - While we have all observed that ice floats, how many of us ask if it makes sense for ice to float? In fact, almost all other frozen substances sink in their own liquid as we would expect. Water is very unusual and we are very fortunate that this is the case.

Otherwise, the lake would fill with ice and fish could not survive in the lake.

**Experiment 1** - The diet version will float and most of the regular ones will sink. The sugar makes the density of the regular can + contents denser than water. The diet drinks without the sugar are less dense than water and float. You will probably find that about 1/3 of the regulars float also. This is due to inadequate filling by the company.

In the figure, the solids sink in their liquids except for water (#3).



**Experiment 2** - The fibers in the newspaper are generally aligned in one direction. Tearing in that direction is relatively easy as it just separates the fibers or polymers from each other. The other direction requires breaking of the fibers or polymers and this requires much more energy. The fibers resist this and the tear generally curves until it is again separating fibers.

**Experiment 4** - Do not worry too much about the process here. The key observation is that the commercial pigments were prepared by mixing different colored pigments together and this process (paper chromatography) partially separates the pigments into the original colors.

**Experiment 3** - You should have observed that the food coloring mixed much faster into the hot water than the cold water. In addition to convection currents this is because the molecules in the hot water are moving faster than the molecules in the cold water. The number of molecules of water in the glass is about 7,000,000,000,000,000,000,000 or 7 septillion or 7 trillion trillion molecules.

## Experiment 5 -

Red cabbage juice contains a dye that is sensitive to the acidity or pH of the solution much like litmus. The paper should turn to a pinkish color when acid is added ( $\text{pH} < 7$ ) and green when base is added ( $\text{pH} > 7$ ).

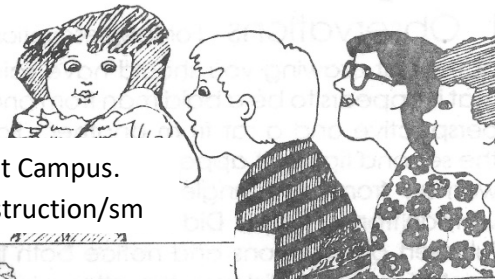
**Experiment 6** - Baking soda (sodium bicarbonate) reacts with vinegar (5% acetic acid) to give sodium acetate, water and carbon dioxide gas. The carbon dioxide bubbles cause the soap solution to foam.



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## Chemistry at Home – Answer Sheet

Name\_\_\_\_\_

Date\_\_\_\_\_

School\_\_\_\_\_

Grade\_\_\_\_\_

Teacher\_\_\_\_\_

### Experiment 1 - Cola Boat

Brand \_\_\_\_\_

Number of regular floaters \_\_\_\_\_

Number of regular sinkers \_\_\_\_\_

Number of diet floaters \_\_\_\_\_

Number of diet sinkers \_\_\_\_\_

Conclusions

### Experiment 2 - On a Tear

Observations

Conclusions

### Experiment 3 - Color the Water

Observations

Conclusions

**Experiment 4 - What Is in It?**

Brand	<hr/>	<hr/>	<hr/>	<hr/>
Colors	<hr/>	<hr/>	<hr/>	<hr/>
	<hr/>	<hr/>	<hr/>	<hr/>
	<hr/>	<hr/>	<hr/>	<hr/>
	<hr/>	<hr/>	<hr/>	<hr/>

Conclusions

**Experiment 5 - Acid or Base**

Observations

Conclusions

**Experiment 6 - Let It Foam**

Observations

Conclusions



### **Experiment 7 - Preparation of a Type of Slime.**

Observations

Conclusions

### **Experiment 8 - Modeling a catalyst.**

Observations

Conclusions