

**Dr. Anderson's  
Favorite Uses for Diet Coke**

**1. Density Experiments**  
**2. Diet Coke + Mentos → Sticky Fun!**  
<http://www.eepybird.com/>

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**CH204 Experiment 2**  
**Dr. Brian Anderson**  
**Fall 2007**

**Separation and Recovery  
of the Components  
of a Mixture**

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**Experiment 1 Post-Game Show**

**We learned pipette,  
burette, deionized water,  
intensive properties,  
interpolation,  
reporting experimental error.**

**A quick note on the accuracy of glassware.**

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## Experiment 1 Post-Game Show continued...

Another question:  
Isn't there some error in the  
density we determined in Part 2?

We going to Jamaica, mon!

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## Experiment 2 Overview

Separate a mixture of salt, sand, and  
chalk dust based on differences in  
their physical and chemical  
properties.

Add water to dissolve NaCl.  
Add acid to dissolve CaCO<sub>3</sub>.  
SiO<sub>2</sub> is left behind in the beaker.

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## Physical properties

Characteristics of a material that do not  
involve changing the identity of the  
compound. Examples include:

|               |                |
|---------------|----------------|
| Boiling point | Physical state |
| Melting point | Particle size  |
| Solubility    | Color          |
| Density       | Shape          |

When a compound changes state (solid,  
liquid, gas, aqueous), it is still the same  
compound, so that's a physical change,  
not a chemical change.

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**Chemical properties**

Characteristics of a material that **DO** involve changing the identity of the compound. This means reactivity with another chemical. Examples:

- Flammability
- Oxidizability (rust/tarnish/corrosion)
- Oxidation/reduction in general
- A host of other chemical reactions

The products of a chemical process are different molecules than the reactants.

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**In this lab**

Dissolve NaCl in water and recover NaCl by evaporating water. Is this process physical or chemical?

React  $\text{CaCO}_3$  with HCl to form  $\text{CaCl}_2$ , then convert  $\text{CaCl}_2$  to  $\text{CaCO}_3$  by adding  $\text{K}_2\text{CO}_3$ . Physical or chemical?

$\text{SiO}_2$  - insoluble in water, and unreactive to HCl. Physical or chemical?

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**Part 1: Removal of NaCl**

Steps 3-5, transferring the dissolved NaCl:

Don't use excessive amounts of water because you will have to evaporate it all away later.

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## Separating the salt

**Step 4: pour the dissolved NaCl through a funnel lined with filter paper.**

**Not all of the liquid will pour through the funnel - the final mL will refuse to drip through.**

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## Part 2:

### "Tiny Bubbles...!"



**Add HCl dropwise into the stirring mixture of sand and chalk to dissolve the chalk:**



**Tiny bubbles from the bottom of the beaker = chemical reaction**

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## "I can't decant."

**Don't worry about a few grains of sand.**

**"Remove the beaker from the hot plate and let it cool to room temperature."**

**Please DO NOT put hot items on the white lab bench surface!**

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**Part 3:  
Recovering the  $\text{CaCO}_3$**

**Suction filtering is the trickiest part of the whole experiment.**

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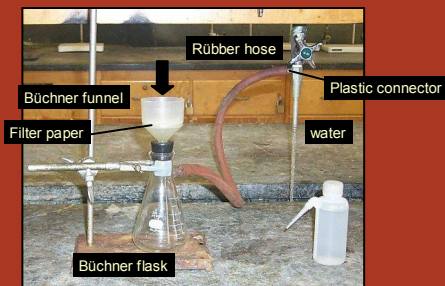
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**Did he say “Byookner?”**

**No, I said “Büchner.”**



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**Almost finished**

**Biggest source of error - wet  $\text{CaCO}_3$**

**Evaporate  $\text{NaCl}$  slowly in the large evaporating dish. Turn down the heat when the water level gets low.**

**Dry the  $\text{SiO}_2$  in the beaker.**

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**And when you're done...**

Enter your name into the spreadsheet.

Enter your starting mass and the masses of recovered NaCl, CaCO<sub>3</sub>, and SiO<sub>2</sub>.

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**Do you feel lucky?**

For each component, you have the option of reporting your own data or the average results of everyone who had the same unknown as you.

You can Q-Test outlying data points, but you cannot arbitrarily keep or reject data based on hunches, Tarot deck readings, or having "a really bad feeling about this one."

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**How's that Q-test work again?**

Let's go see.

Remember, the Q-test is only used for discarding outliers in replicate analyses. (That means repeat measurements of the same thing.)

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## Unknown Summary Sheets

Some of the experiments we do will require you to identify a chemical unknown in some way :

- ❖ Determine the identity the unknown or
- ❖ Determine its concentration or
- ❖ Determine its composition

In addition to your normal lab report, you will turn in an **Unknown Summary Sheet** for these experiments.

Unknown Summary Sheets can be found on the small wooden shelves next to the stockroom or can be downloaded from the class web site at

<http://courses.cm.utexas.edu/banderson/ch204/uss.html>

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## Lab write-up

Don't forget to show a sample calculation for % recovery and for % of each component

If you Q-test an outlying data point, show the calculation regardless of whether the point stays or goes.

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## Post-Lab problem 2

Directly analogous to our experiment with NaCl, CaCO<sub>3</sub>, and SiO<sub>2</sub>.

How would you separate NaCl from CaCO<sub>3</sub> and SiO<sub>2</sub>? Are the separation and recovery done using physical techniques or through chemical reactions?

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**Discussion Question type**

In Question 5, "Report on the percent of NaCl in the mixture based on your own data."

Scratch that out.

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**Preliminary Write-up for Experiment 3**

When you copy the reaction tables on pages 21 and 22

**Make them big!**

You will be writing your observations in those tiny boxes.

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**Final exam time**

Quizzes make up 30% of your course grade.

Nine quizzes, drop the lowest one.

Each individual quiz you keep is worth about 3.75% of your final grade.

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