

Chemistry 1010

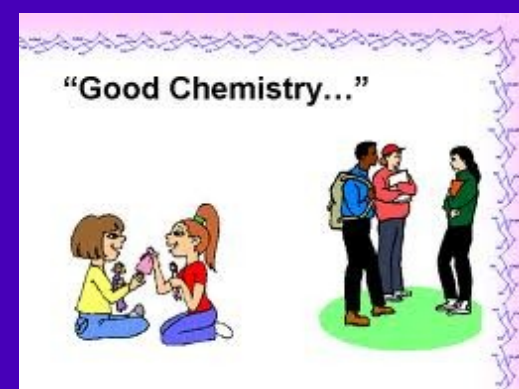
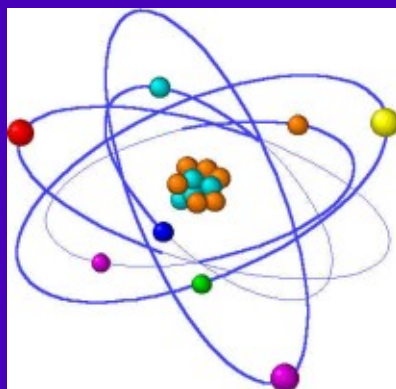
Introduction to Chemistry

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Introduction

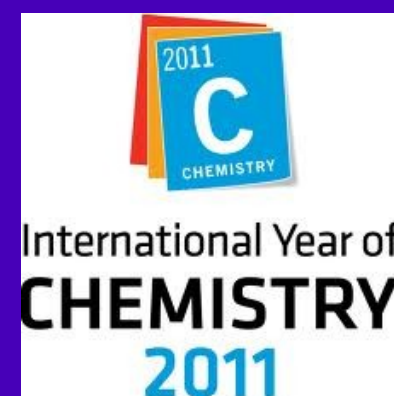
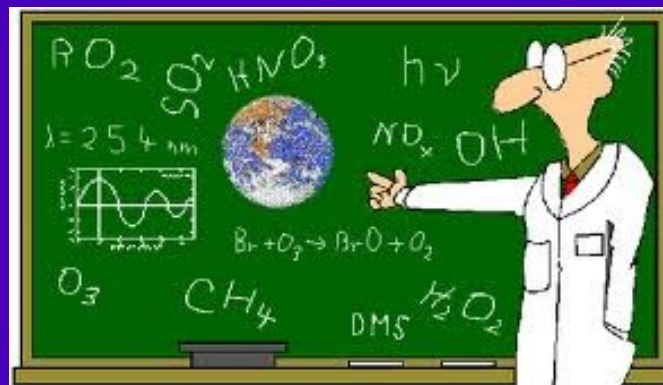
What do you think of when you hear the word CHEMISTRY?

Here are some pictures that come up on a Google image search of the word “chemistry.”



																1 He						
2 Li																3 Be	4 B	5 C	6 N	7 O	8 F	9 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar					
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr					
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe					
55 Cs	56 Ba	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu						
87 Fr	88 Ra	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr						

58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr



Did you think of...



What is chemistry?

A simple definition of chemistry:

the study of matter and the changes it undergoes



anything that
takes up space
and has mass



things that matter
can do

another way to say it:

Chemistry is the study of all of the STUFF in the universe...



We want to find out:

What is it made of?

Why does it act the way it does?

...and what can HAPPEN to the STUFF.



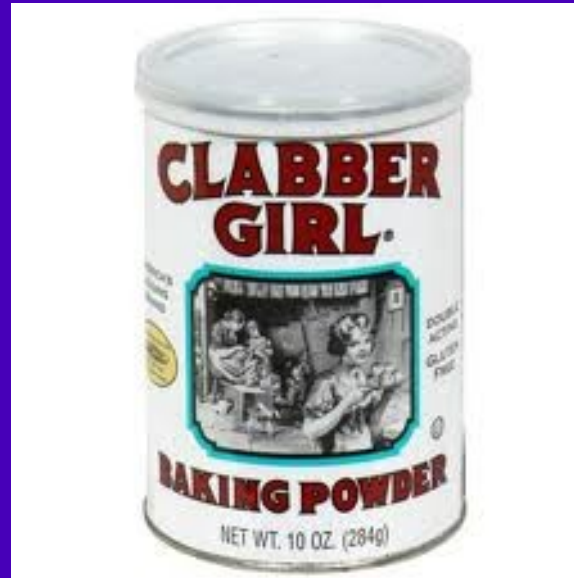
We want to find out:

What really happened?

Why did this happen?

How can we control it?

Baking Powder: What is it and how does it work?



What is baking powder used for in cooking?

it makes things rise

What would happen if you left it out of a recipe?

the result would be flat and dense and nasty

What happens when you add baking powder to water? **bubbles form**



What are they? **carbon dioxide**

This is a chemical reaction.

How does this make food rise?



when heated, the bubbles expand

food cooks around them

becomes light and fluffy

What kinds of things can you cook with baking powder?



pancakes



cookies



muffins



biscuits



banana bread



cakes

What else can be used to make things rise?



yeast

they are microorganisms

consume carbohydrates
and produce carbon dioxide

What is kinds of things is yeast used to cook?



bread

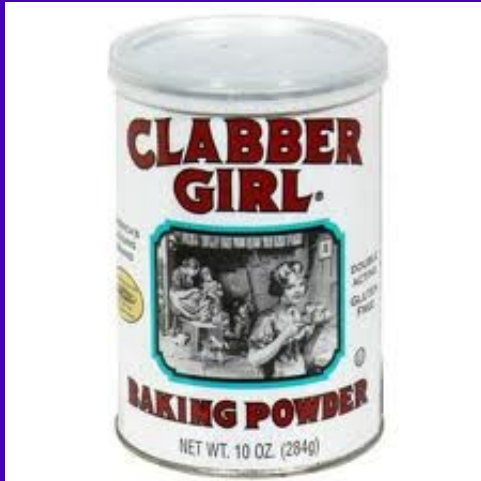


rolls



scones

How long does it take yeast to make carbon dioxide compared to baking powder?



baking powder – a few minutes

**ready to bake right away
(called quick breads)**

dough/batter can be very moist

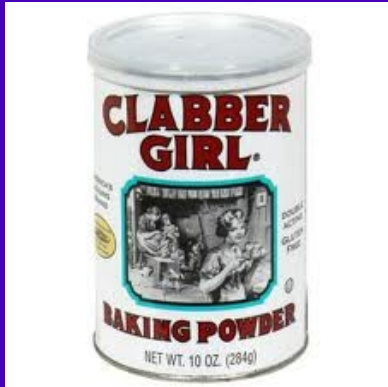


yeast – a few hours

dough has to rise

**dough must be strong and elastic
to hold bubbles**

What is in baking powder?



**1 teaspoon
baking powder**

=



**1/4 teaspoon
baking soda**

+



**1/2 teaspoon
cream of tartar**

+



**1/4 teaspoon
cornstarch**

So how is baking powder different from baking soda?

baking soda is a pure compound

baking powder contains baking soda as well as two other things

Which of these ingredients causes the bubbles to form?



baking soda + water: **no bubbles**



cream of tartar + water: **no bubbles**



cornstarch + water: **no bubbles**



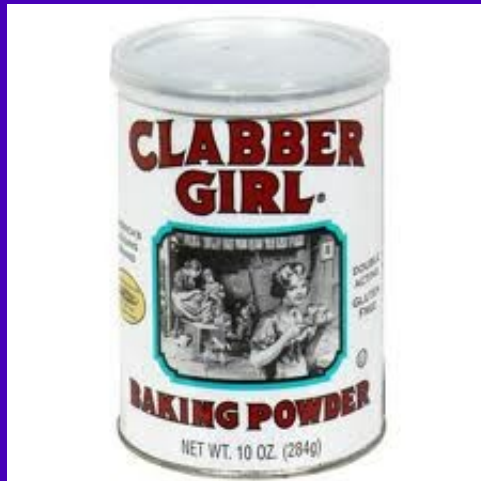
baking soda + cream of tartar + water: **bubbles!**

So why is the cornstarch there?



it absorbs water so that the baking soda and cream of tartar don't start making bubbles in the can

How long will baking powder last in the cupboard? Can it go bad?



if it is exposed to water vapor in the air, it won't work any more

keep it cool and dry

if you add some to water and it doesn't bubble, get a new can!

What does “double acting” mean?



contains two different acids for baking soda to react with
one reacts at room temperature (when mixing dough)
one only reacts when heated (when baking)

Experiment:



- 1) baking powder
- 2) baking powder in water
- 3) after several minutes
- 4) after heating

What about recipes that only call for baking soda?



**baking soda works by itself
if there is another acidic ingredient**

yogurt, buttermilk, lemon juice, vinegar, molasses, brown sugar, honey, sour cream, chocolate, maple syrup, fruit juice (especially citrus juices)



Why do some recipes call for both baking soda and baking powder?



baking powder does most of the leavening

baking soda is there to neutralize other acids

if batter is acidic, it doesn't brown properly



pancakes with a little to a lot of baking powder

What happens if you add too much baking powder?

too many bubbles will form, they will get big and pop, it will go flat

What happens if you add too much baking soda?

if there isn't enough acid to react with it, the baking soda will give a bitter taste to the food

If you were out of baking soda, could you use baking powder instead?

sort of – but you will have extra acid, so it may taste funny or not brown well, also, you need 4 times as much

If you were out of baking powder, could you use baking soda instead?

only if you also add an acid for the baking soda to react with and add only 1/4 of the amount, and bake right away (not double acting)

What would you do if you were inventing a new recipe and didn't know whether to use baking soda, baking powder, or both?

**consider acidic ingredients
whether you want it to brown
how much it should rise**

try it; vary the amounts up and down by 1/2 tsp