Chemistry Holiday Homework
Class 8

A) Carry out the following experiments:

1. Grow Your Own Alum Crystals.

Crystal Growing Tips

- Alum is found in the 'spices' section of the grocery store.
- Alum is an ingredient used to make pickles. It makes them crispy.
- You can use sewing thread or other string instead of nylon fishing line, but crystals will grow on the entire length of the submerged string. Crystals don't adhere to nylon, so if you use it, you can get bigger and better crystals.
- Follow the link https://www.youtube.com/watch?v=39BPnWsawxI

2. Blow Up a Balloon with Yeast.

You will need

A packet of yeast (available in the grocery store)
A small, clean, clear, plastic soda bottle (16 oz. or smaller)
1 teaspoon of sugar
Some warm water
A small balloon

What to do

1. Fill the bottle up with about one inch of warm water.
(When yeast is cold or dry the micro organisms are resting.)

2. Add all of the yeast packet and gently swirl the bottle a few seconds.
(As the yeast dissolves, it becomes active – it comes to life!

Don’t bother looking for movement, yeast is a microscopic fungus organism.)

3. Add the sugar and swirl it around some more.
Like people, yeast needs energy (food) to be active, so we will give it sugar. Now the yeast is “eating!”

4. Blow up the balloon a few times to stretch it out then place the neck of the balloon over the neck of the bottle.

5. Let the bottle sit in a warm place for about 20 minutes
If all goes well the balloon will begin to inflate!

How does it work?

As the yeast eats the sugar, it releases a gas called carbon dioxide. The gas fills the bottle and then fills the balloon as more gas is created. We all know that there are “holes” in bread, but how are they made? The answer sounds a little like the plot of a horror movie. Most breads are made using YEAST. Believe it or not, yeast is actually living microorganisms! When bread is made, the yeast becomes spread out in flour. Each bit of yeast makes tiny gas bubbles and that puts millions of bubbles (holes) in our bread before it gets baked.

Naturalist’s note – The yeast used in this experiment are the related species and strains of Saccharomyces cervisiae. (I’m sure you were wondering about that.) Anyway, when the bread gets baked in the oven, the yeast dies and leaves all those bubbles (holes) in the bread. Yum.

To make it a true experiment, you can try to answer these questions:

1. Does room temperature affect how much gas is created by the yeast?
2. Does the size of the container affect how much gas is created?
3. What water/room temperature helps the yeast create the most gas?

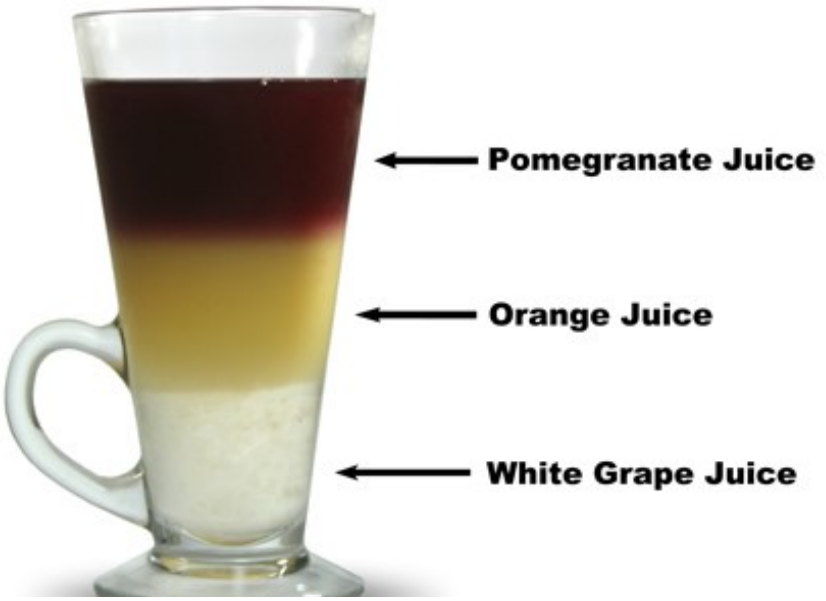
4. What “yeast food” helps the yeast create the most gas? (try sugar, syrup, honey, etc.)

3. A Density Experiment You Can Drink!

Density is a fascinating and sometimes tricky idea to understand. This ***Drink of Density*** will help bring home the idea of density in liquids, not to mention it looks cool when your all done, it’s tasty, and it’s even good for you – what more could you ask for in a science activity!

You will need:

- Juices that have different density levels. (see below for a simple explanation of density) The density of a juice is often determined by how much sugar or fruit is in it – the more sugar or fruit, the more dense the juice is. Powdered and canned juices do not work well for this experiment since they are almost entirely water. You will have to do some experimentation to find juices that are colorful and give a nice display of density, and that’s half the fun.
- A narrow glass (the more narrow it is, the easier it is to separate the density levels)
- Dropper



What to do:

1. Before you begin, you can guess which juices you think will be more dense and form a hypothesis of how the levels of your Drink of Density will turn out. Check the number of ingredients, the sugar content, and the water content to help you out.
2. In order to display your density levels, you will need to find out which of your juices are the most and least dense. Pour one of your juices into the narrow glass to fill it about 1 inch (2.5 cm) high. Fill a dropper with another juice and slowly drop it onto the inside of the glass so that it runs down the side of the glass. Watch the juice to see if it goes below or above the juice in there. (if it simply mixes with the juice and does not go above or below, it has the same density as the juice and you will need to move on to your next juice.
3. Continue experimenting with other juices to determine which juices go to the bottom (more dense) and which ones go to the top (least dense.)
4. Once you have the densities determined, start over with a clean glass and use the dropper for each level to create your final ***Drink of Density***!

Note: In case you were wondering, the juices in the photo are (top) Tropicana Pomegranate-Blueberry, (middle) Tropicana Pure Premium Orange Juice, (bottom) Nature's Promise White Grape (33 grams of sugar in 6.75 ounces!)

How Does It Work?:

The density of liquids demonstrates the the amount of "stuff" (atoms, mass) that are present in a particular volume of the juice. In other words, if you have cup with 200ml of plain water, and a cup with 200 ml of water that has lots of sugar dissolved

in it, the cup of sugar water will be heavier even though they are the same volume of liquid – the invisible sugar molecules are dispersed in the water, making it heavier (more dense.)

B) Books to Read

1. The Cartoon guide to Chemistry by Larry Gonick.

2. Uncle Tungsten by Oliver Sacks.

3. The disappearing Spoon by Sam Kean.

Happy Holidays