Title: Unknown Substance Lab

Statement of the Problem:

How can you identify a set of nontoxic unknown substances?

Preliminary Observations:

Different indicators are used to help scientists determine unknown substances. It's strange to think of something like color being an indicator of what an unknown is, but this is sometimes used by people who are very familiar with the unknown. Smell can be a handy way of identifying a chemical if you've got a good nose. However, since many chemicals are extremely toxic, this is probably not a test you should use. Most chemicals have melting and boiling points that are very different from others. If you can accurately find the melting and/or boiling temperature of your unknown chemical, you can probably match that value to a table of melting and boiling points to identify your unknown. You should never taste an unknown substance.

Source:

16 Sept. 2007 <http://misterguch.brinkster.net/identify.html>. "how do scientists use indicators to identify unknowns?" Simple tests you can do.

History:

Chromatography is when you take a chemical and dissolve it in a gas or liquid (referred to as the carrier gas or liquid). This can be done to identify unknown substances.

Source:


**Hypothesis:**

If you use your observations then you can identify the unknown substances. Baking Soda will... Sugar will....etc. Write a testable hypothesis on what each unknown substance will do when exposed to each indicator.

Powders: Sugar, Baking Soda, Salt, Corn Starch, and mixture of two of these.

Indicators: Iodine, Vinegar, Warm Water, Tap Water

**Materials:**

- magnifying glass  - 1ml warm water  - 4 graduate cylinders  - 
- 1g of 4 unknown powders  - 1ml vinegar  - triple beam balance  - 
- 1g of unknown mixture  - 1ml iodine solution  - 4 eye droppers  - 
- 1ml water (tap)  - 5 petri dishes  - 5 sheets of wax paper  -

**Procedure Summary:**
In the lab we were identifying unknown substances. We got 4 unknown substances and then put each one in a separate petri dish. Then we took the 4 different solutions, vinegar, water, warm water and iodine and put a drop of each in a separate corner of the petri dish. We looked and saw how each solution acted and made our observations. We did this for each solution. The independent variable is the white powders and the dependent variables are the observations.

**Procedure Steps:**

1. Get a sheet of wax and go get a sample of an unknown substance. Make prediction on what the unknown substance is.
2. Weigh the substance on the triple beam balance, you should only have about 1 gram.
3. Spread the unknown substance all around in the petri dish.
4. Measure 1 ml of vinegar using the graduated cylinder and use the eye dropper and put some of the solution in one corner of the petri dish. Make your observations on how the substance reacted. (wash out eye dropper and graduated cylinder)
5. Measure 1 ml of water using your graduated cylinder and put some of the solution in another corner of the petri dish. Make your observations on how the substance reacted. (wash out eye dropper and graduated)
6. Measure 1 ml of warm water using your graduated cylinder and put some in the eye dropper and put it in another corner of the petri dish. Make your observations on how the substance reacted. (wash out eye dropper and graduated cylinder)
7. Measure 1 ml of iodine using the graduated cylinder and use the eye dropper and put the solution in last corner of the petri dish. Make your observations on how the substance reacted. (wash out eye dropper and graduated cylinder)
8. Make sure you clean out the eye droppers, petri dishes and graduated cylinders.
9  Repeat all these steps for the other substances and mixture.

Safety:

Iodine is toxic and caution should be used when handling (DO NOT taste). Hot water can cause burns, caution should be used when handling. Don’t taste any substance in the lab. Always wear your safety goggles.

Results:

*See attached papers.

Analyze:

On unknown substance #1 I thought it was baking soda, the appearance was white powder. The reactions after testing were: vinegar it bubbled and fizzed, water it looked cloudy, iodine it was clear and a little yellow and with warm water it was clear with the substance around it. The actual substance was BAKING SODA. On unknown substance #2 I thought it was cornstarch, the appearance was white powder. The reactions after testing were: vinegar it was cloudy and fizzed a little, water it looked cloudy, warm water it looked cloudy and with iodine it
was pinkish/purple. The actual substance was CORN STARCH. On unknown substance #3 I thought it was flour, the appearance was white powder. The reactions after testing were: vinegar it was cloudy, with water it was cloudy, warm water it was a little cloudy and with iodine it was less cloudy. The actual substance was FLOUR. On unknown substance #4 I thought it was sugar, the appearance was white powder. The reactions after testing were: vinegar it was chunky, with water it was cloudy, warm water it stayed the same and with iodine there was nothing. The actual substance is SUGAR. On the mixture I thought it was corn starch and baking soda, the appearance was white powder. The reactions after testing were: vinegar it really fizzed, with water it stayed the same, with warm water it was really cloudy and with iodine it was dark purple. The actual substances was BAKING SODA AND CORN STARCH.

**Conclusion:**

Yes I accept my hypothesis. I accept it because after doing my observations I could identify the unknown substances.

If I was baking and I had containers that were unmarked and I was wanting to know which one was flour, I could do a test to see which one was flour. Then I could use that to identify which one was flour.

If you are not careful then you could have not known what substance you were testing (1 or 2), you could have let vinegar and water run into each other.

For this experiment my percent error was n/a.