Name: _____ Period: _____ Date: _____

What's that White Powder?!

Think Like a Scientist

Directions: In groups of two you will be performing a lab. All substances are non-toxic and you have probably come into contact with them everyday or have at least once in your life. You and your partner will need to construct a data table to record your results. The "best" data tables will start the year off with extra credit!

QuickTime™ and a decompressor are needed to see this picture.

Pre-Lab: For many labs, you will be required to fill out a pre-lab section. The purpose of the pre-lab section is to provide you the information needed to efficiently perform the laboratory.

In this lab, we will be describing several substances. In order to properly describe them we have to review some of our chemistry terms from our freshman science course.

1. Give an example of each type of property.
    a. Physical _____
    b. Chemical _____

2. How does a physical property and a chemical property differ?

_____

_____

_____

_____

3. Given an example of each type of change.
    a. Physical _____
    b. Chemical _____

4. How does a physical change and a chemical change differ?

_____

_____

_____

_____

Indicators

Labs sometimes call for the use of indicators. An indicator is a chemical that changes color in the presence of another chemical. Indicators are used a lot in the medical field, because they can tell if a particular substance is presence. For example, pregnancy tests use an indicator that turns color in the presence of a hormone only produced when someone is pregnant.

The indicator we are using today is litmus paper. There are two types of litmus paper: red and blue. Litmus paper indicates if a substance is acidic or basic. I've provided you with vinegar (also known as acetic acid), which will help you determine which type tests for an acid and which tests for a base.

Type of Litmus Paper	Color after Vinegar (Acetic Acid)
Red	
Blue	

5. Red litmus paper changes color in the presence of _____.

6. Blue litmus paper changes color in the presence of _____.

Procedure:

****You do not need to perform the experiments in alphabetical order.**

A blank data chart has been included in this lab. Before you begin think about what a scientist would want to observe and take note of (physical chemical properties and changes) when trying to determine an unknown substance. These are the things you should be including in your data chart. Before you begin experimenting you should have your data chart ready to record your observations.

This lab is meant to be fun. Feel free to add more water after your initial 18 – 20 mL. Play with your substances (over the sink!). Poke at them with the popsicle stick! Pour them in your hand!

I have included vinegar (acetic acid) and litmus paper for you to help determine one substance from another. Make sure to use them when experimenting!

It is important that you observe the physical and chemical properties and changes of each substance, because at the end of the lab you will be given an unknown substance you'll have to determine based on your data charts.

Substance A – D
Fill up a disposable cup about halfway full of your substance.
Add 18 – 20 mL of water using your graduated cylinder to measure.
Mix with a popsicle stick.
Perform other tests on substance.

Substance E
See your instructor for a sample of this substance.
Add 20 mL of water to the substance.
Perform other tests on substance.

Post Lab Questions:

1. What do you think each substance is?
    a. _____
    b. _____
    c. _____
    d. _____
    e. _____

2. Describe some other tests you could perform if given the proper equipment on each of the substances to determine their identity? (Name at least three)
    1. _____
    _____
    _____

    2. _____
    _____
    _____

    3. _____
    _____
    _____

3. Of your tests above which test for a physical property and which tests for a chemical property.
    Physical:
    _____
    _____

    Chemical:
    _____
    _____

Unknown

Many chemistry laboratories in school ask you to identify an unknown substance based on your observations of known substances. Unknowns can range from one substance to a mixture of several substances, so they may exhibit several different properties of your known substances.

Your instructor will provide you with an unknown substance that has two different white powders in it. It is your job to determine what they are.

Construct a data table for your unknown to help you determine what substances are present.

What two substances (A, B, C, D, E) are present in your unknown:

1. _____
2. _____

Scientist must support their conclusions using evidence they've collect. In this section you are to explain how you came to your conclusion based on your observations.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Extended Response:

Not every job in chemistry involves determine an unknown substance. Engineering jobs involve understanding the chemical and physical properties of a substance and determining new uses for that substance. Engineers combine knowledge and creativity to create solutions for real world problems.

Using what you know about the substances from this lab, pick one substance and come up with a new use for that substance based on the properties you determined in lab. Make sure to explain why it could be used for that purpose.

There is no wrong answer!

Substance _____

New Use: _____

_____

_____

_____

_____

_____

Explain:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____