

Identifying Mystery Powders

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Lesson Plan

Properties of White Powders in our kitchen



Identifying Mystery Powders



Challenge

Mystery Material X

Properties of White Powders in our kitchen

We can find many white powders in our kitchen.



Salt
Sugar
Starch
Baking Soda
Citric Acid

Warm Up

You walk into the kitchen and find a white powder on the counter. You don't know what it is – it looks like baking soda, but it could be rat poison. You want to know what it is, but you don't want to taste it.

Question

How can we identify the white powder without tasting them?

Your answer

I think

**Write your answer on your worksheet 1.
And discuss your answer in your group.**

Identifying methods

Physical Properties of matter	Chemical Properties of matter
Size, Color, Density, Texture, Appearance, Melting point, State of matter Solubility	Iodine Test pH Heating

Question

Which powder dissolve in water easily, sugar or powdered milk?

- a. Sugar.**
- b. Powdered milk.**
- c. I don't know.**

Write your answer on your worksheet 1 (Box A).

Question

Which powder burns when heated, salt or sugar?

- a. Salt**
- b. Sugar**
- c. I don't know**

Write your answer on your worksheet 1 (Box B).

Question

In the presence of starches, we identify it with iodine test. What color does iodine change?

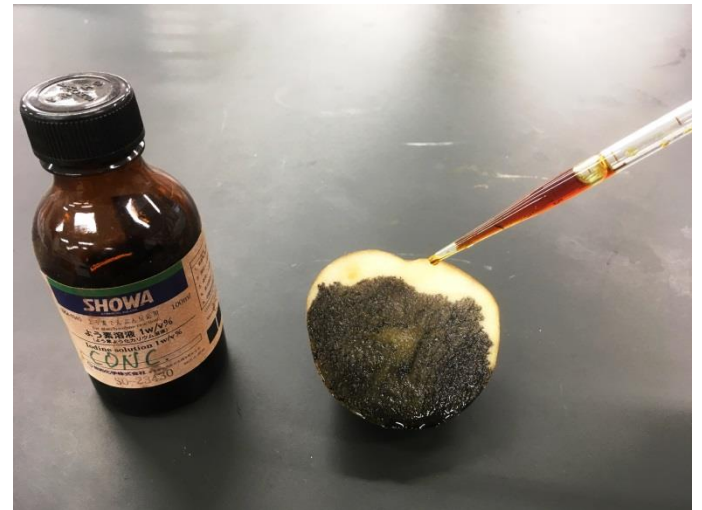
- a. Blue**
- b. Orange**
- c. Red**
- d. I don't know.**

Write your answer on your worksheet 1 (Box C) .

Iodine Test

- To identify the presence of starch.

When iodine mixed with starch, the color of iodine changes to a deep shade of blue.



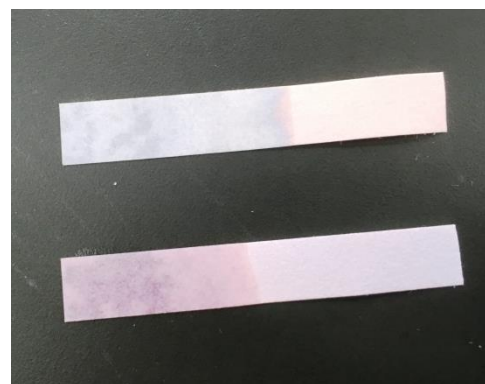
Question

In the presence of acid, what color does blue litmus paper change?

- a. No change**
- b. Orange**
- c. Red**

Write your answer on your worksheet 1(Box D).

Litmus paper



	Test with acid	Test with alkali
Red litmus paper	No changes	Red → Blue
Blue litmus paper	Blue → Red	No changes

Question

Which powder shows basicity?

- a. Salt**
- b. Baking soda**
- c. Citric Acid**

Write your answer on your worksheet 1(Box E).

Hints for Identifying Mystery Powder

- * Each white powder has different physical and chemical properties of matter.
- * When we focus on these properties of matter, we can identify what powder is.



Identifying Mystery Powders

Identifying Mystery Powders

Jennifer keeps all her white powders for cooking in clear bags. Her roommate borrowed her powders. The roommate used up all of the powders and replaced them, but she got the bags all mixed up and now Jennifer has no idea what is in each bag.

Objective

Here are 5 kinds of mystery powders. The white powder is either salt, sugar, starch, baking soda, or citric acid. We are going to identify each of them.

Collect Data

Now, we collect data from 5 mystery powders based on physical and chemical properties of matter :

- * Appearance(Including texture)
 - * Water Solubility
 - * pH Test
 - * Iodine Test
 - * Heating

Collect Data

table	Powder A	Powder B	Powder C	Powder D	Powder E
Appearance		Activity 1			
Water Solubility					
pH test		Activity 2			
Iodine test					
Heating		Activity 3			
The Powder is					

Attention

**While in the activity,
Keep standing.**

Activity 1 : Appearance

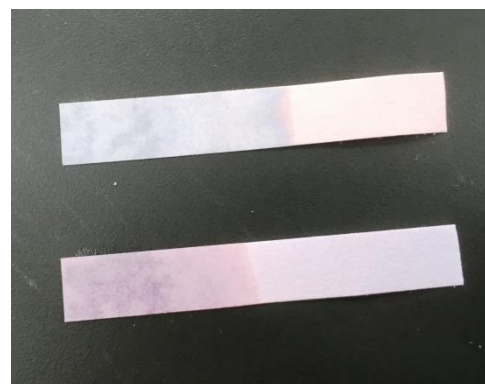
- * Take a small amount of powder with the back of the spoon from each bags and put it on the medical papers .
- * Observe with a magnifying glass and check the appearance.(fine or coarse powder)
- * Test only 1 powder at a time .
- * Be sure to clean the spoon completely before moving onto the next powder.
- * Record your findings on worksheet 2.

Activity 2 :

Water Solubility / pH Test / / Iodine Test

- * Put 5 powders in each into separate well in the cell plate, and add water up to the top.
- * Observe water solubility.
- * Test the pH with litmus paper. Blue litmus paper turns red under acidic conditions and red litmus paper turns blue under basic or alkaline conditions. No color change is neutral.
- * After that, Iodine Test for starch. Starch when mixed with Iodine turns a deep shade of blue.
- * Record your findings on worksheet 2.

Litmus paper



	Test with acid	Test with alkali
Red litmus paper	No changes	Red → Blue
Blue litmus paper	Blue → Red	No changes

Activity 2 :

Water Solubility / pH Test / / Iodine Test

- * Put 5 powders in each into separate well in the cell plate, and add water up to the top.
- * Observe water solubility.
- * Test the pH with litmus paper. Blue litmus paper turns red under acidic conditions and red litmus paper turns blue under basic or alkaline conditions. No color change is neutral.
- * After that, Iodine Test for starch. Starch when mixed with Iodine turns a deep shade of blue.
- * Record your findings on worksheet 2.

Clean up!

- *Before the next activity, clean up your table.**
- *Do not place the laboratory equipment around the alcohol lamp.**

Activity 3 :

Heating

- * Wrap your spoon with aluminum foil, and put one powder on it.
- * Set the fire on your alcohol lamp.
- * Heat up your spoon carefully.
- * After that, put the spoon into a beaker with water and cool down.
- * Repeat the same process for other powders.
- * Record your findings on worksheet 2.

Caution: Do not touch hot part of the spoon.

Objective

Here are 5 kinds of mystery powders. The white powder is either salt, sugar, starch, baking soda, or citric acid. We are going to identify each of them.

Results

	Powder A	Powder B	Powder C	PowderD	Powder E
Appearance	Coarse	Coarse	Fine	Coarse	Fine
Water Solubility	Soluble	Soluble	Soluble	Soluble	In soluble
pH test	Acid	Neutral	Base	Neutral	Neutral
Iodine test	No	No	No	No	Yes
Heating	Melted	Burned	Not burned	Not burned	Burned
The Powder is	Citric Acid	Sugar	Baking Soda	Salt	Starch

Challenge

Here is mystery “material X”. The material is either salt, sugar, starch, baking soda, or citric acid.

“Material X” is different for each group.

Let’s plan your experiment to identify “material X” on worksheet 3.

Challenge

Write on worksheet 3.

(1) What is the most effective order of experiment?

Why do you think your plan is most effective?

(2) Write findings your observations in the table.

Results

	Powder X is
Group1	Sugar
Group2	Salt
Group3	Baking Soda
Group4	Starch
Group5	Citric Acid
Group6	Salt
Group7	Sugar
Group8	Baking Soda
Group9	Citric Acid

Summary

- * Each white powder has different physical and chemical properties of matter.**
- * When we focus on these properties of matter, we can identify what powder is.**



Thank you for your corporation

**Please answer the question on
worksheet 4.**