



Mystery Powder Identification



You buy a box of mystery powders from a Garage Sale. It is only 50 cents and you know that with your amazing Chemistry knowledge you will be able to work out which powder is what substance.

Unfortunately you can't taste or smell them to work it out because you are allergic to Cream of Tartar – if you eat or smell it, you will swell into a big pus ball.

Below are the things that you know about each product. Use them to work out which powder is which.

- **Talcum Powder:** Doesn't dissolve in water or react with acid. Has no effect on pH paper. Settles over time. Does float on the surface of water if it isn't mixed in.
- **Milk Powder:** Does dissolve in water BUT turns the water into a white-ish liquid.
- **Baking Soda:** Doesn't dissolve in water BUT when mixed in water it increases the water's pH (makes it more basic pH paper goes green, purple or blue). Does react in acid. Lots of gas is made.
- **Custard Powder:** Doesn't dissolve in water but when mixed with water, it turns into a yellow liquid which settles out to the bottom when left.
- **Cream of Tartar:** Doesn't dissolve in water BUT when mixed in water, it decreases the water's pH and makes it more acidic. The pH paper goes slightly orangey-pink. Sinks in water if not mixed in.
- **Table Salt:** Dissolves in water and doesn't change the colour of pH paper. Has smallish crystals.
- **Citric Acid:** Dissolves in water and causes the pH of water to drop (makes it acidic so turns the pH paper red or pink). Has smallish crystals.
- **Icing Sugar:** Dissolves in water BUT does change the colour to slightly white. Doesn't react in acid or alter the pH paper's colour.
- **Cornflour:** Doesn't dissolve in water and settles to the bottom over time, doesn't react in acid and doesn't change the pH paper's colour.
- **Raro Powder:** Does dissolve, water goes a slight orange colour, changes the pH slightly so pH paper goes orangey/reddish in colour.
- **White Sugar:** Does dissolve in water and doesn't change the colour of the water. Doesn't react with acid and doesn't alter the colour of pH paper. Does have comparatively large crystals.

Make sure you read this information carefully. Once you have your results, it will help you identify which powder is which.



Method for Working Out the Mystery Powders

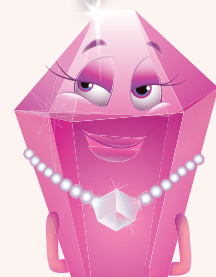
Equipment

Test Tubes (x 11), Stirring rod, dilute hydrochloric acid, pH paper (x 11 pieces), Forceps, Spatula, Watch glass, 200 mL beaker of water, spotting tile, square of paper with a small cross drawn on it, test tube rack, cloth.

Method

1. Label all the powders as A-K.
2. Using the watch glass and spatula, collect 8 spatulas of Powder A.
3. Add 4 spatulas of Powder A to a test tube. Add 5 cm of water to the test tube and stir well using a stirring rod. Hold the small square of paper with the cross on it behind the test tube to see if it has dissolved or not. Write down in your results table (next page) whether or not the powder dissolves.
4. Use the forceps to hold a piece of pH paper in the solution and note down the change in the colour of the pH paper in your results table. Throw out the pH paper.
5. Put the test tube in the test tube rack and leave it to see if the powder settles over time. Record this in your results table.
6. Wash the test tube and put it away.
7. In the spotting tile, add the rest of Powder A to one of the spots.
8. Add a small squirt of hydrochloric acid and note what happens in your results table.
9. Wash out the spotting tile and dry the spotting tile, forceps and stirring rod with the cloth.
10. **Repeat steps 1-7 for the other Powders B-K.**
11. Wash and put away all of your equipment.
12. Use the information above about each powder and your results to work out which powder is which and write these in the final column of your results table.

Make sure you follow the instructions carefully and keep the equipment clean and dry between each different powder.



Mystery Powder	Can You See Through the Test Tube?	Observations in Water F = particles floating then settle to the bottom over time. D = particles completely dissolved, don't settle. X = particles not dissolved, don't float.	Does it Change the Colour of the Water? What colour does it go? (includes colour/less)	Colour of pH Paper When Mixed With Water	Reacts with Acid Does it disappear and/or fizz when acid is added? (yes/no)	Scale of Reaction 1 2 3 4 5 little violent Write the number for the reaction.	We Think the Powder is . . .
A							
B							
C							
D							
E							
F							
G							
H							
I							
J							
K							