

MYSTERY POWDERS Unit (Primary Science – chemistry / solids)

BCTF CP1978.04

Lance Read UBC Educ

A. Learning Outcomes:

1. Work cooperatively*
2. Make observations.
3. Collect, organize, record and analyze data.
4. Seek and evaluate evidence.
5. Solve problems using scientific principles.
6. Draw conclusions.

* Students should work cooperatively in pairs

B. Materials

1. Powders: baking soda, powdered (icing) sugar, corn starch, flour, plaster of paris
Organize and prominently label each powder in containers

2. water, vinegar, iodine, heat (candle)

3. For each pair of students

- 1 –half egg carton – water-proof – styro – reusable (cut dozen size in half)
- 1- eye-dropper
- 1- wooden clothes peg
- 5 - 1” x 1” aluminum foil squares
- 1- candle (small votive work well)

C. Method

Test and record observations for each of the five powders separately

- Label each egg compartment A to E with water proof felt pen
- place 1/4 teaspoon of one powder in each of 5 of the egg compartments heat test done last
- record description of physical property on data worksheet.
- test, observe and record for each experiment test below
- after each powder is tested, clean egg carton and dry compartments completely

NB - With setup, prep, recording, and cleanup one powder can be done each half hour period

Experiment 1: 1 – 2 drops of H₂O on each powder. Note any color changes. (Is the powder now a different color than the original color of the water?)

Basic observation questions:

- What was the original appearance of each powder?
- What happened when water was added to each powder?
- What happened when vinegar was added to each powder?
- What happened when iodine solution was added to each powder?
- Did all powders produce the same response?

MYSTERY POWDERS Unit (Primary Science – chemistry / solids)

BCTF CP1978.04

Lance Read UBC Educ

NB - Wash out egg carton and REPEAT for powders 2-6

Experiment 2: 1 – 2 drops of vinegar on each powder. Note any changes.

Experiment 3: 1 – 2 drops of iodine on each powder. Note any changes.

Experiment 4: Heat each powder.

Method – make a small “canoe” shaped container from foil square (upturned edges)
separately heat $\frac{1}{4}$ tsp of each sample in fresh foil. Carefully note any changes.

Four More Powders

Repeat Experiments 1 to 5 for each of the four remaining powders – carefully recording all data

Once students have successfully prepared the property observation chart, they are ready to solve a mystery powder “mystery”

Mystery Powder challenge

Teacher chooses one of the powders (unlabelled)

Students add $\frac{1}{4}$ tsp of this powder to 3 of the compartments and the foil

Run the water, vinegar, iodine and heat test on the mystery powder.

Use observation chart to determine what the mystery powder is.

Bonus experiment: combine two powders together

e.g. BS and plaster, or Corn Starch and plaster

Teacher background tips:

NB - vinegar and water cause plaster to harden but not to bubble

- heat causes corn starch to bubble & blacken, while BS and flour brown

MYSTERY POWDERS Unit (Primary Science – chemistry / solids)

BCTF CP1978.04
Lance Read UBC Educ

MYSTERY POWDERS Data Recording Grid

Name _____

1. Describe the physical properties of each powder in the A, B, C, D, and E boxes.
colour, texture, odor, etc.
2. Describe the reaction in the appropriate box for test.
3. In each box, identify the reaction as a PHYSICAL or CHEMICAL change.

POWDER	#1 H ₂ O / Water	#2 vinegar	#3 iodine	#4 heat
A				
B				
C				
D				
E				