Can't Judge a Powder
Observation Guidelines

Allowed reactant abbreviations when making observations:

X	Unknown in solid form
S	Aqueous Solution of Unknown in Distilled Water
A	HCl 1M
B	NaOH 1M
C	Na_2CO_3 Solution
H_2O	Distilled Water

Read all instructions before recording your observations.

1. Record observations on attached sheets using the supplied pen.
2. Be specific.
3. Write or print neatly.
4. Make the observations meaningful.

Example Observations	Bad example	Good Example
Include the reactant identification	The reaction fizzed.	The reaction of S and A fizzed
Report pH as the numeric value	B turned the paper green.	The pH of B is 6.
When using a digital conductivity meter, indicate the units in the observation	The conductivity of A is 9	The conductivity of A is 9 µS/cm.
Report only observations, not conclusions, inferences or interpretations	The reaction of X and H_2O is exothermic.	The temperature of the H_2O increased from 20 C to 28 C when X was added.
	The solution of X and H_2O is ionic.	The solution of X and H_2O is highly conductive.
Record only one observation on each line.	The reaction of X and A got hot and turned red.	The reaction of X and A got hot.
		The mixing X and A made a red solution.

5. Points may be deducted for observations not following the above guidelines.
6. Do not make any observations for the H_20, HCl and NaOH. It will waste your time and will result in deductions for not following directions. These observations will be given as part of the test portion.
7. The tiebreaker will be based on the overall quality of the observation.
8. Keep safety glasses and aprons on until instructed to remove them.

Can't Judge a Powder

Team Number 81	Team Name Bada Synayd
Participants Michael Schaffer, Josh Ostrow	

Observations

1	The powder is blue
2	The powder is in coarse, crystaline grains
3	~~The powder sinks in water~~
4	~~The powder does not dissolve in water~~
5	~~The powder does not react with HCl~~
6	~~The powder does not react with NaOH~~
7	The powder reacts with Sodium Carbonate by turning a light...
8	color and clouding the water
9	The pH of the Sodium Carbonate with the powder is 10
10	The Sodium carbonate with the powder is moderately electrically conductive
11	The Sodium carbonate by itself is moderately electrically conductive
12	The powder has low luster
13	The powder has no odor
14	the powder with the sodium carbonate has no odor
15	The distilled water does not conduct electricity
16	The powder has some white spots in it
17	The powder adsorbs ~~water~~ the sodium carbonate
18	After time, the powder with the sodium carbonate turns..
19	completely light blue
20	the powder is opaque
21	The sodium carbonate is translucent and off-white
22	The particles of the powder vary in color
23	The powder itself does not conduct electricity

Not crossed out

24	The pH of the sodium carbonate by itself is 10
25	The powder with the sodium carbonate seems to float sometimes
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Additional observations to be used with the test:

Observations of HCl solution	
100	A has a pH of 1.
101	A is highly conductive.
102	The temperature of A about room temperature.
103	A is a clear colorless liquid.

Observations of NaOH solution (abbreviated B)	
104	B has a pH of 13.
105	B is highly conductive.
106	The temperature of B about room temperature.
107	B is a clear colorless liquid.

Observations of H_2O	
108	H_2O has a pH of 7.
109	H_2O is very slightly conductive.
110	The temperature of H_2O about room temperature.
111	H_2O is a clear colorless liquid.

Team Number B1	Team Name Bala Cynwyd	Score 51
Participants Michael Schaffer, Josh OSTROW		Rank 7

Key: X Unknown in solid form; S Solution of Unknown in Distilled Water; H_2O Distilled Water; A HCl 1M; B NaOH 1M; C Na_2CO_3 Solution

Complete the following questions. Some questions only need the observation number. Others are multiple choice (select best answer). List the number of the observation(s) that you have recorded that justifies your answer. Remember the section letter with the number. If an observation was not made for a particular question you may write an observation in below the question.

1 (10pts) Powder Observations. Points (max 5) will be determined by the quality of the observations.
1 2 12 16 20

2 (5 pts) Na_2CO_3 Solution is: ___ a Strong Base __√__ a Weak Base ___ Neutral ___ a Weak Acid ___ a Strong Acid
Observation Number(s) 24 Additional Observation ___

3 (5 pts) S (X in H_2O) is: ___ a Strong Base ___ a Weak Base √ Neutral ___ a Weak Acid ___ a Strong Acid
Observation Number(s) ___ Additional Observation ___

4 (16pts) For each liquid select the best choice for the ionic characteristics of the solution.

H_2O	___ Ionic	√ Covalent	___ Can not tell	Observation Number(s) 109
HCl	√ Ionic	___ Covalent	___ Can not tell	Observation Number(s) 101
NaOH	√ Ionic	___ Covalent	___ Can not tell	Observation Number(s) 105
Na_2CO_3	√ Ionic	___ Covalent	___ Can not tell	Observation Number(s) 11
S (X in H_2O)	√ Ionic	___ Covalent	___ Can not tell	Observation Number(s) 4

Additional Observation ___

5 (5 pts) The specific gravity of X is: √ Greater than 1.0 ___ About 1.0 ___ Less than 1.0 ___ Can not tell
Observation Number(s) 3 Additional Observation ___

6 (5 pts) X in H_2O is: ___ Highly Soluble ___ Moderately Soluble ___ Slightly Soluble √ Insoluble ___ Can Not Tell
Observation Number(s) 4 Additional Observation ___

7 (10pts) Arrange the following solutions from most acidic to most basic and record the observation number below each solution.

Most Acidic					Most Basic
HCl	S	H_2O	Na_2CO_3	NaOH	
Observations 100	—	108	24	+3 101	

Additional Observation ___

8 (5 pts) Was a gas produced when HCl was mixed with the Na_2CO_3 Solution:
___ Gas √ No Gas ___ Can not tell Observation Number(s) 7 pt
Additional Observation ___

9 (10pts) Using the materials in this event, 2 different precipitates could be formed. List the solutions used to get the precipitates:
Precipitate 1 Na_2CO_3 and X formed a precipitate Observation Number(s) 7
Precipitate 2 ___ and ___ formed a precipitate Observation Number(s) ___
Additional Observation ___

10 (10pts) The 2 precipitates formed in this event could be dissolved using HCl. List the observations where they were dissolved:
Precipitate 1 was dissolved by HCl Observation Number(s) ___
Precipitate 2 was dissolved by HCl Observation Number(s) ___
Additional Observation ___

11 (5 pts) Supervisor Entry – Good Lab Practices

12 (pts) Supervisor Entry – Followed Instructions

51

Can't Judge a Powder
Solon Invitational February 6, 2010

The Unknown was Copper Sulfate, $CuSO_4 \cdot 5H_2O$

Scoring (0-4,+1)

4	For correct well written observation
3	For correct observation
2	For incorrect observation
1	For correct late observation
+1	For correct answer (max total 5)

1 10 pts	Looking for observations including: Particle shape, Particle size, Color, Translucent, Not Clumpy, Crystalline, Oder, etc. 2 points for each good observation, 1 point for each not so good observation, 0 points for incorrect or redundant observations.
2 5 pts 0-4,+1	Na_2CO_3Solution is: __ a Strong Base __X__ a Weak Base ___ Neutral ___ a Weak Acid ___ a Strong Acid The pH in the observations should be 10 to 11.
3 5 pts 0-4,+1	S (X in H_20) is: ___ a Strong Base ___ a Weak Base ___ Neutral _X__ a Weak Acid ___ a Strong Acid The pH in the observations should be 4 to 5.
4 16 pts	For each liquid select the best choice for the ionic characteristics of the solution. H_20 _____Ionic X(1 pt) Covalent __ Can not tell Observation Number __109(1 pt)__ HCl X(1 pt) Ionic _____ Covalent __ Can not tell Observation Number __101(1 pt)__ NaOH X(1 pt) Ionic _____ Covalent __ Can not tell Observation Number __105(1 pt)__ Na_2CO_3 X(1 pt) Ionic _____ Covalent __ Can not tell Observation should have highly conductive in it(4 pts max) S (X in H_20) X(1 pt) Ionic _____ Covalent __ Can not tell Observation should have highly conductive in it(4 pts max)
5 5 pts 0-4,+1	The specific gravity of X is: _X__ Greater than 1.0 ___ About 1.0 ___ Less than 1.0 ____Can not tell X sinks to the bottom when placed in water
6 5 pts 0-4,+1	X in H_2O is: _X__ Highly Soluble ___ Moderately Soluble ___ Slightly Soluble ___ Insoluble ___ Can Not Tell Observation should mention how much X was dissolved in how much water.
7 10 pts	Most Acidic (1 pt each) __HCl__ __S_____ H_20__ Na_2CO_3_ _NaOH__ Most Basic Observations (1 pt each) __100 __ _pH 4-5_ __108___ pH 10-11_ _104____
8 5 pts 0-4,+1	_X__ Gas ___ No Gas ____ Can not tell Observation Number(s) _____ Observation should include effervesced or fizzed
9 10 pts 0-4,+1 For each	Precipitate 1 S and NaOH Observation should include S, NaOH and a description of the precipitate formed Precipitate 2 S and Na_2CO_3 Observation should include S, Na_2CO_3 and a description of the precipitate formed
10 10 pts 0-5 For each	Precipitate 1 Observation should include mixing and the appearance of the resulting solution Precipitate 2 Observation should include mixing and the appearance of the resulting solution, Na_2CO_3 .precipitate should also include effervesced
11 0-5	
0-5	

91 Points total