**Analysis of White Powders Teacher’s Notes and Key**

* If supplies or time are limited for this lab, you can divide class into 6 groups and have each group test a specific substance; then they can share their data with the rest of the class
* Emphasize the hazard of cross-contamination and how results can be incorrect if this happens
* For the unknown sample, mix any two of the substances in any proportion
* To save time, reaction plates can be used in the place of petri dishes if they are available in your lab
* You can add a UV light as another physical characteristic
* A variation of this lab would be to substitute over-the-counter medications for the powders
* Basic powder reactions are as follows, but could be variable based on student opinion:

**DATA TABLE 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **Substance** |  |  | **Color** |  |  | **Appearance** |  |  | **Water** |  |  | **Vinegar** |  |  | **Iodine** |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | Small chunky | |  | NR, | |  |  |  |  |  |  |  |
|  | **Popcorn Salt** |  |  | Dull white | |  |  | dissolves | |  | NR | |  | Yellow/brown | |  |
|  |  |  |  | grains | |  |  |  |  |
|  |  |  |  |  |  |  |  | slightly | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **Powdered** |  |  |  |  |  |  |  |  | NR, | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | Bright white | |  | Fine powder | |  | dissolves | |  | NR | |  | Yellow/brown | |  |
|  | **Sugar** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | slightly | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **Starch** |  |  | Bright white | |  | Fine powder | |  | NR, thickens | |  | NR | |  | Purple/black | |  |
|  |  |  |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **Baking** |  |  | Bright white | |  | Chunky powder | |  | NR | |  | Bubbles | |  | Yellow/brown | |  |
|  | **Powder** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |
|  |  |  |  | Dull, grayish | |  |  |  |  | Thickens, | |  |  |  |  |  |  |  |
|  | **Plaster** |  |  |  | Chunky powder | |  | releases | |  | NR | |  | Yellow/brown | |  |
|  |  |  | white | |  |  |  |  |  |
|  |  |  |  |  |  |  |  | heat | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | |  |  | | | | |  |  |  |  |  |  |  |  |  |  |
|  | **Unknown** |  |  | **ANSWERS WILL VARY** | | | | |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Answers to the Questions**

1. Physical characteristics of this lab would include color, appearance, thickening or dissolving in water, or heat release. Chemical characteristics would include reactions to vinegar and iodine.
2. Answers will vary based on student opinion.
3. Answers depend on what substances made up the unknown.
4. This lab relates to actual unknown substance testing because if a substance is found, the first thing that is done is visual inspection to narrow down the possibilities. Chemical tests can finalize and identify the substances. Also, since the unknown in this lab was a mixture of two substances, it is what toxicologists experience regularly. Drug manufacturers will mix specific drugs with common items (such as baking powder) as “fillers” so they can produce greater quantities.