# **SCIENCE UNWRAPPED STANDARDS**

| **Standard Code** | **6-8.PS1.A.2 (MLS) MS-PS1-2 (NGSS)** | **Grade Level** | **7** |
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| **DOK Ceiling** | 3 | **Link to** [**Proficiency Scale**](https://drive.google.com/file/d/1nbLI8ESJo_HypPWKddomHz-S8l0KlBHQ/view?usp=sharing) | **Link to** [**Exit Slip**](https://docs.google.com/document/d/13_n62fy8oiYNq1ml-Hpro1lGARfZYbXn-H86b2NX2_k/edit?usp=sharing)  **Link to** [**Assessment Bank**](https://docs.google.com/document/d/1LGN0cP7ppMdNmfc4KQrB76UfT_3uIFPHCb4nHP-eYOE/edit?usp=sharing) |
| **Standard Text** | **Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.**  **Clarification Statement:** Examples of reactions could include but are not limited to burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride. | | |
| **Concepts / Knowledge**  **(What do students need to know?)**  ***In Science, this is your DCI.*** | | | |
| **Chemical Reactions**   * Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.   **Structure and Properties of Matter**   * Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. | | | |
| **Skills**  **(What should students be able to do?)**  ***In Science, this is your SEP.*** | | | |
| **Analyzing and Interpreting Data**   * Analyze and interpret data to determine similarities and differences in findings. | | | |
| **Domain Integration**  **(How does the standard transfer across this content area?)**  ***In Science, this is your CCC****.* | | | |
| **Patterns**   * Macroscopic patterns are related to the nature of atomic level structure. | | | |
| **Cross-Curricular Integration**  **(How does this standard fit into other content areas?)** | | | |
| * Macroscopic patterns are related to the nature of atomic level structure.   + identify there is a pattern   + make classification/categorizations based on the pattern   + apply the pattern to new similar phenomena   + make predictions based on established patterns | | | |
| **Learning Targets**  **(Written in student-friendly language. Each learning target should address a single skill.)** | | | |
| LT 1: I can use data to determine whether substances are the same based upon characteristic properties or indicators.  LT 2: I can analyze and interpret data to argue whether a chemical change occurred based on patterns in data properties of substances before and after the substances interacted. | | | |
| **Vocabulary That Supports the Standard**  **(What vocabulary do students need in order to reach mastery of the standard?)** | | | |
| **precipitate***:* an insoluble solid that emerges from a liquid solution​.  **substance*:***a sample of matter  **chemical reaction*:***the process by which one or more substances change to produce one or more different substances.  **chemical property:** is any of a material's properties that becomes evident during, or after, a chemical reaction; that is, any quality that can be established only by changing a substance's chemical identity.  **physical properties:**are properties that can be measured or observed without changing the chemical nature of the substance.  **density:**is a measure of how compact the mass in a substance or object is.  **solubility**: the ability to be dissolved, especially in water  **compound** : a pure substance composed of two or more chemically bonded elements.  **element**: a pure substance that is made of one type of atom.  **flammability:** is the ability of a chemical to burn or ignite, causing fire or combustion.  **volume:** the amount of space that an object takes up, or occupies.  **mass**: a measure of the amount of matter in an object.  **matter:** anything that has mass and takes up space  **boiling point:** the temperature at which boiling occurs.  **chemical change:** a change that results in the formation of new substances.  **freezing point**: the temperature at which freezing occurs.  **melting point**: the temperature at which a solid turns into a liquid. | | | |
| **Prerequisite Knowledge and Skills**  **(What standards prior to this grade level provide prerequisite knowledge for this standard?)** | | | |
| **(5.PS1.B.1)** Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation. | | | |
| **Common Misconceptions and Typical Errors**  **(What do students typically struggle with when learning this standard?)** | | | |
| Based on 5th grade DCIs, some students may have an idea that new substances can be made from mixing old substances and may call such transformations a chemical reaction, but they are unlikely to have a particle level model to explain how this is possible and what is happening to the matter in the system. | | | |
| **Evidence of Learning**  **(What are some examples of how students can demonstrate their learning?)** | | | |
| * Students explain the difference between a physical change and a chemical change.   ● Students explain the difference between a physical property and a chemical property.  ● Students organize given data about the characteristic physical and chemical properties (e.g., density, melting point, boiling point, solubility, flammability, odor) of pure substances before and after they interact.  ● Students organize the given data in a way that facilitates analysis and interpretation.  ● Students analyze the data to identify patterns (i.e., similarities and differences), including the changes in physical and chemical properties of each substance before and after the interaction (e.g., before the interaction, a substance burns, while after the interaction, the resulting substance does not burn).  ● Students use the analyzed data to determine whether a chemical reaction has occurred.  ● Students support the interpretation of data by describing that the change in the properties of substances is related to the rearrangement of atoms in the reactants and products in a chemical reaction (e.g., when a reaction has occurred, atoms from the substances present before the interaction must have been rearranged into new configurations, resulting in the properties of new substances). | | | |
| **Assessment**  **(Sample Question Stems or a Sample Assessment Question)** | | | |
| 1. Classify the following situation as either a physical or chemical change.  a. Baking soda and vinegar are mixed together causing bubbles to form.  b. Water turns from liquid to gas at 100 degrees C  c. Paper becomes ash after being lit on fire d. An iron nail rusts when its been exposed to rain over time e. A plastic pipe cracks when water freezes inside  2. What rule did you use to determine whether the change is physical or chemical? A group of students conducted an investigation to determine how temperature affects the phase of a substance. To do so, they placed a solid form of the substance in a glass beaker. The glass beaker was then placed on a hot plate and the temperature was recorded every two minutes. The data is found in the table below.  1. Develop a graph to display the data provided in the data table. 2. What does the pattern of data you see allow you to conclude from the experiment? | | | |
| **Assessment Boundaries**  **(What are the limits for how this standard can/should be assessed.)** | | | |
| Tasks should be limited to an analysis of the following properties: density, melting point, boiling point, solubility, flammability, and color. | | | |
| **Notes**  **(What do teachers need to consider when teaching this standard?)** | | | |
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| **Writer** | Javier Trejo | **Reviewer** | Dynesse Saling | **Approved by** |  |
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