SCILLSS Classroom Science Assessment Workshop

**Grade 5 SCILLSS Model Unpacking Tools**

## Grade 5 SCILLSS Model Unpacking Tool for 5-PS1-1

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| **Grade:** | 5 |
| **NGSS Performance Expectation: 5-PS1-1.** Develop a model to describe that matter is made of particles too small to be seen.[Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [*Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.*] |
|  | **Science and Engineering Practices (SEP)** | **Disciplinary Core Ideas (DCI)** | **Crosscutting Concepts****(CCC)** |
| **Foundations** | **SEP: Developing and Using Models*** Develop a model to describe phenomena.
* Use a model to describe phenomena.
 | **PS1.A: Structure and Properties of Matter**Matter of any type can be subdivided into particles that are too small to see, but even then, the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. | **CCC: Scale, Proportion, and Quantity**Natural objects exist from the very small to the immensely large. |
| **Key Aspects** | * Identify components of the model
* Use a model to reason about a phenomenon
* Reason about the relationship of the different components of a model
* Select and identify relevant aspects of a situation or phenomena to include in the model
 | * Everything around us (matter) is made up of particles that are too small to be seen
* Matter that cannot be seen can be detected in other ways
* Gas (air) has mass and takes up space
* Gas (air) particles, which are too small to be seen, can affect larger particles and objects
* Gas particles freely move around in space, until they hit a material that keeps them from moving further, thus trapping the gas (e.g., air inflating a basketball, an expanding balloon).
 | * Understand the units used to measure and compare quantities
* Describe relationships between natural objects which vary in size (very small to the immensely large)
* Understanding of scale involves not only understanding systems and processes vary in size, time span, and energy, but also different mechanisms operate at different scales
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| **Prior Knowledge** | * Knowledge that a model contains elements (observable and unobservable) that represent specific aspects of real-world phenomena
* Knowledge that models are used to help explain or predict phenomena
 | * Matter is anything that occupies space and has mass
* Matter can change in different ways
 | **Relationships****to SEPs** | * Models describe the scale of natural objects
* Data analysis serves to demonstrate the relative magnitude of some properties or processes
* Calculate proportions correctly and measure accurately for valid results
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## Grade 5 SCILLSS Model Unpacking Tool for 5-PS1-3

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| **Grade:** | 5 |

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| **NGSS Performance Expectation: 5-PS1-3.** Make observations and measurements to identify materials based on their properties. [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [*Assessment Boundary: Assessment does not include density or distinguishing mass and weight.*] |
|  | **Science and Engineering Practices (SEP)** | **Disciplinary Core Ideas (DCI)** | **Crosscutting Concepts (CCC)** |
| **Foundations** | **SEP: Planning and Carrying Out Investigations**Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. | **PS1.A: Structure and Properties of Matter** 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.) | **CCC: Scale, Proportion, and Quantity**Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. |
| **Key****Aspects** | * Make observations to collect data.
* Make measurements to collect data.
* Use data from an investigation as evidence for an explanation of a phenomenon or support an explanation.
* Identify the purpose of the investigation.
 | * Properties can be used to identify materials.
* Properties can be measured.
* Materials can be identified based on their observable and measurable properties.
* Properties of materials may include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility.
 | * Measure and describe physical quantities such as weight, time, temperature, and volume.
* Collect and record data according to the given investigation plan.
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| **Prior Knowledge** | * Knowledge of units and unit conversions among different-sized standard measurement units within a given measurement system
* Knowledge of bar graphs and histograms
* Knowledge of line graphs (Note: CCSS Mathematics: “Students solve problems involving information presented in line plots” beginning in grade 5)
* Knowledge of how and when to use estimations
 | * Matter is anything that occupies space and has mass.
* Everything around us has unique properties that can be used to identify them, such as what color they are, how hard they are, if they reflect light, whether they conduct electricity or heat, whether they are magnetic, and whether they dissolve in water.
 | **Relationships to SEPs** | * Models describe the scale of natural objects.
* Data analysis serves to interpret quantitative measures of properties, in standard units (e.g., grams, liters).
* Planning and carrying out investigations supports students in identifying phenomena to be investigated, and how to observe, measure, and record outcomes.
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