**Science MPIs**

**GRADE: 7th - 8th**

**ELD STANDARD: The Language of Science TOPIC: Properties of Matter**

**CONNECTION: Common Core RST.6-8.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements or performing technical tasks.**

**CONTEXT FOR LANGUAGE USE:** Students read and follow specific procedures to carry out an experiment, and take measurements.

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| **COGNITIVE FUNCTION: Students at all levels of English Proficiency will interpret the steps and follow to perform an experiment.** | | | | | | |
| **DOMAIN: Reading** | **Level 1**  **Entering** | **Level 2**  **Emerging** | **Level 3**  **Developing** | **Level 4**  **Expanding** | **Level 5**  **Bridging** | **Level 6 - Reaching** |
| Identify materials and to be used in the experiment using scientific instruments. | Identify the illustrated sequence and procedure to follow to carry out the experiment using instruments. | Identify key parts of steps to carry out an experiment using a timeline and check with a partner. | Identify key parts and detailed instructions needed to perform or carry out the experiment and check with a partner. | Identify key scientific terms and summarize steps before carrying out the experiment. |
| **TOPIC-RELATED LANGUAGE:**  **properties: weight, mass, volume, density**  tools: graduated cylinders, balances, scales | | | | | | |

**CONNECTION: MA Science and Technology/Engineering Curriculum Frameworks: (LS 3)** Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g., rulers, graduated cylinders, balances) and knowledge and appropriate use of significant digits.

**CONTEXT FOR LANGUAGE USE:** Student COLLECT measurements and data as they carry out the experiment and report findings.

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| **COGNITIVE FUNCTION: Students at all levels of English Proficiency will CALCULATE the density of different objects using measurement data collected.** | | | | | | |
| **DOMAIN: Writing** | **Level 1**  **Entering** | **Level 2**  **Emerging** | **Level 3**  **Developing** | **Level 4**  **Expanding** | **Level 5**  **Bridging** | **Level 6 - Reaching** |
| Label pictures of objects/tools used and identify mass and volume measured of each object using illustrations. | Using pictures of the objects identify volume and mass measurement for each object. | Gather data using a table for the mass and volume measurements and explain in a sentence finding of the experiment. | Gather data using a table and explain in a paragraph findings and evidence to support it. | Use evidence to state a conclusion using analysis of evidence and correctly applied scientific terms in more than one paragraph. |
| **TOPIC-RELATED LANGUAGE:**  **properties: weight, mass, volume, density**  tools: graduated cylinders, balances, scales | | | | | | |

**CONNECTION: MA Science and Technology/Engineering Curriculum Frameworks: (LS 1)** Differentiate between weight and mass, recognizing that weight is the amount of gravitational pull on an object.

**CONTEXT FOR LANGUAGE USE:** Students DISCUSS similarities and differences between mass and weight in peer groups.

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| **COGNITIVE FUNCTION: Students at all levels of English Proficiency will compare and contrast weight and mass of objects**. | | | | | | |
| **DOMAIN: Speaking** | **Level 1**  **Entering** | **Level 2**  **Emerging** | **Level 3**  **Developing** | **Level 4**  **Expanding** | **Level 5**  **Bridging** | **Level 6 - Reaching** |
| Begin to use vocabulary to identify tools used and properties measured when presented with pictures or objects.  *Ex: A balance is used to measure mass.* | Communicate differences or similarities using scientific vocabulary in simple phrases when presented with pictures.  *Ex: Mass measures amount of matter.* | Retell/ Rephrase ideas using the scientific vocabulary in complex sentences when presented with pictures.  *Ex: Mass measures amount of matter while weight is affected by gravity.* | Paraphrase and summarize ideas presented orally when presented with pictures.  *Ex: Mass measures the amount of matter and we use a balance to measure it.* | Summarize and give evidence to support ideas presented orally.  *Ex: Mass measures amount of matter of an object and it does not change in the universe.* |
| **TOPIC-RELATED LANGUAGE:**  **properties: weight, mass, volume, density**  tools: graduated cylinders, balances, scales | | | | | | |

**CONNECTION: MA Science and Technology/Engineering Curriculum Frameworks: (LS 6)** Differentiate between an atom (the smallest unit of an element that maintains the characteristics of that element) and a molecule (the smallest unit of a compound that maintains the characteristics of that compound). **Next Generation Science Standards MS-PS1-1.** Develop models to describe the atomic composition of simple molecules and extended structures.

**CONTEXT FOR LANGUAGE USE:** Students DESCRIBE the structure of a given molecule or compound.

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| **COGNITIVE FUNCTION: Students at all levels of English Proficiency will CREATE a model of a molecule or a compound.** | | | | | | |
| **DOMAIN: Speaking** | **Level 1**  **Entering** | **Level 2**  **Emerging** | **Level 3**  **Developing** | **Level 4**  **Expanding** | **Level 5**  **Bridging** | **Level 6 - Reaching** |
| Using models (Lego blocks) molecule and identify which atoms it is made of with a partner.  *Ex: Is water made up of hydrogen and oxygen? Yes or No* | Using the built model of molecule, identify the composition of the molecule and describe to a partner.  *Ex: Which elements make up a molecule of water?*  *Hydrogen and oxygen make water.* | Using the model of a more complex molecule, identify its composition and describe to a partner.  *Ex: Water is a molecule made of 2 H atoms and 1 O atom*. | Using the model of a more complex molecule, identify its composition to the class.  *Ex: Water is a molecule composed of 2 H atoms and 1 O atom.* | Using a model of a molecule, describe the structure of the molecule by using the grade level appropriate scientific terms. |
| **TOPIC-RELATED LANGUAGE:**  **Atom, element, molecule, compounds** | | | | | | |

**CONNECTION: MA Science and Technology/Engineering Curriculum Frameworks: (LS 6)** Differentiate between an atom (the smallest unit of an element that maintains the characteristics of that element) and a molecule (the smallest unit of a compound that maintains the characteristics of that compound). **Next Generation Science Standards MS-PS1-1.** Develop models to describe the atomic composition of simple molecules and extended structures.

**CONTEXT FOR LANGUAGE USE:** Students DESCRIBE the structure of a given molecule or compound.

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| **COGNITIVE FUNCTION: Students at all levels of English Proficiency explain the composition of molecule or a compound.** | | | | | | |
| **DOMAIN: Writing** | **Level 1**  **Entering** | **Level 2**  **Emerging** | **Level 3**  **Developing** | **Level 4**  **Expanding** | **Level 5**  **Bridging** | **Level 6 - Reaching** |
| Using the pictures of a molecule, identify how many atoms make up the molecule of water.  *Ex: 3 atoms* | Using pictures of a molecule identify how many atoms make up a molecule of water.  *Ex: 2 Hydrogen atoms and 1 oxygen atom.* | Using pictures of a molecule identify how many atoms make up a molecule of water in a simple, complete sentence.  *Ex: Water is a made of 2 H atoms and 1 O atom*. | Using pictures of a molecule identify how many atoms make up a molecule of water in complete sentence.  *Ex: Water is a molecule made of 2 H atoms and 1 O atom.* | Identify how many atoms make up a molecule of water in a complete sentence using scientific terms. |
| **TOPIC-RELATED LANGUAGE:**  **Atom, element, molecule, compounds** | | | | | | |

**CONNECTION: MA Science and Technology/Engineering Curriculum Frameworks: (LS 6)** Differentiate between an atom (the smallest unit of an element that maintains the characteristics of that element) and a molecule (the smallest unit of a compound that maintains the characteristics of that compound).

**CONTEXT FOR LANGUAGE USE:** Students listen to descriptions about the structural differences between, elements, molecules and compounds.

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| **COGNITIVE FUNCTION: Students at all levels of English Proficiency RECALL the differences between elements, molecules and compounds.** | | | | | | |
| **DOMAIN: Listening** | **Level 1**  **Entering** | **Level 2**  **Emerging** | **Level 3**  **Developing** | **Level 4**  **Expanding** | **Level 5**  **Bridging** | **Level 6 - Reaching** |
| Point to key characteristics of elements, compounds and molecules using a power point a presentation in a whole group discussion. | Select characteristics for elements, compounds and molecules to complete graphic organizer using power point presentation. | Organize the characteristics of elements, molecules and compounds in a graphic organizer using a power point. | Identify the characteristics of elements, molecules and compounds using a power point presentation. | Identify the characteristics of elements, compounds and molecules. |
| **TOPIC-RELATED LANGUAGE:**  **Atom, element, molecule, compounds** | | | | | | |