

# Phases of Matter – Multiple Choice Quiz

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

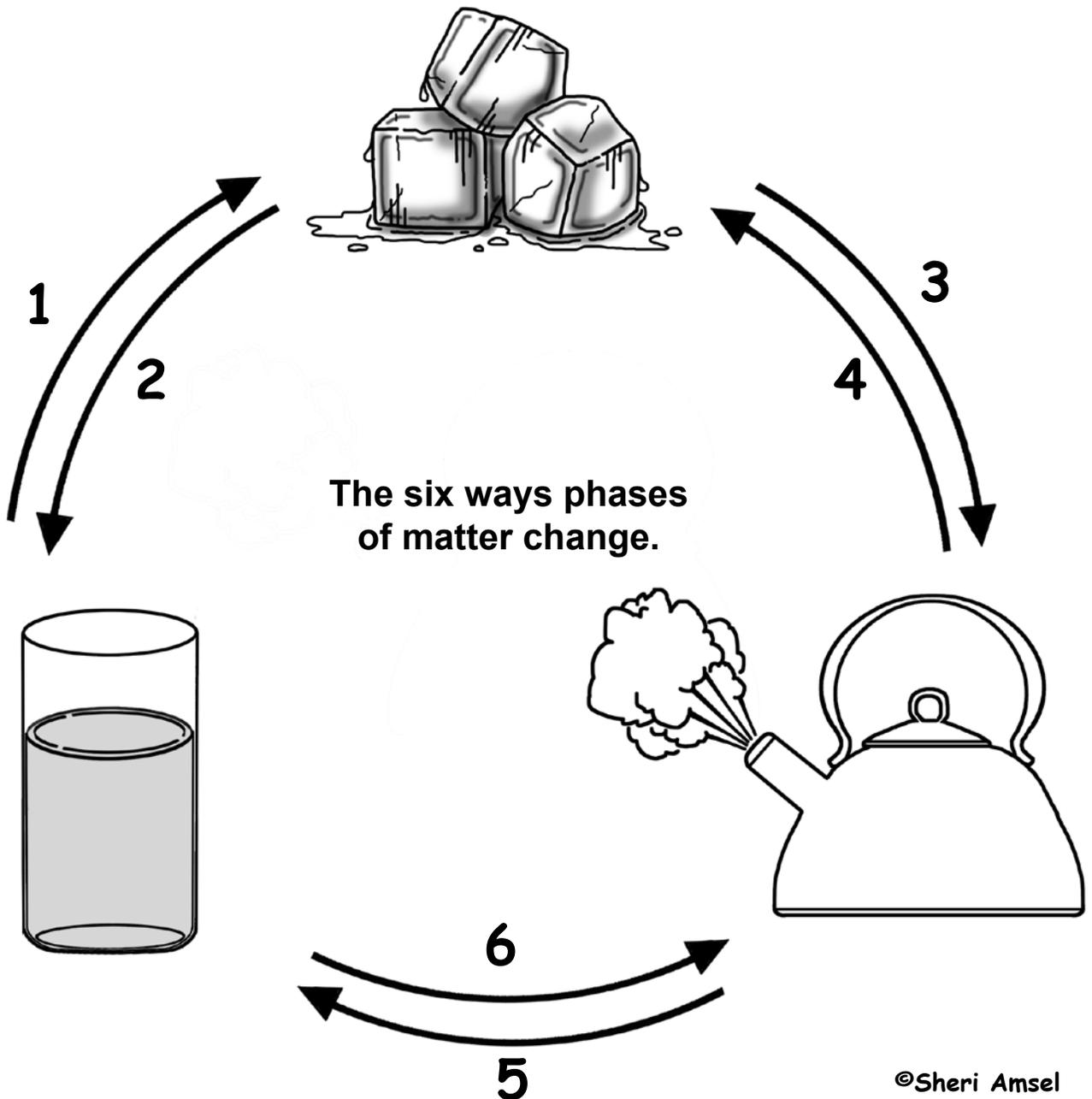
1	All of the following are phases (states) of matter EXCEPT:  <b>A</b> solid <b>B</b> liquid <b>C</b> gas <b>D</b> putty
2	This matter has a fixed shape and volume with particles closely packed together with little movement. It is a:  <b>A</b> liquid <b>B</b> solid <b>C</b> gas <b>D</b> plasma
3	Matter changing from a solid to a liquid is called:  <b>A</b> evaporation <b>B</b> sublimation <b>C</b> deposition <b>D</b> melting
4	The melting point of water is:  <b>A</b> 0°C <b>B</b> 100°C <b>C</b> 32°C <b>D</b> 60°C

5	Water is different from other substances because:  <b>A</b> It is more dense as a solid than a liquid <b>B</b> It is less dense as a solid than liquid <b>C</b> it is more dense as a gas than a liquid <b>D</b> It is less dense as a solid than a gas
6	Which of the following substances has a higher melting point than water?  <b>A</b> salt <b>B</b> sugar <b>C</b> flour <b>D</b> all of the above
7	Which of the following is NOT a way that matter changes phase?  <b>A</b> melting <b>B</b> freezing <b>C</b> evaporation <b>D</b> mixing
8	Matter changing from a solid to a gas is called:  <b>A</b> evaporation <b>B</b> sublimation <b>C</b> deposition <b>D</b> melting

# Phases of Matter - Vocabulary Quiz

Name the six ways the phase (state) of matter changes:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_



# Phases of Matter - Vocabulary

Write in the correct term (provided on right) to describe the phase changes of water shown in each of the pictures below. \*\*Note that you will use some terms more than once and some not at all.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_

Evaporation

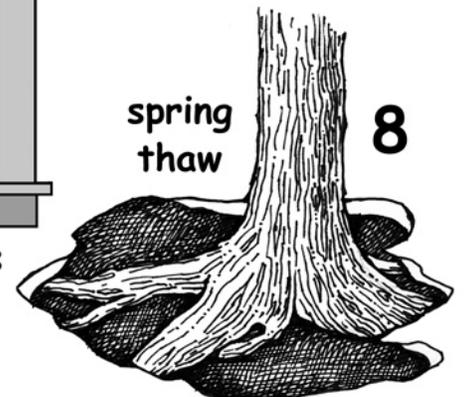
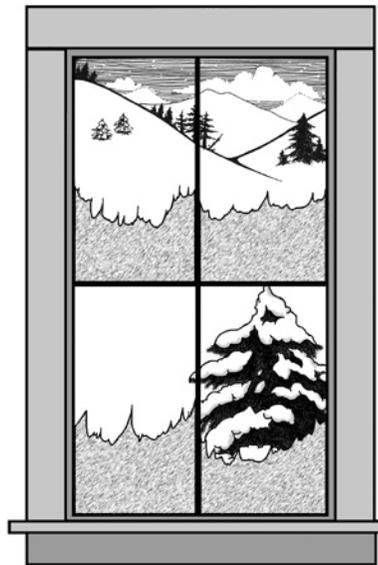
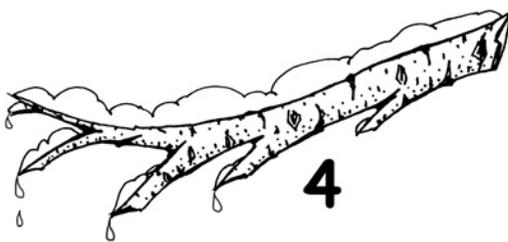
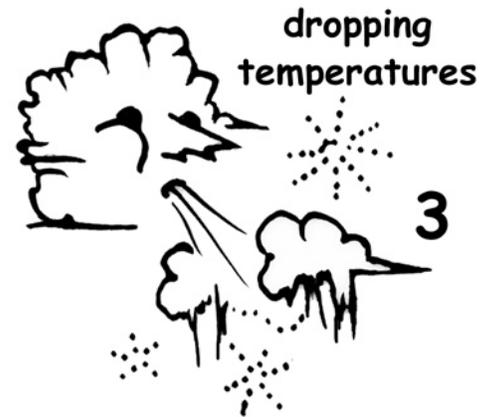
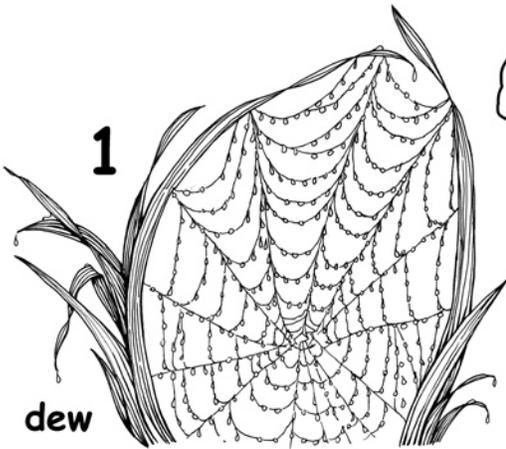
Condensation

Sublimation

Deposition

Freezing

Melting

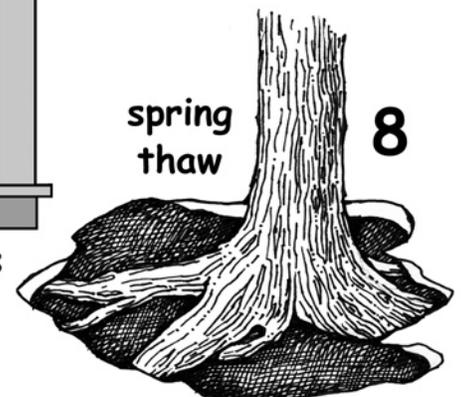
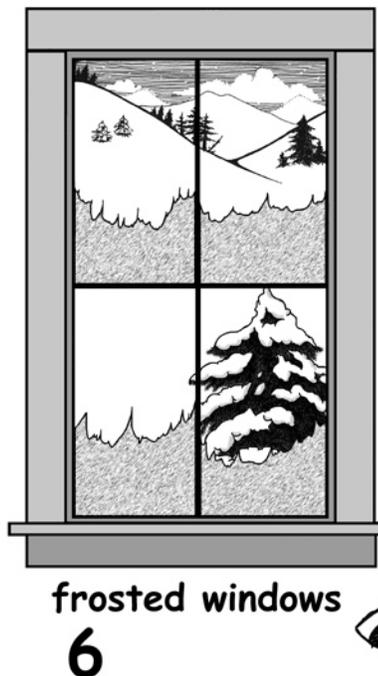
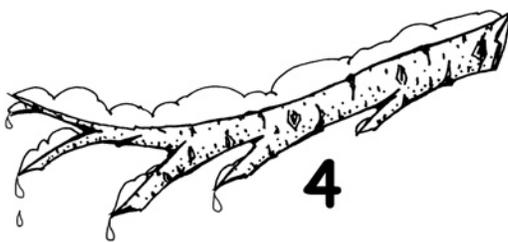
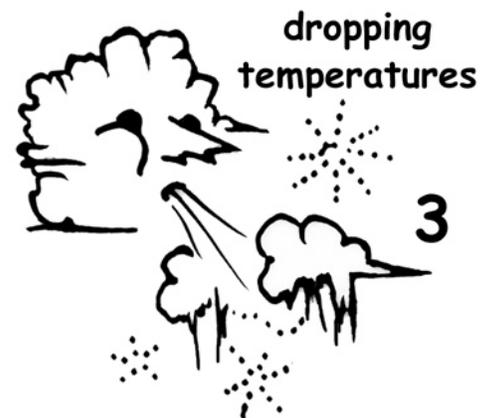
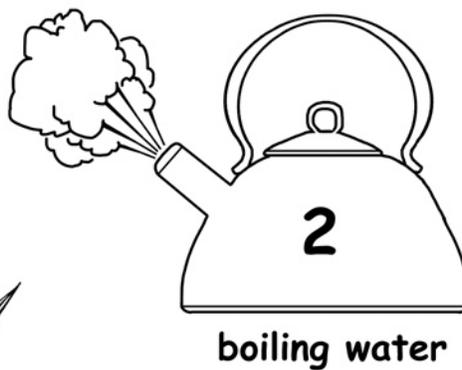
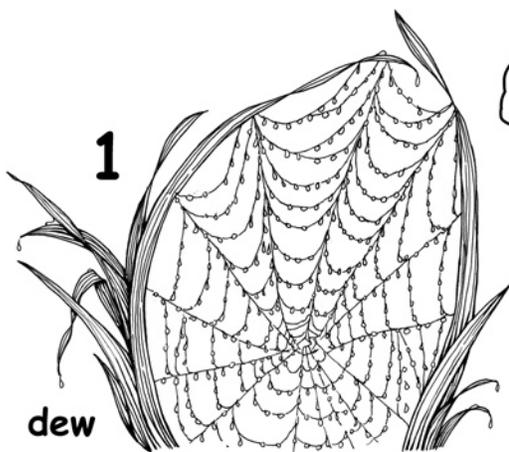


# Phases of Matter - Vocabulary KEY

Write in the correct term (provided on right) to describe the phase changes of water shown in each of the pictures below. \*\*Note that you will use some terms more than once and some not at all.

1. Condensation
2. Evaporation
3. Freezing
4. Melting
5. Evaporation
6. Deposition
7. Melting
8. Melting or Sublimation

- Evaporation
- Condensation
- Sublimation
- Deposition
- Freezing
- Melting



# Review Important Points about Phases of Matter

1) What is matter?

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2) Name the three phases (states) of matter?

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3) Identify and describe the particle in each phase of matter and how they are different in each phase of matter.

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## Assessment KEYS

### 1) What is matter?

Matter is something that has mass and volume.

### 2) Name the three phases (states) of matter?

The three most common phases of matter on Earth are solids, liquids and gases.

### 3) Identify and describe the particle in each phase of matter and how they are different in each phase of matter.

A solid's particles are packed closely together. There is not much space between the particles and there is little particle movement. Liquids have a fixed volume, but take the shape of the container in which they sit. There is not much space between the particles, but they can slide past each other and flow easily. Gas fills the shape and volume of the container in which it sits. There is a lot of free space between its particles and they flow easily past each other.

### Phases of matter Multiple Choice KEY

1. D
2. B
3. D
4. B
5. B
6. D
7. D
8. B

### Phases of Matter - Vocabulary Quiz

1. Freezing
2. Melting
3. Sublimation
4. Deposition
5. Condensation
6. Evaporation

### Phases of Matter - Vocabulary Graphic Concepts Quiz

1. Condensation
2. Evaporation
3. Freezing
4. Melting
5. Evaporation
6. Deposition
7. Melting
8. Melting or Sublimation

## NGSS and Common Core Integration

# MS-PS1 Matter and its Interactions

### Disciplinary Core Ideas:

#### PS1.A: Structure and Properties of Matter

- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1)
- Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. (MS-PS1-2),(MS-PS1-3)
- Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4)
- In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4)
- Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS-PS1-1)
- The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)

#### PS1.B: 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. (MS-PS1-2),(MS-PS1-3),(MS-PS1-5)
- The total number of each type of atom is conserved, and thus the mass does not change. (MS-PS1-5)
- Some chemical reactions release energy, others store energy. (MS-PS1-6)

#### PS3.A: Definitions of Energy

- The term “heat” as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that thermal energy from one object to another. In science, heat is used only for this second meaning; it refers to the energy transferred due to the temperature difference between two objects. (secondary to MS-PS1-4)
- The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule (whichever is the appropriate building block for the system’s material). The details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material. Temperature is not a direct measure of a system’s total thermal energy. The total thermal energy (sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of the material. (secondary to MS-PS1-4)

#### ETS1.B: Developing Possible Solutions

- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (secondary to MS-PS1-6)

#### ETS1.C: Optimizing the Design Solution

- Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process - that is, some of the characteristics may be incorporated into the new design. (secondary to MS-PS1-6)
- The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (secondary to MS-PS1-6)

## Crosscutting Concepts:

### Patterns

- Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (MS-PS1-2)

### Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS1-4)

### Scale, Proportion, and Quantity

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-PS1-1)

### Energy and Matter

- Matter is conserved because atoms are conserved in physical and chemical processes. (MS-PS1-5)
- The transfer of energy can be tracked as energy flows through a designed or natural system. (MS-PS1-6)

### Structure and Function

- Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. (MS-PS1-3)

## Connections to Engineering, Technology, and Applications of Science

### Interdependence of Science, Engineering, and Technology

- Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-PS1-3)

### Influence of Science, Engineering and Technology on Society and the Natural World

- The uses of technologies and any limitation on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-PS1-3)

## Science and Engineering Practices:

### Developing and Using Models

Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to predict and/or describe phenomena. (MS-PS1-1),(MS-PS1-4)
- Develop a model to describe unobservable mechanisms. (MS-PS1-5)

### Analyzing and Interpreting Data

Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to determine similarities and differences in findings. (MS-PS1-2)

### Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.

- Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. (MS-PS1-6)

### Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 6–8 builds on K–5 and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or now supported by evidence. (MS-PS1-3)

## Connections to Nature of Science

### Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS1-2)

### Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- Laws are regularities or mathematical descriptions of natural phenomena. (MS-PS1-5)

## Performance Expectations:

Students who demonstrate understanding can:

**MS-PS1-1.** Develop models to describe the atomic composition of simple molecules and extended structures.

*[Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.] [Assessment Boundary: Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete description of all individual atoms in a complex molecule or extended structure is not required.]*

**MS-PS1-2.** 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 burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.] [Assessment boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.]*

**MS-PS1-3.** Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. *[Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.] [Assessment Boundary: Assessment is limited to qualitative information.]*

**MS-PS1-4.** Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. *[Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawing and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.]*

**MS-PS1-5.** Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. *[Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.] [Assessment Boundary: Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.]*

**MS-PS1-6.** Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.\* *[Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.] [Assessment Boundary: Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.]*

## Common Core State Standards Connections:

### ELA/Literacy -

**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (MS-PS1-2), (MS-PS1-3)

**RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS1-6)

**RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-PS1-1), (MS-PS1-2), (MS-PS1-4), (MS-PS1-5)

**WHST.6-8.7** Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-PS1-6)

**WHST.6-8.8** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-PS1-3)