Table 14: Examples of Performance Expectations for State of Matter

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| Grade 4 | Grade 8 | Grade 12 |
| **Identifying Science Principles:**  Classify samples of materials as solid, liquid or gas. | **Identifying Science Principles:**  Given an animation of molecules in motion, identify the substances that is being illustrated as a solid, liquid, or gas | **Identifying Science Principles:**  Explain why ice is harder than liquid water in terms of the strength of the force between the molecules. |
| **Using Science Principles:**  Infer that a change of state (e.g. freezing or melting) affects the identify of an object, but not the identity of the material of which it is made. | **Using Science Principles:**  Predict how the mass of a sample of iodine will change after sublimation. Justify the prediction based on what occurs during sublimation at a molecular level. | **Using Science Principles:**  Use the concept of molecular arrangements and bonds to explain why graphite is very soft and diamond is very hard, even though they are ll made of pure carbon. |
| **Using Scientific Inquiry:**  Collect, display, and interpret data showing how the temperature of a substance changes over time as it cools and becomes a solid. | **Using Scientific Inquiry:**  Plan and conduct an investigation to determine the melting point and boiling point of an unknown substance. | **Using Scientific Inquiry:**  Explain the results of experiments showing how the volume of three different liquids changes when they are heated by using molecular theory. |
| **Using Technological Design:**  Propose a method for determining for certain if holiday chocolates that have been shaped by different processes (melting, freezing, reshaping, or breaking into pieces) have the same amount of chocolate in them. | **Using Technological Design:**  Choose the best solution for increasing the altitude of a hot air balloon, based on an understanding of the macroscopic and microscopic changes that occur when the gas inside the balloon is heated. | **Using Technological Design:**  Design an instrument to measure temperatures accurately as possible, taking into account both the thermal properties of liquids and solids to be used in the device, and structural shape and dimensions of the device. |

NAEP 2009 Science Framework

\* <http://www.nagb.org/>

\* A learning progression is a sequence of successively more complex ways of reasoning about a set of ideas.

NATIONAL SCIENCE EDUCATION

STANDARDS CONTENT DOMAINS

BIG Cs LITTLE C’s

* Life Science \* Unify8ing Principles & themes
* Physical Science \*Sci3nce & Technology
* Earth/Space Science \* Science in Personal & Social Contexts
* Inquiry \* Nature of Science

ASSESSMENT TRAINGLE

3 PART HARMONY

* OBSERVATION INTERPRETATION

COGNITION

C = THEORY OF HOW Ss learn the topic

O= tasks that elicit relevant Ss knowledge/skills

I = Classroom assessment – less formal interpretation by the teacher

LEARNING GOALS

* What we know
* How we have come to know it
* Why we believe it over alternatives