

5-PS1-1 Matter and Its Interactions

California Science Test—Item Content Specifications

# 5-PS1-1 Matter and Its Interactions

Students who demonstrate understanding can:

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 | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Developing and Using Models  Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.  Use models to describe phenomena. | PS1.A: Structure and Properties of Matter   1. 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. | Scale, Proportion, and Quantity  Natural objects exist from the very small to the immensely large. |

## Assessment Targets

Assessment targets describe the focal knowledge, skills, and abilities for a given three-dimensional Performance Expectation. Please refer to the Introduction for a complete description of assessment targets.

### Science and Engineering Subpractice(s)

Please refer to appendix A for a complete list of Science and Engineering Practices (SEP) subpractices. Note that the list in this section is not exhaustive.

2.1 Ability to develop models

### Science and Engineering Subpractice Assessment Targets

Please refer to appendix A for a complete list of SEP subpractice assessment targets. Note that the list in this section is not exhaustive.

2.1.1 Ability to determine components of a scientific event, system, or design solution

2.1.2 Ability to determine the relationships among multiple components of a scientific event, system, or design solution

2.1.4 Ability to represent mechanisms, relationships, and connections to illustrate, explain, or predict a scientific event

### Disciplinary Core Idea Assessment Targets

#### PS1.A.4

* Develop a model of matter with microscopic particles as the components
* Describe bulk matter as being composed of tiny particles of matter that cannot be seen
* Describe the behavior of many tiny particles to explain observable phenomena involving bulk matter
* Explain observable phenomena by using a model of bulk matter composed of many tiny particles

### Crosscutting Concept Assessment Target(s)

CCC3 Identify that natural objects exist from the very small to the immensely large

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides a complete description of a phenomenon and components that can be used to make a model:

* Develops a model that correctly explains solvation or precipitation (2.1.1, PS1.A.4, and CCC3)
* Develops a model that correctly portrays evaporation or condensation as the movement of particles in the air from or to a surface, respectively (2.1.1, PS1.A.4, and CCC3)

Task provides an incorrect model or claim about matter:

* Identifies the error (2.1.1, PS1.A.4, and CCC3)
* Identifies the necessary revision (2.1.1, PS1.A.4, and CCC3)
* Selects the revised model that corrects the error (2.1.1, PS1.A.4, and CCC3)

Task provides a particle model of matter and an observed phenomenon:

* Selects the modification of the particle model that explains the observation (2.1.3, PS1.A.4, and CCC3)

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* Materials that seem to disappear when they dissolve or evaporate (e.g. dissolving sugar in water)
* Materials that seem to appear when they condense or precipitate (e.g. condensation on a cold bottle of water)
* Objects that are expanded or compressed by air (e.g., expanding or deflating a ball)
* Materials that are mixed in water and cause its physical appearance to change
* Odors that can be smelled from a distance

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Evaporation or dissolution destroys particles and their associated mass.
* Constituent particles of a solid are completely still.
* Particles expand when heated.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

5-PS1-1 Evidence Statement [https://www.nextgenscience.org/sites/default/files/evidence\_statement/black\_white/5-PS1-1 Evidence Statements June 2015 asterisks.pdf](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/5-PS1-1%20Evidence%20Statements%20June%202015%20asterisks.pdf)

The *2016 Science Framework for California Public Schools Kindergarten through Grade 12*

Appendix 1: Progression of the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts in Kindergarten through Grade 12 <https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix1.pdf>

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