

HS-PS3-4 Energy

California Alternate Assessment for Science—Item Content Specifications

# HS-PS3-4 Energy

| California Science Connector | Focal Knowledge, Skills, and Abilities | Essential Understanding |
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| Identify that the temperature of two different components, when combined, show uniform energy distribution. | 1. Recognize that the mixture of two different components shows uniform energy distribution.
 | Recognize components change their temperature when combined. |

## **CA NGSS Performance Expectation**

Students who demonstrate understanding can:

**Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).** [Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigations could include mixing liquids at different initial temperatures or adding objects at different temperatures to water.] *[Assessment Boundary: Assessment is limited to investigations based on materials and tools provided to students.]*

## Mastery Statements

Students will be able to:

* Recognize the temperature of a warmer substance will decrease when a cooler substance is added
* Recognize the temperature of a cooler substance will increase when a warmer substance is added
* Recognize the combination of two substances with different temperatures will result in a final temperature between that of the two substances
* Recognize the combination of two substances with different energy levels will result in a uniform final energy distribution because one substance loses heat energy and the other gains heat energy

## Possible Phenomena or Contexts

*Note that the list in this section is not exhaustive or prescriptive.*

**Possible contexts include the following:**

* Combining warm and cold water in fish tanks, kitchen sinks, bathtubs, etc.
* Adding a cold liquid food to a warm liquid food
* Adding ice to a beverage

## Additional Assessment Boundaries

* None listed at this time

## Additional References

California Science Test Item Specification for HS-PS3-4

<https://www.cde.ca.gov/ta/tg/ca/documents/itemspecs-hs-ps3-4.docx>

Environmental Principles and Concepts <http://californiaeei.org/abouteei/epc/>

The *2016 Science Framework for California Public Schools Kindergarten through Grade Twelve* <https://www.cde.ca.gov/ci/sc/cf/cascienceframework2016.asp>

Appendix 1: Progression of the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts in Kindergarten through Grade Twelve

<https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix1.pdf>

Appendix 2: Connections to Environmental Principles and Concepts

<https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix2.pdf>

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