

# 09: Heat & Phase Changes

Content Area: **Special Education**  
Course(s):  
Time Period: **Full Year**  
Length: **4 weeks**  
Status: **Published**

## General Overview, Course Description or Course Philosophy

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Physical Science establishes a basic approach to the fundamentals of chemistry and physics. The following concepts will be explored: atomic structure, chemical bonding, chemical reactions, the periodic table, kinetic theory, and kinematics. The use of technology to gather and analyze data will be incorporated. This course is concept-oriented with a focus on Chemistry and Physics in the real world. Laboratory work and special projects will facilitate active learning and accommodate different learning styles.

## OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

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Students will understand that:

- the kinetic molecular theory can be used to explain the properties of solids, liquids, and gases, and that changing between them involves the flow of energy.
- Temperature is a measure of the average kinetic energy for the molecules/atoms in a substance.
- Heat flow is the energy transfer between objects due to a temperature difference between them.
- The energy that a substance has due to its temperature is its internal energy.

## CONTENT AREA STANDARDS

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SCI.HS-PS3-1	Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
SCI.HS-PS3-4	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).

## RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

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- CRP 2 Apply appropriate academic and technical skills.  
CRP 4 Communicate clearly and effectively and with reason.  
CRP 5 Consider the environmental, social and economic impacts of decisions.  
CRP 6 Demonstrate creativity and innovation.  
CRP 8 Utilize critical thinking to make sense of problems and persevere in solving them.

CRP 11 Use technology to enhance productivity.

## **EVIDENCE OF LEARNING**

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Refer to the 'Formative Assessments' and 'Summative Assessments' sections.

### **Formative Assessments**

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Observation, do now, homework

### **Summative Assessments**

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- Benchmarks – departmental benchmark given at the end of MP1, MP2, and MP3
- Alternative Assessments
  - Lab inquiries and investigations
  - Lab Practicals
  - Exploratory activities based on phenomenon
  - Gallery walks of student work
  - Creative Extension Projects
  - Build a model of a proposed solution
  - Let students design their own flashcards to test each other
  - Keynote presentations made by students on a topic
  - Portfolio

## **RESOURCES (Instructional, Supplemental, Intervention Materials)**

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[Vernier.com/experiments](http://Vernier.com/experiments)

Khan Academy, Crash Course Physics, and Bozeman Science

American Chemical Society ([acs.org/content/acs/en/education/resources/highschool.html](https://acs.org/content/acs/en/education/resources/highschool.html))

## **INTERDISCIPLINARY CONNECTIONS**

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Algebra, English, Geometry

## **ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS**

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See link to Accommodations & Modifications document in course folder.