

Educational Resources from *Phenomenon Science Education*

Student Proficiency Goals for NGSS 4-PS3-2



Information about 4-PS3-2

NGSS Performance Expectation 4-PS3-2.

Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Clarification Statement.

No clarification statement is listed for this Performance Expectation.

Assessment Limits.

Assessment does not include quantitative measurements of energy.

Science and Engineering Practice (Planning and Carrying Out Investigations)

- Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.

Disciplinary Core Idea (PS3.A: Definitions of Energy)

- Energy can be moved from place to place by moving objects or through sound, light, or electric currents.

Disciplinary Core Idea (PS3.B: Conservation of Energy and Energy Transfer)

- Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced.
- Light also transfers energy from place to place.
- Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy.

Crosscutting Concept (Energy and Matter)

- Energy can be transferred in various ways and between objects.

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Student Proficiency Goals

SEP (Planning and Carrying Out Investigations):

- Students observe examples of energy being transferred from one place to another.
- Students describe evidence of energy being transferred from place to place, in the form of sound, light, heat, and/or electric currents.
- Students use the descriptions of their observations as evidence that supports an explanation for a phenomenon related to energy transfer.
- Students use the descriptions of their observations as evidence to test a solution for a design problem related to energy transfer.

DCI (PS3.A Definitions of Energy):

- Students know that energy can take the form of sound, light, heat, or electric current.
- Students know that energy can be moved from one place to another through sound, light, heat, or electric current.

CCC (Energy and Matter):

- Students think about ways that energy can be transferred.
- Students consider that sound, heat, light and/or electric current are all forms of energy that can be transferred from one place to another.
- Students consider that sound, heat, light, and/or electric currents can transfer energy among objects.

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DCI (PS3.B Conservation of Energy and Energy Transfer):

- Students know that when energy is present it can take the form of sound, light, heat, or electric current.
- Students know that when objects collide, energy can be transferred among the objects involved in the collision, thereby changing the motion of those objects.
- Students know that when objects collide, energy can be transferred to the surrounding air.
- Students know that when energy is transferred to the surrounding air, it can take the form of heated air particles and/or sound.
- Students know that energy can be transferred from place to place by light.
- Students know that energy can be transferred from place to place by electric currents.
- Students know that electric currents can be used to produce motion, sound, heat, and/or light.
- Students know that electric currents can be produced by transforming the energy of motion into electrical energy.