



## Grade 4

### 3.2.4.C Physical Science: Energy

**Students who demonstrate understanding can** *ask questions and predict outcomes about the changes in energy that occur when objects collide.*

**Clarifying Statement:** Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.

**Assessment Boundary:** Assessment does not include quantitative measurements of energy.

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
<b>Asking Questions and Defining Problems</b> Asking questions and defining problems in 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships. <ul style="list-style-type: none"> <li>Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.</li> </ul>	<b>Definitions of Energy</b> <ul style="list-style-type: none"> <li>Energy can be moved from place to place by moving objects or through sound, light, or electric currents.</li> </ul> <b>Conservation of Energy and Energy Transfer</b> <ul style="list-style-type: none"> <li>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.</li> </ul> <b>Relationship Between Energy and Forces</b> <ul style="list-style-type: none"> <li>When objects collide, the contact forces transfer energy so as to change the objects' motions.</li> </ul>	<b>Energy and Matter</b> <ul style="list-style-type: none"> <li>Energy can be transferred in various ways and between objects.</li> </ul>

**Pennsylvania Context:** N/A

**PA Career Ready Skills:** Identify consequences of a decision to oneself and others prior to action.



### Connections to Other Standards Content and Practices

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
<b>Agriculture (AFNR)</b>	CS.01.02.02.b: Analyze how technology is used in AFNR systems to maximize productivity.
<b>Science, Environmental Literacy and Sustainability (NAAEE)</b>	K-4 Strand 1.A. Questioning: Learners develop questions that help them conduct simple investigations and learn about the environment.
<b>PA Core Standards: ELA</b>	CC.1.4.4.S: Draw evidence from literary or informational texts to support analysis, reflection, and research, applying grade level reading standards for literature and informational texts. CC.1.4.4.V: Conduct short research projects that build knowledge through investigation of different aspects of a topic. CC.1.4.4.W: Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. CC.1.5.4.A: Engage effectively in a range of collaborative discussions on grade-level topics and texts, building on others' ideas and expressing their own clearly.
<b>PA Core Standards and Practices: Math</b>	MP.1: Make sense of problems and persevere in solving them. CC.2.4.4.A.2: Translate information from one type of data display to another.
<b>PA Standards: Social Studies</b>	N/A
<b>Educational Technology (ISTE)</b>	1.1. Empowered Learner: Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.
<b>Technology and Engineering (ITEEA)</b>	STEL-7I: Apply the technology and engineering design process.