



Claim, Measurement Target, and PE Bundle

Grade 8 Overall Claim

The student has demonstrated proficiency in integrating Scientific and Engineering Practices with important Disciplinary Core Ideas and Crosscutting Concepts to scientifically investigate and understand natural phenomena and solve important science and engineering design problems.

Unit 1 Measurement Target: Students are able to apply Science and Engineering Practices with emphasis on **planning investigations** related to the **scale of motion of an object**, **interactions between objects**, and **constructing and interpreting graphical displays of data in support of an argument to explain** interactions between **energy, forces, and motion in a system**.

Unit 1 PE Topic Bundle:

- **MS-PS2-1** Apply Newton's third law to design a solution to a problem involving the motion of two colliding objects. **Clarification Statement:** Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle. **[Assessment Boundary:** Assessment is limited to vertical or horizontal interactions in one dimension.]
- **MS-PS2-2** Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. **[Clarification Statement:** Emphasis is on balanced (Newton's first law) and unbalanced forces in a system, qualitative comparisons of forces, mass, and changes in motion (Newton's second law), frame of reference, and specification of units.] **[Assessment Boundary:** Assessment is limited to forces and changes in motion in one dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.]
- **MS-PS2-4** Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. **[Clarification Statement:** Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.] **[Assessment Boundary:** Assessment does not include Newton's law of gravitation or Kepler's laws.]
- **MS-PS3-1** Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. **[Clarification Statement:** Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a wiffle ball versus a tennis ball.]

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