

DCI: Motion and Stability: Forces and Interactions

3.PS2.A: Forces and Motion

Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (3-PS2-1)

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3.PS2.B: Types of Interactions

Objects in contact exert forces on each other. (3-PS2-1)

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3.PS2.A: Forces and Motion

The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) (3-PS2-2)

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3.PS2.B: Types of Interactions

Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. (3-PS2-3), (3-PS2-4)

Science and Engineering Practice

Asking Questions and Defining Problems

Asking questions and defining problems in grades 3–5 builds from grades K–2 experiences and progresses to specifying qualitative relationships. Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4)

Science and Engineering Practice

Asking Questions and Defining Problems

Asking questions and defining problems in grades 3–5 builds from grades K–2 experiences and progresses to specifying qualitative relationships. Ask questions that can be investigated based on patterns such as cause and effect relationships. (3-PS2-3)

Science and Engineering Practice

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-PS2-1)

Science and Engineering Practice

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2)

Crosscutting Concept

Patterns

Patterns of change can be used to make predictions. (3-PS2-2)

Crosscutting Concept

Cause and Effect

Cause and effect relationships are routinely identified, tested, and used to explain change. (3-PS2-3)

Crosscutting Concept

Cause and Effect

Cause and effect relationships are routinely identified. (3-PS2-1)