

Disciplinary Core Ideas in the Louisiana Student Standards for Science

MOTION AND STABILITY: FORCES AND INTERACTIONS

	Primary (K-2)	Elementary (3-5)	Middle (6-8)	High (9-12)
Performance Expectation	(K-PS2-1) Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.	(3-PS2-1) Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	(6-MS-PS2-1) Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	(HS-PS2-1) Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
Disciplinary Core Ideas	<p><u>FORCES AND MOTION</u> Types of Interactions, Relationship between Energy and Forces.</p> <p><u>TYPES OF INTERACTIONS</u> When objects touch or collide, they push on one another and can change motion. (LE.PS2B.a)</p> <p><u>RELATIONSHIP BETWEEN ENERGY AND FORCES</u> A bigger push or pull makes things speed up or slow down more quickly. (LE.PS3C.a)</p>	<p><u>FORCES AND MOTION</u> 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. (UE.PS2A.a)</p> <p>Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (UE.PS2A.b)</p> <p><u>TYPES OF INTERACTIONS</u> Objects in contact exert forces on each other. (UE.PS2B.a)</p>	<p><u>FORCES AND MOTION</u> For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law). (MS.PS2A.a)</p> <p><u>DEVELOPING POSSIBLE SOLUTIONS</u> A solution needs to be tested, to prove the validity of the design and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. Models of all kinds are important for testing solutions (MS.ETS1B.a)</p>	<p><u>FORCES AND MOTION</u> Newton's second law accurately predicts changes in the motion of macroscopic objects. (HS.PS2.A.a)</p>