

Vertical Alignment of Force and Motion

TEKS *in Focus* highlights key concepts and student expectations to assist educators in implementing the science Texas Essential Knowledge and Skills (TEKS). The vertical progression of a concept within the science TEKS is provided along with a side-by-side view of the changes implemented in 2024.

Elementary School

Level of Study	Prior Science TEKS	TEKS Implemented in 2024
Kindergarten	K.6.B explore interactions between magnets and various materials; K.6.C observe and describe the location of an object in relation to another such as above, below, behind, in front of, and beside; and K.6.D observe and describe the ways that objects can move such as in a straight line, zigzag, up and down, back and forth, round and round, and fast and slow.	K.7.A describe and predict how a magnet interacts with various materials and how magnets can be used to push or pull. ----- -----
Grade 1	1.6.B predict and describe how a magnet can be used to push or pull an object. 1.6.C demonstrate and record the ways that objects can move such as in a straight line, zig zag, up and down, back and forth, round and round, and fast and slow.	1.7A explain how pushes and pulls can start, stop, or change the speed or direction of an object's motion; 1.7.B plan and conduct a descriptive investigation that predicts how pushes and pulls can start, stop, or change the speed or direction of an object's motion.
Grade 2	2.6.B observe and identify how magnets are used in everyday life; 2.6.C trace and compare patterns of movement of objects such as sliding, rolling, and spinning over time.	2.7.B plan and conduct a descriptive investigation to demonstrate how the strength of a push and pull changes an object's motion.
Grade 3	3.6.C observe forces such as magnetism and gravity acting on objects. 3.6.B demonstrate and observe how position and motion can be changed by pushing and pulling objects such as swings, balls, and wagons;	3.7.A demonstrate and describe forces acting on an object in contact or at a distance, including magnetism, gravity, and pushes and pulls; 3.7.B plan and conduct a descriptive investigation to demonstrate and explain how position and motion can be changed by pushing and pulling objects such as swings, balls, and wagons.
Grade 4	4.6.D design a descriptive investigation to explore the effect of force on an object such as a push or a pull , gravity, friction, or magnetism.	4.7.A The student is expected to plan and conduct descriptive investigations to explore the patterns of forces such as gravity, friction, or magnetism in contact or at a distance on an object.
Grade 5	5.6.D design a simple experimental investigation that tests the effect of force on an object. -----	5.7.B design a simple experimental investigation that tests the effect of force on an object in a system such as a car on a ramp or a balloon rocket on a string. 5.7.A investigate and explain how equal and unequal forces acting on an object cause patterns of motion and transfer of energy; and

Key Changes in Force and Motion: Elementary

- **Kindergarten:** In kindergarten, students explore pushes and pulls using magnets. Describing patterns of motion has been removed from elementary science.
- **Grade 1:** Patterns of motion, magnetic forces, and interactions with magnets are no longer taught in grade 1. Grade 1 students now explain how pushes and pulls impact an object's motion, previously introduced in grade 3. Descriptive investigations are introduced in grade 1.
- **Grade 2:** Patterns of motion and magnets are no longer taught in grade 2. Grade 2 students now investigate the effects of different amounts of force.
- **Grade 3:** Grade 3 now introduces the concept of forces acting at a distance or by contact.
- **Grade 4:** Students in grade 4 plan and conduct investigations of forces in contact or at a distance.
- **Grade 5:** Forces within a system and energy transfer are introduced in grade 5. Students in grade 5 investigate the motion produced by varying the strength, quantity, or direction of the applied forces.

Middle School

Level of Study	Prior Science TEKS	TEKS Implemented in 2024
Grade 6	<p>-----</p> <p>8.6.A demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion;</p> <p>-----</p>	<p>6.7.A identify and explain how forces act on objects, including gravity, friction, magnetism, applied forces, and normal forces, using real- world applications;</p> <p>6.7.B calculate the net force on an object in a horizontal or vertical direction using diagrams and determine if the forces are balanced or unbalanced;</p> <p>6.7.C identify simultaneous force pairs that are equal in magnitude and opposite in direction that result from the interactions between objects using Newton's Third Law of Motion.</p>
Grade 7	<p>-----</p> <p>6.11.B understand that gravity is the force that governs the motion of our solar system; and</p>	<p>7.7.D analyze the effect of balanced and unbalanced forces on the state of motion of an object using Newton's First Law of Motion.</p> <p>7.9.B describe how gravity governs motion within Earth's solar system; an</p>
Grade 8	<p>8.6.A demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion;</p> <p>8.6.C investigate and describe applications of Newton's three laws of motion such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.</p>	<p>8.7.A calculate and analyze how the acceleration of an object is dependent upon the net force acting on the object and the mass of the object using Newton's Second Law of Motion;</p> <p>8.7.B investigate and describe how Newton's three laws of motion act simultaneously within systems such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.</p>

Key Changes in Force and Motion: Middle School

- **Grade 6:** Grade 6 introduces the concepts of applied and normal forces and real-world applications of different types of forces. The concepts of balanced and unbalanced forces were moved from grade 8 to grade 6. Newton's Third Law is introduced in grade 6.
- **Grade 7:** Newton's First Law is introduced in grade 7. The concept of gravity causing the solar system's motion was moved from grade 6 to grade 7.
- **Grade 8:** Newton's Second Law is introduced in grade 8. Students now investigate the simultaneous effects of all three of Newton's laws.

High School

Level of Study	Prior Science TEKS	TEKS Implemented in 2024
Integrated Physics and Chemistry (IPC)	<p>IPC.4.D describe and calculate the relationship between force, mass, and acceleration using equipment such as dynamic carts, moving toys, vehicles, and falling objects;</p> <p>IPC.4.G examine electrical force as a universal force between any two charged objects</p>	<p>IPC.5.B analyze data to explain the relationship between mass and acceleration in terms of the net force on an object in one dimension using force diagrams, tables, and graphs;</p> <p>IPC.5.D describe the nature of the four fundamental forces: gravitation; electromagnetic; the strong and weak nuclear forces, including fission and fusion; and mass-energy equivalency;</p>
Physics	<p>Phy.4.D calculate the effect of forces on objects, including the law of inertia, the relationship between force and acceleration, and the nature of force pairs between objects using methods, including free-body force diagrams.</p> <p>Phy.5.C describe and calculate how the magnitude of the electric force between two objects depends on their charges and the distance between their centers;</p> <p>Phy.5.D identify and describe examples of electric and magnetic forces and fields in everyday life such as generators, motors, and transformers;</p>	<p>Phy.5.E explain and apply the concepts of equilibrium and inertia as represented by Newton's first law of motion using relevant real-world examples such as rockets, satellites, and automobile safety devices;</p> <p>Phy.5.F calculate the effect of forces on objects, including tension, friction, normal, gravity, centripetal, and applied forces, using free body diagrams and the relationship between force and acceleration as represented by Newton's second law of motion;</p> <p>Phy.5.G illustrate and analyze the simultaneous forces between two objects as represented in Newton's third law of motion using free body diagrams and in an experimental design scenario; and</p> <p>Phy.6.A use scientific notation and predict how the magnitude of the electric force between two objects depends on their charges and the distance between their centers using Coulomb's law;</p> <p>Phy.6.B identify and describe examples of electric and magnetic forces and fields in everyday life such as generators, motors, and transformers;</p>

Key Changes in Force and Motion: High School

- **IPC:** In addition to the electromagnetic force, students now describe all four fundamental forces and their applications.
- **Physics:** Each of Newton's laws are now studied in separate student expectations which have increased rigor and specificity.

TEKS in Focus spotlights concepts or student expectations monthly to bolster TEKS alignment, rigor, and collective understanding. It does not suggest an order or timing but helps with comprehension of TEKS changes, serving as a guide when relevant to classroom instruction.