# Unit Summary

| | Cluster 1: Describing Motion (Lessons 1-4) |
|---|---|
| **Overview** | Children heighten their awareness of motion in their surroundings by going on a Motion Search. They practice describing an object's motion with words and drawings and learn to incorporate aspects of distance, time, speed, change of speed, and path into their descriptions. Children use their bodies and balls to experience different paths of motion; they investigate speed by comparing how far they can move in a fixed amount of time using different motions. |
| **Science Content** | • Motion is movement.<br>• Motion always follows a path.<br>• Motion has speed, which is related to how far something goes (distance) and how long it takes (time).<br>• You can describe an object's motion by how long it takes, how far the object travels, how fast the object moves, and what path it follows. |
| **Science Center** | • Explore various objects to find and describe interesting ways to make them move.<br>• Use drawings to document observations and discoveries about motion.<br>• Make and fly paper airplanes to explore and describe motion.<br>• Look for pictures that depict motion in interesting ways.<br>• Use measuring devices and stopwatches to measure distance and time.<br>• Set up "races" between objects and document the results.<br>• Investigate an exercise pedometer or bicycle speedometer. |
| **Family Links** | • Go on a motion search at home to look for and document examples of motion.<br>• Bring in objects that move in interesting ways, such as yo-yos, Slinkys™, springs, and Frisbees™. |
| **Further Science Explorations** | • Examine and try to create flipbooks.<br>• Learn about cartoon animation.<br>• Collect, record, and analyze data about how long it takes to complete a frequently traveled route in the school.<br>• Conduct additional speed trials for different motions. |
| **Cross-Curricular Extensions** | **Language Arts:** Categorize motion words as verbs or adverbs. Play a motion verb and adverb game. Make a class book about the motion search. Write a story to accompany a motion mural.<br>**Mathematics:** Practice using mathematical language to describe distance, time, speed, and path of motion. Use meter sticks and stopwatches to measure distance and time for races and speed trials. Collect, display, and analyze speed data.<br>**Art:** Collaborate to create a motion mural. Make marble art to depict different paths. Incorporate these paths into pictorial representations. |

| Cluster 2: Changing Motion (Lessons 5-8 and 13) | Cluster 3: Friction and Gravity (Lessons 9-12) | |
|---|---|---|
| Children explore how forces (pushes and pulls) cause starts, stops, and changes in speed or direction of motion. As they think of ways to get a toy car to start moving and a rolling ball to change direction, children discover that successful tries involve either a push or a pull. They explore the effect of big and little forces on toy cars, and they perform controlled collisions with marbles along a track to see the results. | Children learn about two ubiquitous, but often overlooked or misunderstood, forces that affect motion: friction and gravity. They explore friction by comparing the motion of pennies sliding across different surfaces and the traction of different shoes on smooth surfaces. They learn about gravity by investigating its effects on their bodies and on falling objects. They also imagine and draw what the classroom would look like without the force of gravity. | **Overview** |
| • The way to change how something moves is to give it a push or a pull.<br>• Starting, speeding up, slowing down, and changing direction all represent changes in motion.<br>• There are many sources of pushes and pulls.<br>• There are different sizes of pushes and pulls. Bigger pushes and pulls (forces) cause bigger changes in motion than smaller forces do.<br>• Collisions cause pushes that may change the motion of all the colliding objects. | • Friction is a force (a pull) that slows down moving objects.<br>• If there is a lot of friction between surfaces, a moving object slows down quickly. If there is not much friction between surfaces, a moving object slows down more gradually.<br>• On Earth, gravity is a force that pulls everything down all the time. | **Science Content** |
| • Look for additional ways to change the motion of toy cars, balls, and other props.<br>• Measure hand and arm strength using a bathroom or spring scale.<br>• Design and conduct collision experiments using ramps, tracks, and marbles.<br>• Play with steel "collision balls."<br>• Set up marble "races." | • Use penny launchers on different surfaces.<br>• Play sliding games with coins or paper "footballs."<br>• Conduct additional shoe slide trials.<br>• Use balance scales to explore the relationship between weight and gravity.<br>• Repeat and vary marble drop experiments.<br>• Use marbles and inclined tracks to explore gravity. | **Science Center** |
| • Measure the hand strength of family members using a bathroom scale. | | **Family Links** |
| • Experience forces through different muscles and movements.<br>• Discuss which muscles are used during different activities.<br>• Play "Tug of War."<br>• Investigate head-on collisions and chain reactions using marbles and tracks.<br>• Experience and discuss the forces involved in T-Ball, kickball, bowling, and Four-Square.<br>• Analyze the forces involved in one of the motions observed on the Motion Search. | • Experiment with overcoming friction using blocks, shoes, rubber bands, various surfaces, and other props.<br>• Roll balls on different surfaces to compare how far they travel before stopping.<br>• Resurface the indoor "shoe slide" with different materials and compare the results.<br>• Observe a helium-filled balloon and discuss why it doesn't fall to the ground.<br>• Analyze the pushes and pulls involved in jumping.<br>• Explore the effects of air resistance by dropping various items and comparing the results.<br>• Devise parachutes to slow the descent of falling marbles and test how well they work.<br>• Research gravity and outer space. | **Further Science Explorations** |
| **Language Arts:** Write about the forces involved in favorite activities. Write about favorite "Motion Madness" activity. Narrate a sports event.<br>**Mathematics:** Collect, record, and analyze data about collision experiments.<br>**Art:** Create and analyze marble art to explore the effects of forces on the path of motion. | **Language Arts:** Write about the outdoor slide climb.<br>**Mathematics:** Compile the data from the penny launching experiments, find a way to depict the results in a graph, and analyze the data.<br>**Art:** Make shoe sole prints with flour and black paper. Predict whether or not a shoe would be a good slider, based on its sole print. | **Cross-Curricular Extensions** |