

Wright City Science Curriculum

Unit 3 - 2nd grade

Grade	2
Unit of Study	Force and Interactions
Length of Unit	10 days; 30 minutes per day
Sample Essential Questions	Sample Corresponding Big Ideas
	Pushes and pulls can have different strengths and directions. Pushing or pulling on an object can change the speed or direction of its motion and can start or stop the object (A.1)
	A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions (A.1)
	Different properties are suited to different purposes (A.2): Examples of properties could include, strength, flexibility, hardness, texture, and absorbency

Missouri Learning Standards	
Priority Standards	Supporting Standards
2.PS2.A.1 Analyze data to determine how the motion of an object changed by an applied force or the mass of an object	2.W.3.A Gather, analyze, evaluate, and use information from a variety of sources to apply the research process
2.ETS1.A.1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool	
2.ETS1.C.1 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs	

Unit 3 Sequence			
MLS	Topic(s)	Learning Targets	Academic Vocabulary
			force, motion, mass, push, pull, speed, friction, texture

MLS	Learning Activities	
2.PS2.A.1 Analyze data to determine how the motion of an object changed by an applied force or the mass of an object	Here are specific experiment ideas and activities: - Marble Collisions and Ramps: Students roll marbles of different sizes down a ramp to collide with a stationary marble, measuring how far the second marble moves. This demonstrates how mass and force affect motion. - Propeller Cars: Students build propeller-driven cars to observe action-reaction forces and investigate how friction affects motion and how far the car travels.	Must Do

	● Balloon Rocket Races: A hands-on activity where students use balloons on a string to investigate balanced and unbalanced forces, analyzing how different sizes or added weights affect the distance traveled. ● Object Collision Lab: Students investigate what happens when a moving object hits a stationary one, or when two moving objects collide, specifically looking at objects of the same vs. different masses. ● Push-Pull Investigation Stations: Setting up stations to test how the strength (gentle vs. hard) or direction of a push/pull affects an object's motion (speed and direction). ● Race Cars Down a Ramp: Using toy cars, students explore how the steepness of a ramp and the weight of the car affect its speed and distance, illustrating force and motion. ● Magnetic Mazes: Moving a paperclip through a maze using a magnet to demonstrate non-contact, magnetic forces. ● Friction Slide Test: Sliding objects across different surfaces (e.g., carpet vs. wood) to observe how different materials affect motion.	
2.ETS1.A.1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development	Top Experiments for 2.ETS1.A.1 (Defining and Solving Design Problems) ● Marshmallow/Candy Corn Tower Challenge: Students are tasked to build the tallest or strongest tower using only marshmallows/candy corn and toothpicks. They must define the problem of stability and iterate on their design when it fails. ● Parachute Design Task: Students design, build, and test a parachute to land a specific object safely on a target, comparing different materials and redesigning to improve performance. ● Bridge Building with Limited Materials: Using items like chopsticks or spaghetti, students create a bridge to span a gap and hold weight, focusing on structural integrity and the limitations of materials.	Option Level

of a new or improved object or tool	● Catapult Design Challenge: Students build a simple catapult to launch an item, optimizing their design to increase distance or accuracy. Key Engineering Design Principles Applied ● Problem Identification: What am I trying to build, and what are the limitations (e.g., time, materials)? ● Testing & Evaluation: Does the design solve the problem? ● Redesign: How can I improve the design to make it work better?	
2.ETS1.C.1 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs	Top Experiments for 2.ETS1.C.1 (Optimizing Design Solutions) ● Marshmallow Challenge (Tower Building): Teams build the tallest freestanding structure using spaghetti, tape, string, and a marshmallow on top. Students analyze why some structures fall while others stand, modifying designs to improve stability. ● Build-a-Bridge Challenge: Using limited, varied materials (straws, popsicle sticks, paper), students construct bridges to span a gap. They test which design holds the most weight, analyzing strengths and weaknesses to optimize performance. ● Mitten Insulation Investigation: Students test different materials to keep a "hand" (bag of ice water) warm. They compare data to see which insulation material works best, optimizing their mitten design. ● Paper Airplane Optimization: Students create different paper airplane designs, test them for distance or accuracy, and analyze which design flies best. They then modify their top design to improve its performance.	Option Level

	• Aluminum Foil Boat Challenge: Design boats using the same amount of foil, testing them for cargo capacity (pennies). Students compare results to optimize the design for maximum buoyancy and stability.	
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		Option Level

Assessments		
MLS	Description or Location	Rubric/Location

Additional Resources	
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