

Unit 2 - Energy in Motion: Crashes, Currents, and Creations

Pacing Guide

*Informational writing standards are now being covered in science. Please use [these resources](#) to address the informational writing standards. These lessons can be incorporated at any point during the unit.

Unit & Lesson #	Focus	Standards Addressed	Day (20-30 minutes)	Overview	Writing Activities	Additional Activities
Energy & Energy Transfer Anchor Phenomenon Rube Goldberg Machine	Energy & Modeling	4-PS3-1 4-PS3-3 4-PS3-4	1	The anchor phenomenon for this unit is an intricate Rube Goldberg machine. Students generate observations and questions about the phenomenon and create an initial conceptual model to explain what is happening. The performance task can be completed at any time after the sixth lesson.	Rube Goldberg Machine Conceptual Model See-Think-Wonder Chart	
Energy & Energy Transfer Lesson 1 How is your body similar to a car?	Speed & Energy	4-PS3-1	2	In this session, students learn that we use the energy from food to make our bodies move just like cars use the energy from gasoline to move.		
			3	In the hands-on activity, Twist-o-matic Tester, students build paper models		

			of an amusement park ride called the Twist-o-Matic. The ride stores energy in rubber bands and spins around when the energy is released. Students compare the speed of the spins when they use a thin rubber band versus a thick rubber band. Wrap-up slides & teacher-led discussion			
		4	Anchor Connection Students wonder: How else can energy be stored? Students learn: Throughout this Anchor Layer, students revisit a video of a complex chain reaction machine. In the first anchor connection, students realize that the chain reaction machine needs stored energy to keep going.	<u>Science Journal</u> entry to answer anchor connection question.		
		5	<u>Lesson 1 Assessment</u>			

				Extensions include: Readings, activities, and videos.		
Energy & Energy Transfer Lesson 2 What makes roller coasters go so fast?	Gravitational Energy, Speed, & Collisions	4-PS3-1 4-PS3-3	6	In this session, students explore how energy can be stored as height.		
			7	In part 1 of the activity, Bumper Coasters, students build paper roller coasters.		
			8	In part 2 of the activity, students release marbles down the roller coaster track to understand height energy and energy transfer. Wrap-up slides & teacher-led discussion.		
			9	Anchor Connection Students wonder: How does the height of an object relate to the energy that's stored by that object? Students learn: A chain reaction machine can use height to store	<u>Science Journal</u> entry to answer anchor connection question.	

				energy. When an object rolls or falls or swings from a high place to a low place, its energy of motion comes from its height.			
			10	<u>Lesson 2</u> <u>Assessment</u> Extensions include: Readings, activities, and videos.			
			11	In this session, students investigate how energy transfers when objects collide.			
			12	In the hands-on activity, Bumper Jumper, students ask questions and make predictions about how far a marble will launch over a jump after colliding with other objects.			
			13	This activity has a natural stopping point built in and is split into two sessions. Wrap-up slides & teacher-led discussion.			
			4-PS3-3				
			Collisions & Energy Transfer				
Energy & Energy Transfer Lesson 3	How can marbles save the world?						

Energy & Energy Transfer Lesson 4 Could you knock down a building using only dominoes?			14	Anchor Connection Students wonder: How else can energy be transferred from one object to another? Students learn: Students gain a deeper understanding of how energy is transferred in collisions. They observe how the speed of a moving object affects the speed of the object it hits.	Science Journal entry to answer anchor connection question.	
			15	<u>Lesson 3 Assessment</u> Extensions include: readings & activities.		
			16	In this session, students construct an explanation of how energy is stored, released, and transferred in chain reactions, such as falling dominoes.		
			17	In the hands-on activity, Build a Chain Reaction		
		4-PS3-4 3-5-ETS1-1				
	Energy Transfer & Engineering					

Energy & Energy Transfer Lesson 5 Can you build a chain reaction machine?	Energy Transfer & Engineering	4-PS3-4 3-5-ETS1-1	19	Lesson 4 <u>Assessment</u> Extensions include: Readings, activities, and videos.		
			20	In this session, students learn about storing, releasing, and transferring energy.		
			21	In the hands-on activity, Build a Chain Reaction (Part II), students complete the chain-reaction machine they started building in the previous lesson. Teacher-led discussion.		
			22	Anchor Connection Students wonder: Is electricity a form of energy? Students learn: Students consider how to add steps to an existing chain reaction machine, reasoning about how energy is	<u>Science Journal</u> entry to answer anchor connection question.	

				stored and how that stored energy can be released.			
			23	<u>Lesson 5 Assessment</u> Extensions include: Readings, discussions, and inspiration for chain reaction builders.			
Energy & Energy Transfer Unit Assessment			24	<u>Energy & Energy Transfer Unit Assessment</u>			
Energy & Energy Transfer Performance Task Can you design and build your own Rube Goldberg machine?	Sound Waves & Engineering	4-PS3-1 4-PS3-3 4-PS3-4	25	In the Performance Task, students will design a Rube Goldberg machine that utilizes energy transfers and conversions to complete a simple goal.			
Unit 2 Benchmark			26	LPS Unit 2 Benchmark (Given via LinkIt!)			