8th Grade Science Curriculum Bundle #1

Title	Suggested Dates
Force and Motion	8/25-9/18 (9 days)

Big Idea/Enduring Understanding	Guiding Questions
Unbalanced forces cause changes in motion.	How can we use forces and the laws of motion to understand the motion of objects? How do objects respond when acted on by a force? What is the relationship between distance and time?

The resources included here provide teaching examples and/or meaningful learning experiences to address the District Curriculum. In order to address the TEKS to the proper depth and complexity, teachers are encouraged to use resources to the degree that they are congruent with the TEKS and research-based best practices. Teaching using only the suggested resources does not guarantee student mastery of all standards. Teachers must use professional judgment to select among these and/or other resources to teach the district curriculum.

Knowledge & Skills with Student Expectations	Specificity & Examples	Suggested Resources (Read the note above)
8.7 Science concepts. The student knows that there is a relationship between force and motion. 8.7A Demonstrate how unbalanced forces cause changes in the speed or direction of an object's motion.	Including: --- Speed • Speed=Distance/Time • Velocity as a measure that combines speed and direction • Acceleration=change in velocity/time • Use of formula chart for solving problems --- Gravity • Weight as a measure of the force of attraction between the earth and an object • On Earth, the weight of an object is = mass x g (where g = 9.8 m/s^2) --- N2L: If an unbalanced force acts on an object, it's motion will change (acceleration) by speeding up, slowing down or changing direction. The amount of change depends on the amount of force and the mass of the object. • Acceleration=Force/Mass --- Application of Newton's Three Laws --- Apply concepts of force and acceleration to the interpretation of graphs ---differentiate between speed, velocity, and acceleration ---demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion	**VOCABULARY**: conclusion, control, controlled experiment, inference, hypothesis, observations, scientific theory, scientific law, scientific method, estimate, variables (mv/iv and rv/dv), limitation of models, speed, acceleration, extrapolation, balanced/unbalanced forces, velocity, inertia, mass, weight, and gravity. AVID Activity for beginning of school—"Tower Building" OR "All About Me." AVID Activity- Writing in Science pages 22-23 "Pre-write and Quickwrite" **CORE ACTIVITY:** ROLLER COASTER MANIA LAB **TECHNOLOGY: @** http://www.learner.org/interactives/parkphysics/coaster.html Physics Scavenger Hunt (on line) The Physics Classroom Webquest Physics Formula Challenge Newton's Law of Motion Lab

	Teacher Notes: ▪ It is recommended NOT to use the term, "deceleration," to describe a negative acceleration, as it can be confusing to students, who may see deceleration as something different from acceleration. It is important to stress that acceleration refers to *any* change in the motion (speed or direction) of an object. Conceptually, the idea of a negative acceleration is more useful and far-reaching than the single case of deceleration. ▪ N1L: If all the forces acting on an object are balanced, the object will continue in its state of motion (straight line, constant speed). ▪ It is not necessary for students to memorize definitions of Newton's Laws (as in, which of the laws is this an example of?). It is important for students to understand the interactive nature of forces (N3L) and the predictive ability of N1L and N2L. *Investigate and describe applications of Newton's law of inertia, law of force and acceleration, and law of action-reaction such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.*	Puff Cup Lab Domino Dash @ http://science-class.net Dare You to Stop me Knocked Off Course
8.1 The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. 8.1A Demonstrate safe practices during field and laboratory investigations.	Including: --- Proper use of safety goggles --- Proper handling and storage of graphing calculators and probeware --- The periodic table and formula chart -- Safety Contract In accordance with the Texas Safety Standards: Teacher Note: Safety skills and process TEKS should be embedded and reinforced throughout the year.	**CORE ACTIVITY**: District Safety Contract District Safety Power point Lab Safety Exercise (your choice) Lab Safety Disasters Texas Safety Standards

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8.2 The student uses scientific inquiry methods during fields and laboratory investigations. 8.2A Plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology.	Such as: --- Design their own experiments --- Emphasis should be on scientific methods and should build understanding of the variety of methods and their suitability for various tasks. Teacher Note: It is recommended that students create and design at least 2 labs/experiments.	Sponge Bob: Scientific Method AVID Activity- Writing in Science pages 55-94 "Experimental Design Lab Report Activities"
8.2 The student uses scientific inquiry methods during fields and laboratory investigations. 8.2B Collect information by observing and measuring..	Including: --- Measuring distances using meter sticks --- Measuring force using spring scales --- Using dimensional analysis to convert from English to metric units --- (Pre-AP: Emphasis on using probeware in a variety of situations) Teacher Note: Measurement exercises should progress across the middle school grade levels and begin by developing conceptual understanding. In 8th grade, students can begin to convert from one unit to another	**CORE ACTIVITY:** Dimensional Analysis Power Point and Math Skills #31 (listed below). **Holt Math Skills for Science** #27-What is SI? #28-A Formula For SI-Catch Up? #31-The Unit Factor & Dimensional Analysis AVID Activity- Writing in Science pages 26-28 " Observation Narrative" PREAP Only: Dimensional Analysis-Snail Race
8.2 The student uses scientific inquiry methods during fields and laboratory investigations. 8.2C Organize, analyze, evaluate, make inferences and predict trends from direct and indirect evidence.	Including: --- graph interpretation and extrapolation --- predicting outcomes based on data tables --- translate graphs (distance/time & velocity/time) into written descriptions of motion	**Science Graphing Pack** -Speed and Braking Distance Graph -Distance-Time Graph -Changing Speeds Graph AVID Activity- Writing in Science pages 29-30 "Comparative Analysis"
8.2 The student uses scientific inquiry methods during fields and laboratory investigations. 8.2D Communicate valid conclusions.	Including: --- Experimental conclusions --- Supporting conclusions with data --- Analyze error sources and fix experiment to reduce outside variables --- Graph/Chart/Table extrapolation for conclusion --- Analysis of graphs	AVID Activity- Reading in Science pages 111-132 " Additional Active Reading Graphic Organizers"
8.2 The student uses scientific inquiry methods during fields and laboratory investigations. 8.2E Construct graphs, tables, maps, and charts using tools including computers to organize, examine and evaluate data.	Such as: --- plot graphs of distance vs. time and velocity vs. time for moving objects	PREAP: LTF Lesson # IV: Graphing Skills-Chem/Physics p. 91

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8.3 The student uses critical thinking and scientific problem solving to make informed decisions. 8.3A Analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information.	Including: --- Newton's Laws of motion and their adequacy in describing motion across a variety of scales. Teacher Note: Current event analysis that critiques a scientific explanation. Relate to labs throughout the year. Should emphasize the nature of scientific explanations: testability, repeatability, evidence, and predictive nature.	
8.3 The student uses critical thinking and scientific problem solving to make informed decisions. 8.3E Connect Grade 8 science concepts with the history of science and contributions of scientists. Such as research on scientist.	Such as: --- Galileo, Newton	
8.4 The student knows how to use a variety of tools and methods to conduct science inquiry. 8.4A Collect, record, and analyze information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, hot plates, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, calculators, field equipment, computers, computer probes, water test kits, and timing devices.	Including: --- meter sticks, timing devices, balances, spring scales, computers, probes	Metric Conversions 2 Metric Practice Lab
8.4 The student knows how to use a variety of tools and methods to conduct science inquiry. 8.4B Extrapolate from collected information to make predictions.	Such as: --- extrapolate from graphs of motion and data tables to predict expected results.	**Science Graphing Pack:** Take given graphs listed on p. 3 of curriculum and extrapolate.