5th Grade - Elementary Science Bundle # 5

Title	Suggested Dates
Properties of Matter	11/16/09 – 12/4/09 (12 days)

Big Idea/Enduring Understanding	Guiding Questions
Matter has measurable physical properties and those properties determine how matter is classified, changed, and used.	How can matter be classified? What are the similarities and differences between mass and relative density of matter? In what ways can matter conduct and insulate heat? How is freezing point related to melting point?

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	District Specificity/Examples	Suggested Resources (See note above)
CURRENT TEKS **5.7 Science concepts.** The student knows that matter has physical properties. **5.7a** classify matter based on its physical properties including magnetism, physical state, and the ability to conduct or insulate heat, electricity, and sound NEW TEKS **5.5 Matter and energy.** The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. **5.5a** classify matter based on physical properties, including mass, magnetism, physical state (solid, liquid, and gas), relative density (sinking and floating), solubility in water, and the ability to conduct or insulate thermal energy or electric energy	Use appropriate tools, including senses, to identify physical properties of matter. Use a variety of types of matter in various states. Use example items from previous bundles and bundles to come. Classify using multiple criteria in multiple ways. Including: mass (review mass vs weight – introduced in 3rd) magnetism (is it magnetic?) relative density* (sinking and floating) Solubility in water (ability to dissolve) ability to conduct or insulate thermal energy or electric energy *relative density: no formula and not measuring absolute density. Using sinking and floating, the physical properties can then be connected to the ability to sink or float: introducing relative density. Density itself is taking on in 6th grade and beyond. 5th grade serves as the bridge by connecting the sinking and floating capabilities with the mass of the matter.	Resources listed here apply to the entire bundle. Science Notebooks IF I TRY: intranet and Sci Curr Info folder in each campus share folder KLEW/ Claims & Evidence PISD Elem Science Homepage PISD K-5 Equipment Alignment – part of the Vertical Alignment Document on the curriculum page Vernier Probeware / Logger Lite for data collection. Probeware can be found on each laptop cart (Go Temp!). Logger Lite software allows real time data collection. Elementary computer images already have this software loaded.
CURRENT TEKS **5.7 Science concepts.** The student knows that matter has physical properties.		

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5.7d observe and measure characteristic properties of substances that remain constant such as boiling points and melting points NEW TEKS **5.5 Matter and Energy.** The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. **5.5b** identify the boiling and freezing / melting points of water on the Celsius scale CURRENT TEKS **5.8 Science concepts.** The student knows that energy occurs in many forms. **5.8a** differentiate among forms of energy including light, heat, electrical, and solar energy NEW TEKS **5.6 Force, motion, and energy.** The student knows that energy occurs in many forms and can be observed in cycles, patterns, and systems. **5.6a** explore the uses of energy including mechanical, light, thermal, electrical, and sound energy	**TEACHER NOTE**: insulation and conduction of electrical energy is in Bundle 7 tied directly to electricity – can be used in terms of measuring the property here, but focus on thermal energy as it relates to identifying properties of matter. Connect thermal energy to previous bundles (Sun, energy behind weather: weathering and erosion). Boiling and freezing/melting points of matter remain constant for that type of matter: a descriptive property of that type of matter. Boiling and freezing/melting points may be different between types. EX: Water boils at 100 degrees Celsius and freezes/melts at 0 degrees Celsius. This will remain the same for water. However, it may not be the same for salt water, kool-aide, wax, etc. Yet, they each have their own melting/freezing and boiling points that remain constant for that item.	AIMS: Texas Edition, Physical Science: Oh Dear, What can This matter be? A Matter of States Metal Matters Reaching a Point Flipping Over Ice Cream (document use of food in lesson plans and do not serve) Heat Energy and Temperature (pg 77) Thermometers and Scales (pg 79) A Matter of Degrees Brainpop States of Matter Measuring Matter Supplemental: Bouyancy, Magnetism United Streaming TLC Elementary School Introduction to Physical Science: Solid, Liquid, and Gas (Segment 1) Heat and Matter (Segment 2); Defining the three states of matter (Segment 3), Changing from one state to another (Segment 4) TAKScopes Classifying Matter (5.7a)

CURRENT TEKS
5.1 Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.
 	
5.1a demonstrate safe practices during field and laboratory investigations
 	
5.1b make wise choices in the use and conservation of resources and the disposal or recycling of materials
 	
NEW TEKS
5.1 Scientific investigations and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures and environmentally appropriate and ethical practices.
 	
5.1a demonstrate safe practices and the use of safety
	No tasting or touching unless instructed
	Safe smelling – wafting
	Goggles
	Wait for teacher directions
	Wash hands after science activities
	
	Review investigation safety procedures for both indoor and
	outdoor activities, as applicable:
	• Directly point out possible safety risks
	• Discuss precautions
	• Share specific guidelines for the lesson
	  o Use of equipment and materials
	  o Respect for environment
	
	Encourage students to identify these on their own throughout the year [document in science notebooks via words and/or pictures]
		PISD Safety Website
		-Safety Contracts, games, etc
		-Science Safety is Elementary (for teachers)
		-Safety in the Elementary Classroom (for teachers)
		
		DuPont Science Safety Zone website
		
		Texas Science Safety Standards
		
		District Recycling Program:
		http://www.paperretriever.com/default.asp?id=226

equipment as described in the Texas Safety Standards during classroom and outdoor investigations **5.1b** make informed choices in the conservation, disposal, and recycling of materials **Health5.5 Health behaviors. The student comprehends behaviors that reduce health risks throughout the life span.** Health5.5e demonstrate strategies for preventing and responding to deliberate and accidental injuries Health5.5g describe response procedures for emergency situations Health5.5h describe the value of seeking advice from parents and educational personnel about unsafe behaviors **Health5.8 Influencing factors. The student knows how various factors influence individual, family, and community health throughout the life span**. Health5.8d identify environmental protection programs that promote community health such as recycling, waste disposal, or safe food packaging	Make note of and teach use of district-wide recycling resource. Health: - preventing injuries in both indoor and outdoor investigations - responses including communication from science lab and outdoor investigations to the front office and nurse	
CURRENT TEKS **5.2 Scientific processes.** The student uses scientific methods during field and laboratory investigations **5.2a** plan and implement descriptive and simple experimental investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology **5.2b** collect information by observing and measuring **5.2c** analyze and interpret information to construct reasonable explanations from direct and indirect evidence **5.2d** communicate valid conclusions **5.2e** construct simple graphs, tables, maps, and charts using tools including computers to organize, examine,	Classes and students should be working on their own or in groups to plan an experimental investigation. Asking an appropriate question needs to be modeled and taught. Testing one variable is not a new idea for 5th grade, but the language is new. This is not innate and must be modeled and taught. Teacher continues to model the investigative / decision making process using the Think-Aloud technique Formal and informal terms in all areas of science should be used interchangeably for exposure. The emphasis in all types of investigations is the systematic approach used: students form questions or define a problem and develop a plan to answer their question or solve the problem using appropriate tools to implement the plan.	Using Science Notebooks in Elementary Classrooms by Michael Klentschy (Chapter: Questioning). This book can be found in your campus professional development collection (library). Using Science Notebooks in Elementary Classrooms by Michael Klentschy (Chapter: Conclusions). This book can be found in your campus professional development collection (library).

and evaluate information NEW TEKS **5.2 Scientific investigations and reasoning.** The student uses scientific methods during laboratory and outdoor investigations **5.2a** describe, plan, and implement simple experimental investigations testing one variable **5.2b** ask well-defined questions, formulate testable hypothesis, and select and use appropriate equipment and technology **5.2c** collect information by detailed observation and accurate measuring **5.2d** analyze and interpret information to construct reasonable explanations from direct (observable) and indirect (inferred) evidence **5.2e** demonstrate that repeated investigations may increase the reliability of results **5.2f** communicate valid conclusions in both written and verbal forms **5.2g** construct appropriate simple graphs, tables, maps, and charts using technology, including computers, to organize, examine, and evaluate information	Develop questions using resources such as Science Notebooks, KLEW charts and students sharing with one another EX: How does a change in temperature affect mass or other properties of these materials? Does heating water change its mass? Class discussion is a critical element to allow students to elaborate and build understanding Record their ideas, the process and discussion points in Science Notebooks. Initial support for recording collected information should be more guided in the beginning of the year and move toward students making independent decisions on which type of graphic organizer to use as the year progresses. Use Science Notebook to build the skill of constructing ways to record data. Also include the following measurements to the nearest number (following Math TEKS for fractional amounts): Mass (g) using double pan balance with gram masses, comparing mass, and using triple beam balance (including calibration) Explanations: • Student generated explanations with justifications of reasoning. • This can be whole group, small group, partners or individuals • Both verbal and written in Science Notebook The KLEW format is a graphic organizer that allows students to record learning pieces and show the connection to evidence. Repeated trials will not need to be done on every hands-on/ minds-on investigation during the year, but need to be incorporated and connected to the concept of “practice” and how doing things more than one time allows patterns and other recognizable data to emerge. There should be an opportunity to discuss or have a	

	mini-lesson on the reason for repeating investigations during each bundle. It is good to remember that many demonstrations and investigations in science do not work in the classroom on a particular day – however, that is a great time to discuss repeating a test to get a more valid result – even if there is no time to actually try the demonstration or investigation again that day. Labeling of technical drawings, diagrams and pictures is a huge support for vocabulary development so that students will have a model to connect to the text	
CURRENT TEKS **5.3 Scientific Processes.** The student uses critical thinking and scientific problem solving to make informed decisions. **5.3a** analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information **5.3b** draw inferences based on information related to promotional materials for products and services **5.3c** represent the natural world using models and identify their limitations **5.3d** evaluate the impact of research on scientific thought, society, and the environment **5.3e** connect Grade 5 science concepts with the history of science and contributions of scientists NEW TEKS **5.3 Scientific investigation and reasoning.** The student uses critical thinking and scientific problem solving to make informed decisions **5.3a** in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations so as to encourage critical thinking by the student	Continue to support building understanding of using a systematic approach to solve a problem or answer a question 5.3a The key here is to support students as they observe the world and the results of their investigations and build their critical thinking by looking at those results as evidence that supports a concept. Use reflective discussions to develop and answer questions about the scientific concepts studied. This is an opportunity to integrate with point of view in ELA and SS. Student should use and reference their Science Notebooks and one another 5.3b For every model used during the year, ask the following questions: • What is the model for? • What do the parts of the model represent? • How is the model the same as its target – the real thing? • How is the model different from its target – the real thing? • How well does the model represent its target? What can it not show? (limitations) Use different models of each concept target where each different model is designed to highlight a different	

5.3b evaluate the accuracy of the information related to promotional materials for products and services such as nutritional labels **5.3c** draw or develop a model that represents how something works or looks that cannot be seen such as how a soda dispensing machine works **5.3d** connect grade level appropriate science concepts with the history of science, science careers, and contributions of scientists	important part of the overall concept. The questions allow you to focus on each part of each model so that when all those parts combine, a better mental model is created for students	
CURRENT TEKS **5.4 Scientific Processes.** The student knows how to use a variety of tools and methods to conduct science inquiry **5.4a** collect and analyze information using tools including calculators, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, compasses, balances, hot plates, meter sticks, timing devices, magnets, collecting nets, and safety goggles **5.4b** demonstrate that repeated investigations may increase the reliability of results NEW TEKS **5.4 Scientific investigation and reasoning.** The student knows how to use a variety of tools and methods to conduct science inquiry. **5.4a** collect, record, and analyze information using tools including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, prisms, mirrors, pan balances, triple beam balances, spring scales, graduated cylinders, beakers, hot plates, meter sticks, magnets, collecting nets, and notebooks; timing devices including clocks and stopwatches, and materials to support the observation of habitats of organisms such as terrariums and aquariums **5.4b** use safety equipment including safety goggles and gloves	Metric units of measurement only **TEACHER NOTE:** Teaching the proper use of tools should be scaffolded: 1. Tools are modeled 2. Students are exposed through group interaction and then, 3. Individuals develop skills through multiple opportunities for practice during the year. Tools and equipment, including senses, should be used in authentic learning settings including during an outside field investigation Double pan balance with and without weights, platform scale, beakers, graduated cylinders, hand lenses, magnets, notebooks. Including hand lenses and microscope for further observation *Important to plan for the use of goggles and other safety equipment as needed. Be aware of chemical and other safety hazards and take proper precautions*	