Physics
Scope and Sequence

PROFILE

Science is a way of knowing and experiencing the natural world. It is a social and intellectual endeavor that provides the foundation for lifelong informed decision-making, problem-solving, improved quality of life and technological advances. Learning science is an active process, and all students should have access to challenging, relevant, exciting, "hands-on," and content-rich science experiences.

OUR CURRICULUM

The Conroe Independent School District offers students a challenging science curriculum that utilizes inquiry and discovery models of instruction which provide opportunities for all students to participate and master science concepts. Students will experience the richness of science through hands-on laboratory and field investigations through inquiry and active experimentation. Emphasized science process skills include: observing, measuring, identifying, classifying, predicting, comparing, inferring, and drawing conclusions. Students will also develop a proficient use of technology through analyzing and collecting data for real world science applications. Our science curriculum is based on the Texas Essential Knowledge and Skills (TEKS) curriculum framework.

CURRICULUM & INSTRUCTION STAFF

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EXPECTATIONS

1. **Student Investigations**
   The students will be able to gather, analyze, and interpret information using selected equipment and tools. The students will conduct field and laboratory investigations using safe, environmentally appropriate and ethical practices. The student will spend at least 40% of instructional time conducting investigations.

2. **Vocabulary**
   The student will build and expand vocabulary, through a print-rich environment, to increase fluency and understanding by incorporating scientific vocabulary into their everyday speaking, listening, and writing routines.

3. **Content Integration**
   The student will read a variety of texts to analyze, review, and critique scientific explanations, hypotheses, and theories as to strengths and weaknesses, and draw inferences on promotional materials. The student will write to inform, describe, and classify using correct scientific vocabulary, scientific concepts, sentence structure, capitalization, punctuation, spelling, usage, and word order.

4. **The student will…**
   a. Demonstrate safe practices
   b. Plan and implement descriptive investigations – well-defined questions and formulated hypotheses
   c. Select and use equipment and technology
   d. Collect data through observation and measurement
   e. Demonstrate repeated investigations to increase reliability of results
   f. Organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence
   g. Communicate valid conclusions
   h. Construct graphs, tables, maps, and charts to organize, examine, and evaluate data
   i. Connect science concepts with history and scientists

SCIENCE PROCESS SKILLS

Throughout the year, students will master certain required skills. These skills are important to a student's understanding of the nature of science. **The Science Process Skills are not designed to be taught in isolation.** They are to be embedded in each instructional unit and some should be practiced each time science is taught.

The student will:

1. Demonstrate safe practices during field and laboratory investigations. **(TEKS 1A)**
2. Make wise choices in the use and conservation of resources and the disposal or recycling of materials. **(TEKS 1B)**
3. Plan and implement experimental procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology. **(TEKS 2A)**
4. Make quantitative observations and measurements with precision. **(TEKS 2B)**
5. Organize, analyze, evaluate, make inferences, and predict trends from data. **(TEKS 2C)**
6. Communicate valid conclusions. **(TEKS 2D)**
7. Graph data to observe and identify relationships between variables. **(TEKS 2E)**
8. Analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information. **(TEKS 3A)**
9. Express laws symbolically and employ mathematical procedures including vector addition and right-triangle geometry to solve physical problems. **(TEKS 3B)**

Physics
Scope and Sequence

FIRST NINE WEEKS

SCIENCE PROCESS SKILLS SHOULD BE PRACTICED EACH TIME SCIENCE IS TAUGHT.

VOCABULARY		STUDENT EXPECTATIONS (SEs)		RESOURCES / ACTIVITIES
NOUNS	**VERBS**			
magnitude displacement motion velocity speed direction distance time graph constant dimensional analysis slope intercept position linear interval	calculate interpret apply recognize investigate analyze plot model convert	**Week 1**	**CONSTANT VELOCITY** 1. Student must be able to calculate velocity: v=d/t (TEK 4A)	Dimensional analysis Velocity lab Motion, sensors, motion-match graph (Vernier's ultrasonic sensor)
		Week 2	2. Student must be able to recognize and interpret constant velocity (distance vs time) graphs. (TEK4A, TEK 4B)	Pre-AP extension: Graphical analysis
free fall gravity acceleration average velocity instantaneous velocity	acceleration (positive/ negative) measure	**Week 3**	**CONSTANT ACCELERATION** 1. Student must be able to calculate acceleration: a=av/t ($v=v_0 + at$) 2. Interpret velocity vs time graphs.	Ramp lab
		Week 4	3. Investigate gravity as constant acceleration.	Picket fence or ticker tape lab w/ photogate sensor
vector angle resultant parabola horizontal vertical components resultant projectile scalar	resolve combine launch	**Week 5**	**VECTORS 2D** 1. Student should recognize that vector involves direction, exp. speed, velocity, acceleration	Trigonometry extension
		Week 6	2. Student should be able to graphically resolve a ♦ 2-D vector/components of a single vector ♦ vector addition/resolution 3. Describe the independence of x, y motion	Orienteering lab for vectors (Rippetoe) Vector Racing activity (Rippetoe)

		Week 7	**VECTORS 2D (con't)** 4. Understand parabolic motion of projectile. 5. Describe the qualitative relationship between angle and range. 6. Analyze examples of circular motion.	Projectile lab Conic Toss (Rippetoe)
force balanced force unbalanced force	define differentiate demonstrate	**Week 8**	**STATICS** 1. Student should be able to define force as a push or pull. 2. Differentiate between balanced and unbalanced forces.	2 Dimensions lab: Force table Tug of War (2D)
		Week 9	3. Student should be able to define force as a push or pull. 4. Create free – body diagrams for various systems; e.g. object @ rest; object @ constant velocity; object accelerating.	

Physics
Scope and Sequence

SECOND NINE WEEKS

SCIENCE PROCESS SKILLS SHOULD BE PRACTICED EACH TIME SCIENCE IS TAUGHT.

VOCABULARY		STUDENT EXPECTATIONS (SEs)		RESOURCES / ACTIVITIES
NOUNS	**VERBS**			
net force acceleration friction	demonstrate interpret identify describe analyze	**Week 1**	**DYNAMICS** 1. Student must be able to explain Newton's 3 laws of motion. 2. Be able to apply 2nd law to systems (F=ma) (reference back to free-body diagrams).	Pulling cart lab (Davies) Elevator activity (Rippetoe)
		Week 2	3. Investigate the relationship between net force and acceleration. 4. Apply force as a vector. 5. Evaluate the impact of friction.	Hanging mass lab
work power energy kinetic energy potential energy gravitational energy law of conservation of energy mechanical advantage efficiency	interpret observe describe calculate	**Week 3**	**WORK – ENGERGY** 1. Define and calculate work, power and energy. 2. Observe and describe different types of energy (kinetic, potential, gravitational).	Conservation of Energy Simple machine Efficiency
		Week 4	3. Explain the Law of Conservation of Energy/Work – energy theorem. 4. Simple machines: ♦ List ♦ Calculate mechanical advantage ♦ Calculate efficiency	
		Week 5	5. Simple machines (continued)	
momentum impulse law of conservation of momentum	interpret	**Week 6**	**WORK – ENGERGY** 1. Student will be able to define and calculate momentum and impulse. 2. Demonstrate and describe the law of conservation of momentum.	Collision lab Explosion lab Egg toss lab
		Week 7	3. Express momentum as a vector.	Extension – air bags

		Week 8	**SEMESTER REVIEW**	
		Week 9	**SEMESTER REVIEW**	

Physics
Scope and Sequence

THIRD NINE WEEKS

SCIENCE PROCESS SKILLS SHOULD BE PRACTICED EACH TIME SCIENCE IS TAUGHT.

VOCABULARY		STUDENT EXPECTATIONS (SEs)		RESOURCES / ACTIVITIES
NOUNS	**VERBS**			
temperature specific heat	evaluate analyze explain	**Week 1**	**HEAT** 1. Student will define/differentiate quantitative and temperature. 2. Describe the three types of heat transfer.	Calorimeter lab Extensions – Phase changes (quantitative)
		Week 2	3. Identify the Laws of Thermodynamics. 4. Explain specific heat and apply Q = mcdt. 5. Demonstrate a qualitative understanding of phase changes.	
wave velocity frequency amplitude reflection refraction interference resonance	examine describe identify	**Week 3**	**WAVES / SOUND** 1. Student will define and apply 4 properties of waves. 2. Differentiate between types of waves and parts of waves.	Resonance tub Sound interference demo Resonance boxes demo
		Week 4	3. Explain wave interactions. 4. Understand/apply wave equations. 5. Demonstrate qualitative understanding of the Doppler effect.	Applications /Extension Medical
		Week 5	6. Analyze and explain wave interactions. 7. Describe resonance and interference.	
photoelectric effect line spectra electromagnetic waves electromagnetic spectrum	examine describe	**Week 6**	**LIGHT/COLOR** 1. Student will understand / explain wave/particle duality. 2. Describe the different types of electro-magnetic waves / spectrum.	Polarization and Colors Demo
		Week 7	3. Differentiate between the color properties of light and pigments. 4. Describe the photoelectric effect and explain line spectra.	

reflection refraction	examine describe identify	**Week 8**	**OPTICS** 1. Demonstrate reflection using mirrors. 2. Demonstrate refraction using lenses.	Lens lab
Coulomb's law induction conduction polarization		**Week 9**	**ELECTROSTATICS** 1. Describe the interactions of charges. 2. Describe charges as a part of atoms. 3. Identify the force between charges, i.e. Coulomb's Law. 4. Describe the three methods of charging – induction; conduction and polarization.	

Physics
Scope and Sequence

FOURTH NINE WEEKS

SCIENCE PROCESS SKILLS SHOULD BE PRACTICED EACH TIME SCIENCE IS TAUGHT.

VOCABULARY		STUDENT EXPECTATIONS (SEs)		RESOURCES / ACTIVITIES
NOUNS	**VERBS**			
potential difference current resistance Ohm's Law DC power	design analyze demonstrate identify	**Week 1**	**ELECTRIC CURRENT** 1. Define potential difference, current and resistance. 2. Explain and apply Ohm's Law.	Ohm's Law
		Week 2	3. Calculate power (example – electric bill) 4. Identify DC sources. 5. Identify and analyze alternative energy sources 6. Describe the environmental impact of alternative energy.	
series circuit parallel circuit resistance	design analyze calculate	**Week 3**	**CIRCUITS** 1. Distinguish between the 2 types of circuits. 2. Calculate equivalent resistance. 3. Apply Ohm's law to various circuits. 4. Design and analyze electric circuits.	Series/Parallel lab Circuit lab
		Week 4	**TAKS REVIEW**	
		Week 5	**TAKS TESTING**	
		Week 6	**CIRCUITS** (cont'd)	

magnetism generator electromagnetism motor	identify demonstrate	**Week 7**	**MAGNETISM** 1. Explain magnetic interactions. 2. Demonstrate the relationship between electricity and magnetism.	Motor/Generator lab Electromagnetic activity with rechargeable batteries
		Week 8	3. Understand electromagnetism 4. Describe motors/generators	
		Week 9	**REVIEW CONCEPTS**	
		Week 10	**EXAMINATION**	
		Week 11		