Course: IPC		
Curricular Unit: **Force and Motion**	**Strand:** **Motion**	**Duration:** 4 weeks
Content (TEKS): Northside Independent School District incorporates big ideas, enduring understandings and skills of a discipline. The curriculum units provide clarity and are aligned to the Texas Essential Knowledge and Skills.		
Universal Concepts: Cause and Effect; Scale, Proportion and Quantity; Stability and Change		
Content Specific Concepts: Distance, Displacement, Speed, Velocity, Acceleration, Momentum.		
English Language Proficiency Standards (ELPS): Classroom instruction must effectively integrate second language acquisition with quality content area instruction to ensure that ELLs acquire social and academic language proficiency, in English, learn the knowledge and skills in the TEKs, and reach their full academic potential.		
Understanding/Generalization: • Changes in position and the rates of these changes influence concepts of motion.		
Essential Questions: The student will be able to answer these questions… • How do you know an object has moved? • How is it possible for an object to have a smaller displacement value than the distance traveled value? • Why do roads have speed limits rather than velocity limits? • During a trip can a car's instantaneous speed ever be greater than its average speed? Explain. • How would describe and graph your motion from your house to school and back to your house? • What does it mean to "step on the gas?" • How can an object be going a constant speed yet, still accelerating? • What designs in consumer products are influenced by velocity, acceleration, momentum? • Why is momentum a property of moving objects but not of stationary objects? • Can a 6 year old ballerina ever have the same momentum as a sumo wrestler? Explain. • Explain how the momentum of a cannon and cannon ball can have the same momentum before and after the cannon is fired. • What role does conservation of momentum play in the real world? Explain.		
Do: The student will be able to…		**Know:** The student will know…
4 The student knows concepts of force and motion evident in everyday life. The student is expected to: (A) describe and calculate an object's motion in terms of position, displacement, speed, and acceleration.	**4(A)**	**• the difference between vector and scalar quantities.** **• the units associated with the measurements of this strand.** **• difference between distance and displacement.** **• acceleration = change in velocity / time.** **• the difference between speed and velocity & how to calculate each.** **• what instantaneous speed is and how to calculate it.** **• what average speed is and how to calculate it.** **• speed=distance /time.** **• velocity = displacement / time.**
4 The student knows concepts of force and motion evident in everyday life. The student is expected to: (B) measure and graph distance and speed as a function of time.	**4(B)**	• instantaneous and average speed on graph. **• interpreting types of motion graphs (i.e.- distance vs time (speed) graph & speed vs time (acceleration) graph).** • differences in scalar and vector quantities. **• the difference between independent & dependent variables and where they are on a graph (e.g. independent = time; dependent = distance or speed) DRY MIX (Dependent, Responding, Y-Axis / Manipulated, Independent, X-Axis).** • the significance of the slope on a displacement vs time graph. • what "at rest" looks like on a displacement vs time graph and a velocity vs time graph. • what "constant velocity" looks like on a displacement vs time graph and a velocity vs time graph. • the significance of the slope on a velocity vs time graph. • what constant acceleration look like on a displacement vs time graph and a velocity vs time graph.

4 The student knows concepts of force and motion evident in everyday life. The student is expected to: (E) explain the concept of conservation of momentum using action and reaction forces.	4(E)	• relationships between mass and momentum where an increase in mass leads to an increase in momentum. • relationship between velocity and momentum where an increase in velocity leads to an increase in momentum. **• concept of conservation of momentum.**

Process Standards

(1)Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:
(A) demonstrate safe practices during laboratory and field investigations , including the appropriate use of safety showers, eyewash fountains, safety goggles or chemical splash goggles, as appropriate, and fire extinguishers
(B) know specific hazards of chemical substances such as flammability, corrosiveness, and radioactivity as summarized on the Safety Data Sheets (SDS); and
(C) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

(2) Scientific processes. The student uses scientific practices [methods] during laboratory and field investigations. The student is expected to:
(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;
(B) plan and implement investigative procedures, including asking questions, formulating testable hypotheses, and selecting equipment and technology;
(C) collect data and make measurements with accuracy and precision;
(D) organize, analyze, evaluate, make inferences, and predict trends from data; and
(E) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphs, journals, summaries, oral reports, and technology-based reports.

(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:
(A)analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the students
(B) communicate and apply scientific information extracted from various sources such as current events, published journal articles, and marketing materials;
(C) draw inferences based on data related to promotional materials for products and services;
(D) evaluate the impact of scientific research on society and the environment;
(E) evaluate models according to their limitations in representing biological objects or events; and
(F) research and describe the history of biology and contributions of scientists.