Science Grade 5 Unit 2

Canterbury Public Schools

Subject	Science
Grade Level	5
Unit Title	Waves: Waves and Information
Unit Goals	Understand the basic properties of waves and how they can transfer information
Pacing (# of weeks)	3 Weeks
Standards	**Performance Expectations** **4-PS4-1.** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Assessment Boundary: Assessment does not include interference effects,non-periodic waves) **4-PS4-3**. Generate and compare multiple solutions that use patterns to transfer information. [Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]
Content/Conceptual Knowledge (know)	Science knowledge is based on logical and conceptual connections between evidence and explanations. NGSS Disciplinary Core Ideas (See below) **PS4.A: Wave Properties** Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. (4-PS4-1) Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1)

	PS4.C: Information Technologies and Instrumentation Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3) **ETS1.C**: **Optimizing The Design Solution** Different solutions need to be tested to determine which of them best solves the problem, given the criteria and the constraints. (secondary to 4-PS4-3)
Skills (be able to do)	**Inquiry/Science skills:** ● Observing: Using all five senses to gather information, noting details, and describing objects or events. ● Measuring: Using standard and non-standard measures to accurately quantify dimensions, including the metric system (centimeters, liters, milliliters) ● Inferring: Interpreting or explaining observations to make sense of data. ● Hypothesizing and Testing: Forming a testable, educated guess and designing experiments to test it. ● Controlling Variables: Identifying and managing independent, dependent, and controlled variables in experiments. ● Data Analysis & Interpretation: Creating and reading graphs, charts, and tables to analyze data. ● Modeling: Using models to represent, understand, and explain complex systems. ● Draw conclusions and use data to determine next steps in an attempt to refine the experimentation process. Soft Skills: ● Follow step by step directions ● Communication: Active listening, verbal, and written communication are crucial for collaborating and presenting ideas effectively. ● Teamwork & Collaboration: Working effectively in groups, respecting diverse perspectives, and contributing positively to shared goals. ● Adaptability & Flexibility: The ability to adjust to new situations, unexpected challenges, and evolving environments. **Digital Literacy Skills** ● Use Google Classroom ● Use technology to complete tasks and research data. ● Use Google Sheets to create graphs

	• Use Google Slides to present data • Hyperlink data sources
Essential Questions	• What are the properties of a wave? • How are waves used to send information or energy? • What are electromagnetic waves? • What are sound waves? • How do radio waves transfer information?
Enduring Understandings	• Light can travel as a wave. • Sound can travel as a wave. • Waves have an amplitude and a frequency. • Amplitude is the height of a wave, and the higher the amplitude, the more energy is being transferred through the wave • Frequency is how often a wave is made. • Wavelength can impact the frequency of a wave. • Waves with longer wavelengths have a lower frequency. • Waves with shorter wavelengths will have a higher frequency. • Waves are used in many devices to transmit or receive information.
Vocabulary	Amplitude, Frequency, Wavelength, Crest, Trough, Wave, AM, FM, radiowaves, electromagnetic waves, transverse wave
Common Learning Experiences	• Using waves to transmit a secret code to a partner across the room • Demonstration of a transverse wave that helps illustrate the parts of a wave. • Taking notes on key terms: AM, FM, wavelength, frequency, amplitude. • Drawing and labeling the parts of a transverse wave • Using Tuning forks to demonstrate how different frequencies can have an impact on sound waves • Reviewing concepts with the “Keep your eye on the ball” review game. • Watching videos of transverse waves to show particle movement.
Assessments	Pretests Unit Assessments Demonstrations Lab Reports Experiments
Student Resources	Classroom library, Google Classroom, Mystery Science activities and lessons, online classroom resources, Online Super Stem articles,
Teacher Resources	NASA.gov, Mystery Science activities and lessons, Scholastic.com, NGSS,