

Overall Expectations:

SIV.01 demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);

SIV.02 identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields;

WSV.01 analyse how mechanical waves and sound affect technology, structures, society, and the environment, and assess ways of reducing their negative effects;

WSV.02 investigate, in qualitative and quantitative terms, the properties of mechanical waves and sound, and solve related problems;

WSV.03 demonstrate an understanding of the properties of mechanical waves and sound and of the principles underlying their production, transmission, interaction, and reception.

Specific Expectations:

SI1.01 formulate relevant scientific questions about observed relationships, ideas, problems, or issues, make informed predictions, and/or formulate educated hypotheses to focus inquiries or research;

SI1.03 identify and locate a variety of print and electronic sources that enable them to address research topics fully and appropriately;

SI1.07 select, organize, and record relevant information on research topics from a variety of appropriate sources, including electronic, print, and/or human sources, using suitable formats and an accepted form of academic documentation;

SI1.09 analyse the information gathered from research sources for logic, accuracy, reliability, adequacy, and bias;

SI1.11 communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models);

SI2.01 identify and describe a variety of careers related to the fields of science under study (e.g., theoretical physicist; communications, networks, and control systems professional; engineer; metallurgist) and the education and training necessary for these careers;

WS1.01 analyse how properties of mechanical waves and sound influence the design of structures and technological devices (e.g., the acoustical design of a concert hall; the design of headphones, hearing aids, musical instruments, wave pools) [AI, C];

WS1.02 analyse the negative impact that mechanical waves and/or sound can have on society and the environment, and assess the effectiveness of a technology intended to reduce this impact [AI, C];

WS2.01 use appropriate terminology related to mechanical waves and sound, including, but not limited to: *longitudinal wave, transverse wave, frequency, period, cycle, amplitude, phase, wavelength, velocity, superposition, constructive interference, destructive interference, standing waves, and resonance* [C];

WS2.02 conduct laboratory inquiries or computer simulations involving mechanical waves and their interference (e.g., using a mass oscillating on a spring, a mass

oscillating on a pendulum, the oscillation in a string instrument) [PR];

WS3.03 explain and graphically illustrate the principle of superposition with respect to standing waves and beat frequencies;

WS3.04 identify the properties of standing waves, and, for both mechanical and sound waves, explain the conditions required for standing waves to occur.