

University of Wisconsin – River Falls
2016 Summer Session Workshop

Syllabus - Waves: NGSS for Physics and Physical Science Teachers

This is an intensive two-week course designed to focus on the wave section of NGSS standards in both physics and physical science. Daily activities will include content knowledge discussion, active learning techniques, and engineering design applications. This syllabus is intended as a general outline only and daily topics may change.

Day 1 & 2: MS-PS4-1 and HS-PS4-1

Topics: Mathematical representation of waves; Frequency, wavelength, speed of waves in different media

Emphasis: Qualitative and quantitative description of waves; EM radiation in a vacuum and glass, sound waves through air and water, and seismic waves

Day 3 & 4: MS-PS4-2 and HS-PS4-2

Topics: Use of models to describe reflections, absorption, and transmission of waves; uses of digital transmission and storage of information

Emphasis: Consider both mechanical and light waves; advantages and disadvantages for both transmission and storage

Day 5 & 6: MS-PS4-3 and HS-PS4-3

Topics: Support claim that digitized signals are a more reliable way to encode and transmit information than analog signals; Claims, evidence, and reasoning for wave or particle model & which is more useful in some situations

Emphasis: Basic understanding that waves can be used for communication purposes ; how experimental evidence supports a claim and how theory is generally modified in light of new evidence

Day 7 & 8: HS-PS-4

Topics: Validity and reliability of claims in published materials of effects that different frequencies of electromagnetic radiation have when absorbed by matter

Emphasis: Energy of photons at different frequencies and damage done to living tissue from energy of electromagnetic radiation; bias as related in written articles will be included

Day 9 & 10: HS-PS4-4

Topics: How some technological devices use principles of wave behavior and wave interactions with matter to transmit and capture information and energy

Emphasis: Modern uses of technology such as solar cells converting to electricity, medical imaging, communication, etc.