


IPC Curriculum Bundle #6

Title		Suggested Dates
Waves and Sound		12/7-12/18/2009 (8 days)

Big Idea/Enduring Understanding	Guiding Questions
All types of waves transfer energy. Waves interact with other waves and with matter.	How do waves affect everybody's daily lives for good and for bad? What kinds of waves are fun and which can hurt you?

The resources included here provide teaching examples and/or meaningful learning experiences to address the District Curriculum. In order to address the TEKS to the proper depth and complexity, teachers are encouraged to use resources to the degree that they are congruent with the TEKS and research-based best practices. Teaching using only the suggested resources does not guarantee student mastery of all standards. Teachers must use professional judgment to select among these and/or other resources to teach the district curriculum.

Knowledge & Skills with Student Expectations	District Specificity/Examples	Suggested Resources (See note above)
<p>5 The student knows the effects of waves on everyday life.</p> <p>5A Demonstrate wave types and their characteristics through a variety of activities. Such as</p> <ul style="list-style-type: none"> • Modeling with ropes and coils • Activating tuning forks • Interpreting data on seismic waves 	<p>Including</p> <ul style="list-style-type: none"> • Identify and measure <ul style="list-style-type: none"> ○ Frequency ○ Wavelength ○ Period ○ Wave velocity • Describe and give examples of transverse, compressional (longitudinal), and standing waves • Solve problems involving frequency, period, velocity, and wavelength • <i>explore the characteristics and behaviors of energy transferred by waves, including acoustic, seismic, light, and waves on water as they superpose on one another, bend around corners, reflect off surfaces, are absorbed by materials, and change direction when entering new materials</i> 	<p>http://www.kettering.edu/~drussell/Phys302/phys302.html</p> <p>http://www.phys.unsw.edu.au/jw/strings.html#travelling</p> <p>Tacoma Narrows Bridge Video (online) - http://www.enm.bris.ac.uk/anm/tacoma/tacnarr.mpg</p> <p>Slinky Wave Lab</p> <p>Pendulum Lab (versions 1 & 2)</p> <p>Sounds Demonstrations</p>
<p>5 The student knows the effects of waves on everyday life.</p> <p>5B Demonstrate wave interactions within various materials. Including</p> <ul style="list-style-type: none"> • Interference • Polarization 	<p>Including</p> <ul style="list-style-type: none"> • Absorption • Illustrate the diffraction waves (spectroscopes) • Identify the causes and effects of resonance • Compare and contrast constructive and destructive interference • Evaluate the law of reflection 	<p>“Natural Frequency and Resonance” – Investigations in Physics and Chemistry</p> <p>http://www.kettering.edu/~drussell/Phys302/phys302.html</p> <p>Wave Tank (kit) - demonstration</p>

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<ul style="list-style-type: none"> • Reflection • Refraction • Resonance 		
<p>5 The student knows the effects of waves on everyday life.</p> <p>5C Identify uses of electromagnetic waves in various technological applications. Such as</p> <ul style="list-style-type: none"> • Fiber optics • Optical scanners • Microwaves 	<p>Including</p> <ul style="list-style-type: none"> • Radar (Doppler Effect) • X-Rays • Laser • Magnetic Resonance Imaging (MRI) 	<p>http://www.kettering.edu/~drussell/Demos/doppler/doppler.html</p> <p>Doppler Effect Demo (outside by road)</p> <p>Australian Bull Roarer Lab</p>
<p>5 The student knows the effects of waves on everyday life.</p> <p>5D Demonstrate the application of acoustic principles. Such as</p> <ul style="list-style-type: none"> • Echolocation • Musical instruments • Noise pollution • Sonograms 	<p>Including</p> <ul style="list-style-type: none"> • Sonar • Describe how sound waves are heard • Relate loudness to intensity and pitch to frequency • Illustrate the Doppler Effect 	<p>http://www.kettering.edu/~drussell/Demos/doppler/doppler.html</p> <p>“Sound Lab” – <u>Investigations in Physics and Chemistry</u></p> <p>Resonance Box and Tuning Fork (demonstration)</p> <p>Identify Items by dropping them and recognizing their natural frequencies</p> <p>Harmonic Tubes (twirl overhead and change frequencies)</p>