

## Penn College NDT Externship: Lesson Template

Name of Lesson/Activity	Ultrasonic Inspection
Participants <ul style="list-style-type: none"> <li>Age/Location</li> </ul>	51 students ages 16-18 at Mercer Area High School, Mercer, PA
Content Area(s)	Sound/Resonance
How do you know the inquiry is real?	The inquiry was related to the real-world application of ultrasonic inspection.
Brief Lesson Summary <ul style="list-style-type: none"> <li>What NDT content is involved?</li> </ul>	I began with an introduction to NDT to include methods and applications. I then focused on ultrasonic inspection and principles of sound waves. I demonstrated ultrasonic frequencies to the students by allowing them to find the upper end of their own audible range using a function generator and a speaker. I also discussed the speed of sound and how it varies based on the medium. I demonstrated a standing longitudinal wave in an aluminum rod. The students then began an inquiry activity in which they determined the speed of sound in air using a tube closed at one end (see attachment). Results were then shared with the class.
List Activities <ul style="list-style-type: none"> <li>General materials and equipment needed for each</li> <li>Time frame(s)</li> </ul>	Activity: Measuring the Speed of Sound in Air (see attachment)  Materials: Resonance tube apparatus, tuning fork, water  Time frame: 45 min
Engineering Design Process	FULL _____ PARTIAL <u> X </u> NONE _____
Which of the EDP steps are included? Are they supported?  <input type="checkbox"/> Establishing Problem <input type="checkbox"/> Brainstorming <input type="checkbox"/> Questioning <input type="checkbox"/> Decision Making <input type="checkbox"/> Iteration <input type="checkbox"/> Justifying/CER <input checked="" type="checkbox"/> Mathematical Thinking <input checked="" type="checkbox"/> Communicating Results	

<p>Include Metacognition</p> <ul style="list-style-type: none"><li>• Peer review</li><li>• Journals</li></ul>	None
<p>Communicate Results</p> <ul style="list-style-type: none"><li>• Peer Review</li><li>• Assessments</li><li>• Sharing results to larger audience</li></ul>	Results were shared with classmates.

**Reviewer Comments/Suggestions:**