Assessment for Physics 108

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The Department of Physics and Astronomy has set the following goals for Physics 108.

Goals:

1. Students will recognize and be able to describe wave and vibrational phenomena, understanding that waves and vibrations are all around them in the physical world.
2. Students will relate human perception of sound to its production, and propagation through space.
3. Students will gain competency in interpreting graphs, and basic quantitative problem solving skills.
4. Students will develop a general understanding of the logical and quantitative analyses that scientists use to study phenomena and processes.

The success in meeting these goals will be assessed by the following outcomes. The outcomes were chosen to cover some of the most important topics and to demonstrate a range of skills in critical thinking and solving problems, not necessarily to cover all the topics in the course.

Outcomes:

Outcome 1: Students will demonstrate understanding of the basic properties of waves, including wavelength, frequency, and velocity. They will answer qualitative questions on the relationship between frequency, wavelength, and velocity, and quantitative problems involving simple calculations and interpreting graphs regarding waves.
NM HED Area III competencies 2, 4 and 5: Solve problems scientifically, Apply quantitative analysis to scientific problems, and Apply scientific thinking to real world problems.

Outcome 2: Students will demonstrate understanding of wave reflection, diffraction, and interference, through graphical representation, and quantitative problems.
NM HED Area III competencies 2, 4 and 5: Solve problems scientifically, Apply quantitative analysis to scientific problems, and Apply scientific thinking to real world problems.

Outcome 3: Students will demonstrate understanding of the relationship between intensity of sound, and the human perception of loudness. This is shown through qualitative, quantitative, and graphical questions. They will understand the relationship between frequency and pitch.
NM HED Area III competencies 2, 4 and 5: Solve problems scientifically, Apply quantitative analysis to scientific problems, and Apply scientific thinking to real world problems.

Outcome 4: Students will demonstrate recognition of vibrational modes in a variety of instruments, and the relationship to frequencies produced, and how humans can control these modes and thus the timbre of sound.
NM HED Area III competencies 2, 4 and 5: Solve problems scientifically, Apply quantitative analysis to scientific problems, and Apply scientific thinking to real world problems.

Outcome 5: Students will demonstrate understanding, from a basic physical standpoint, of how sound energy is translated to perceived sound by the human ear/brain system.
NM HED Area III competencies 2, 4 and 5: Solve problems scientifically, Apply quantitative analysis to scientific problems, and Apply scientific thinking to real world problems.

Assessment Data Collection:
For each outcome the material will be covered in class using teaching strategies that include lecture, demonstrations, example problems, and hands-on activities with worksheets. Homework will include problems that require these outcomes skills. Assessment will come from embedded questions in exams.

Rubric: For each SLO, there will typically be either three or more questions covering the concept. The SLO can be assessed with either of two methods. Method 1 assesses students' performance based on the percentage of questions they answered correctly in each rubric as a group. The instructor can then examine the percentage of students demonstrating Exemplary, Satisfactory, or Unsatisfactory performance on each SLO. Method 2 is more simply based on the average score of all students on all questions in each rubric. The instructor can use this average score to decide if the class performance as a whole is Exemplary, Satisfactory, or Unsatisfactory. The table below provides more detail on what is meant by Exemplary, Satisfactory, or Unsatisfactory performance on each SLO.

Exemplary	Satisfactory	Unsatisfactory
Method 1: a student correctly solves or answers all three problems or qualitative questions, (or at least 75% if more than 3 problems/questions). Method 2: the average score of students on the problems and questions is at least 75%.	Method 1: a student correctly solves at least 50% of the problems, or answers qualitative questions. Method 2: the average score of students on the problems/questions is 50-75%	Method 1: a student solves 50% or less of the problems or answers 50% or less of the qualitative questions correctly. Method 2: the average score of students on the problems/questions is less than 50%.