Yesterday is a dream, tomorrow but a vision. But today well lived makes every yesterday a dream of happiness, and every tomorrow a vision of hope. Look well, therefore to this day. -- Sanskrit Proverb

Assume the speed of sound to be 340 m/s for all problems.

1. A 1250 kg car has 3 passengers with a combined mass of 135 kg. The car has four identical springs that have a spring constant of 18 500 N/m. (a) Find the frequency of vibration for the car when it goes over the old speed bump. (b) How much time does it take for the car to go through 2 oscillations?

2. You are at a stop light in your car, stuck behind a red light. Just before the light is supposed to change, a fire engine comes zooming up towards you traveling at a horrendous 85.0 km/h. If the siren has a rated frequency 665 Hz, (a) what frequency do you hear? (b) What is the wavelength of the sound you hear?

3. You spot a large pendulum that is swinging through a small arc. If the length of the pendulum is 5.5 m, what is its period?

4. You are on a train traveling at 105 km/h. You approach a stationary 455 Hz siren. What is frequency you hear?

5. Two trains on separate tracks move towards one another. Train 1 has a speed of 130 km/h, train 2 a speed of 90.0 km/h. Train 2 blows its horn, emitting a frequency of 500 Hz. What is the frequency heard by the engineer on train 1?

6. You are standing next to a train track as a train rolls slowly past. You note that the frequency of the train whistle is 442 Hz when the train is approaching you and 441 Hz when the train is receding from you. Using these frequencies, calculate the speed of the train.