

Problems A - Sound as a wave.

1. What type of wave is sound? (two ways)
2. What does the frequency of the sound wave do?
3. How is a sound wave's speed changed?
4. Why does sound move faster in solids than in gasses?
5. What is a red shift? a blue shift? How does it affect the wave's speed?
6. How does the sound's amplitude affect it?
7. What do we call the science of the study of sound?
8. A cop's siren has a frequency of 450 Hz when standing still. What frequency do you hear when it is traveling toward you at 40 m/s? If it passes you, what frequency do you hear now that it is moving away from you?
9. Omanik is standing on a small hill screaming at the top of her lungs at a 11 100 Hz frequency. A duck flying toward her hears a 12 700 Hz frequency. How fast is the duck flying, and what frequency will be heard after it passes her?
10. What is the difference (mathematically) between two notes one octave apart?
12. What are beats? Why do they occur? How can we use beats to tune instruments?
13. Why do your parents call your music noise? Who is right?
14. What do we call musical sounds that sound good together?
15. Sounds that don't seem to go together are called _____.
16. Consonances have frequencies that go together how, mathematically?

Problems B -

Resonance, overtones

1. What is the fundamental of a tube open at both ends?
2. What is the fundamental of a tube closed at one end?
3. What is the step between the

fundamental and the first overtone?

4. What are the steps between the overtones?
5. What is the fundamental of a guitar string?
6. If we fill a glass increasingly full of water, how will the resonant frequency be affected?
7. Jazmin finds an empty bullet casing and blows across the top. If the inside of the casing is 7.9 cm deep, what pitch is produced?
8. A flute is a tube opened at both ends and is about 59 cm long. If all the holes (not the ends) are closed, what fundamental frequency is produced? What is the 3rd harmonic?

Problems C - Sound sources, sound quality.

1. What produces all sounds?
2. What are the ranges of frequencies heard by people?
3. What do we call frequencies too high to be heard?
4. What do we call frequencies too low to be heard?
11. What do we call something traveling faster than sound?
5. Name the main types of instruments and what vibrates in each group.
6. Draw an ear, labeling the three major portions and all the important parts, describing what they do.
7. Another name for sound quality is:
8. If a note has a frequency of 65 Hz, what frequency would be two octaves higher?
9. If we have 1000 times the energy in a sound wave, how much louder does it sound?
10. If a 20 dB sound has 10 000 times less energy than a loud sound, what is the decibel rating of the loud sound?
11. How big is the wavelength of a 75 Hz sound at room temperature?
12. A stereo is cranking out 90 dB of sound, while the concert down the street is generating 120 dB. How much louder is the concert? How much more energy does it generate?

Pbs A: 8 510 Hz, 400 Hz
 9 49 m/s, 9500 Hz
 Pbs B: 7 1100 Hz
 8 290 Hz, 1200 Hz
 C: 8 260 Hz
 9 60 dB
 10 60 dB
 11 4.6 m
 12 8 (2) x8, 1000 x