

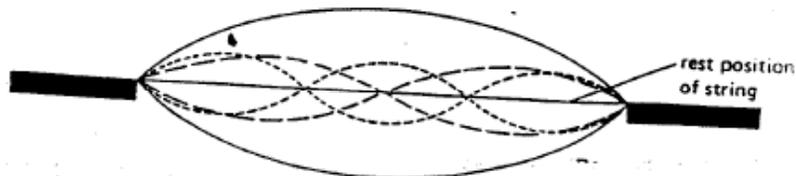
MUSIC HW:

1. A group of tones that have regular wave patterns is:
2. Sounds with an irregular wave pattern are called:
3. Identify three properties of musical tones that can be distinguished by the human ear.
 - a. the frequency of the sound wave:
 - the amplitude of the sound wave:
 - the tone's distinct sound:
1. State what is meant by the fundamental frequency and overtone of a musical tone:
5. Identify the four classes of musical instruments and give at least one example of each.
is called
 - a.
 - b.
 - d.
6. Explain the function of a vibrator and a resonator in musical instrument.
7. The pitch of one string on your guitar is too low. What will you do to correct it? Why

FUNDAMENTALS

A vibrating string produces sound waves with the lowest frequency, the fundamental frequency. Vibrating in parts, the string produces higher frequencies, called overtones, that are multiples of the fundamental frequency.

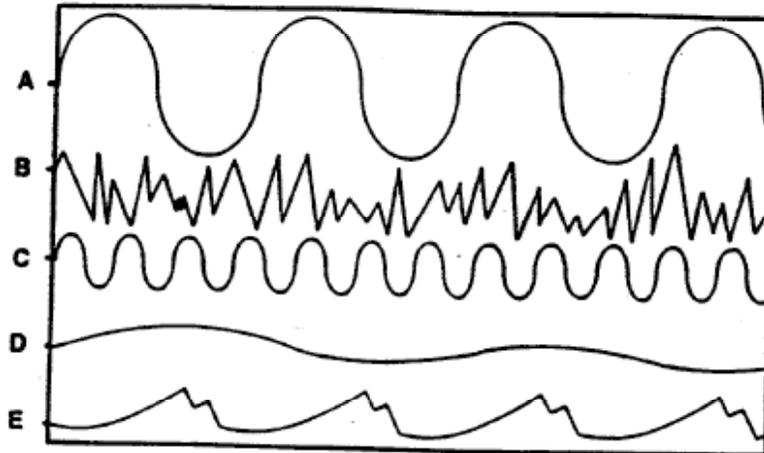
Or harmonics



The diagram above shows a vibrating string on an imaginary string instrument. Use it to answer the following.

1. Put an "F" next to the line that represents the fundamental frequency.
2. Put a "1" next to the line that is the first overtone.
3. Put a "2" next to the line that shows the second overtone.

The source of any sound wave is vibration of matter. These vibrations may vary in size and frequency. A short, high-frequency vibration produces a high-pitched sound. A large amplitude in a wave indicates a loud sound. Study the diagram of sound waves below and answer the following questions.



See other side!! too!!

1. Which vibration represents the following sounds?

a. _____ A very loud sound	d. _____ Noise
b. _____ Music	e. _____ A very soft sound
c. _____ The highest pitch	

2. When a person is playing a wind instrument, such as a flute, what is vibrating to produce the sound?

3. You can use an empty bottle to produce a musical tone by gently blowing across the opening. If you add water to the bottle, how will it affect the sound? Explain.

4. Describe the way in which string instruments produce sound.

5. Describe two ways to raise the pitch of the sound made by a vibrating string.

PROBLEMS: (Sec 13-3,13-4)

- 1) On a piano, the note middle C has a fundamental frequency of 264 Hz. What is the second harmonic (1st overtone) of this note?
- 2) If the piano wire in item one is 66 cm long, what is the wavelength of the sound? What is the speed of sound?
- 3) A piano tuner using a 392 Hz tuning fork to tune the wire for G natural hears four beats per second. What are the two possible frequencies of vibration of this piano wire?
- 4) In a clarinet, the reed end acts as a closed, and the first hole acts as an open. What is the wavelength of the fundamental and the first two overtones as compared to the length of the pipe? What are the frequencies?
- 5) A .2 m long organ pipe is closed at one end. What is its fundamental frequency when the temperature of the air is 35 degrees Celsius? What are the frequencies of the first two overtones?
- 6) Mr T is singing an A note at 440 Hz. His voice isn't so pure, and he has a strong overtone at 880 Hz and a weak (1/4 amplitude of the fundamental) at 660 Hz.

Draw each wave. (Hint use graphing calculator?!)

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Draw what the superposition of the waves would look like:

*** Honors:

Find the fundamental and overtones that would match this: (Fourier analysis)

