Beats

When two waves overlap, they interfere and combine to form a new wave. If two notes of similar frequency are played at the same time, they will constructively and destructively interfere with each other in a regular pattern that will cause the sound to get louder and softer several times per second. This regular pattern of volume change is called **beats**. The number of beats per second is equal to the difference between the frequencies. Beats can be used to tune an instrument. A piano tuner might strike a tuning fork and the corresponding note at the same time. If the difference in pitch is small, beats are heard. When the beats disappear, the notes are the same pitch.

Answer the questions below based on the reading above and on your knowledge of physics.

1. What are beats? _____

_____

2. Use the table below to figure out the possible frequencies of each of the six guitar strings being tuned based on the number of beats when played together with a correctly tuned string:

String	Correct Frequency	Number of Beats	Possible frequencies
a. E	82 Hz	10	
b. A	110 Hz	4	
c. D	147 Hz	7	
d. G	196 Hz	11	
e. B	247 Hz	6	
f. E	330 Hz	8	

3. How can beats be used to tune an instrument? _____

_____

4. A note with a frequency of 440 Hz and 880 Hz are played at the same time. Does this mean there are 440 beats per second? Explain. _____

_____