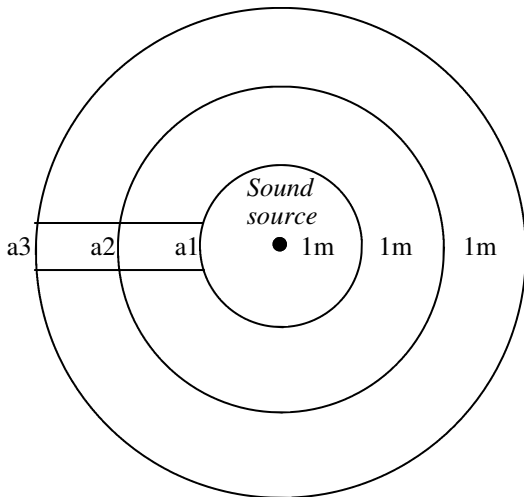


2009 PreAP Harmonic Motion 4

1. If the period of a pendulum is doubled, by what factor should its length change?
2. If a spring-mass system has its mass halved and its spring constant tripled, by how much does the spring's period change?
3. What are the wavelengths of the first four harmonics on a 1.2 m long string?

p. 482—*Be sure to read to read about speed of sound at the bottom and read the table.*

4. Which has a faster speed of sound?
A. Air or helium?
B. Air or steel?
5. From the book: what are beats and how are they created?
6. Two notes vibrate with frequencies of 125 Hz and 123 Hz, how many beats are heard?
7. If one note has a frequency of 350 Hz and 3 beats per second are heard, what frequency is the other note?
8. From the book: define timbre.
9. What is the frequency of the second harmonic for a pipe open at both ends that has a speed of sound of 560 m/s?



p. 487—

10. Give the basic equation for work.
11. How can sound waves do work?
12. The diagram at the left shows a sound source propagating three dimensionally.
 - A. Given that the surface area of a sphere is $4\pi r^2$, calculate the surface area of each sphere, leaving each in terms of 4π , for easy comparison.
Sphere 1 = _____
Sphere 2 = _____ times the area of sphere 1.
Sphere 3 = _____ times the area of sphere 1.
 - B. The power emitted by the sound source is spread out over these spherical surface areas. Think of the power as lines going outward. The farther out the sound moves, the less power is available to be “heard” or absorbed by the ear. The two lines on the left side of the rings indicate equal areas. How does the amount of power absorbed by the 2nd and 3rd areas compare to the first?

13. p. 488 do Q 2 and 3.

14. p. 490. Why is intensity not directly proportional to volume?
15. From Table 13-2.
- When the volume is increased by 10 dB, the intensity is increased by:
 - Since intensity is in W/m^2 , assuming a 1 m^2 area, if the decibels increases by 30 decibels the amount of power received is _____ times the power at the lower volume.

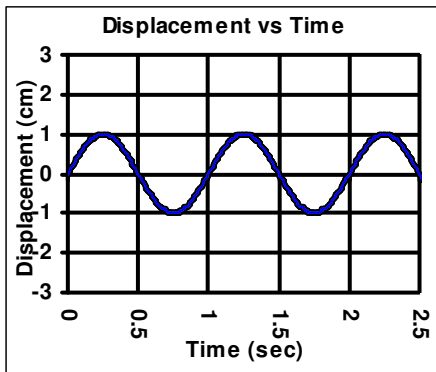
Notice that the difference between a whisper and a normal conversation is only 20 dB!!!

16. Describe the Doppler Effect.

17. What is timbre?

18. Given the following graphs, springs, and pendulums. Give the amplitudes and periods of each graph and then match the springs and pendulums to their correct graphs.

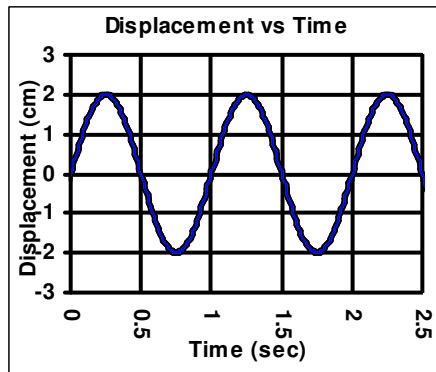
Graph A: Amplitude: _____
Period: _____



Spring _____

Pendulum _____

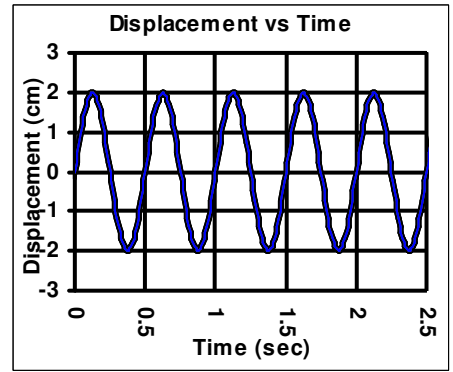
Graph B: Amplitude: _____
Period: _____



Spring _____

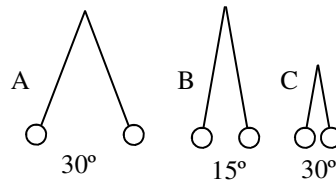
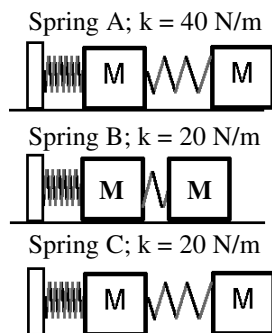
Pendulum _____

Graph C: Amplitude: _____
Period: _____



Spring _____

Pendulum _____



From "Wave Action" Notes:

- 19.
- If a wave hits a hard wall, it bounces off by:
 - If a wave hits a soft boundary, it dies by:
 - Waves bending due to different speed mediums:
 - A wave bends around a corner by:
 - A wave bends as it passes thru a boundary by:
 - Tile or marble makes for a loud room by:
 - Eyeglasses magnify objects by:

You will need the new Biology notes from the website.

20. Which of the following characteristics of viruses makes them difficult to treat with medications?
 - A. Viruses are not living
 - B. Viruses are very small, making them hard to find
 - C. Viruses are very numerous
 - D. Viruses replicate rapidly and undergo many mutations
21. Bacteria that break down the wastes of remains of dead organisms in the environment are -
 - A. Photosynthetic
 - B. Decomposers
 - C. Producers
 - D. Parasites
22. Parts of organisms that have a similar function but do not share similar structural characteristics are called -
 - A. Homologous structures
 - B. Vestigial organs
 - C. Embryological structures
 - D. Analogous structures
23. Earth has undergone several ice ages in its history. Which types of organisms would natural selection favor if Earth underwent another ice age?
 - A. Organisms that are able to swim.
 - B. Organisms that are predators.
 - C. Organisms that carry out photosynthesis
 - D. Organisms adapted for surviving cold temperatures
24. Which group of organisms transfers energy from the sun to food?
 - A. Animals
 - B. Primary consumers
 - C. Secondary consumers
 - D. Producers
25. Organisms that make their own food are known as:
a_____ or p_____.
26. Organisms that eat other organisms are h_____ or c_____.
27. You go to the grocery store. Is there more food or those buying the food?
28. In an ecosystem is there more food or those that eat the food?
29. In order for a wolf to gain 5 kg of mass,
 - A. How many kg of prey does the wolf have to eat?
 - B. How many kg of grass are eaten by the prey for the wolf to gain the 5 kg?
30. What level of the biomass pyramid are we when
 - A. we eat steak?
 - B. we eat salads?
31. When do we use more resources, when we eat meat or when we eat plants?