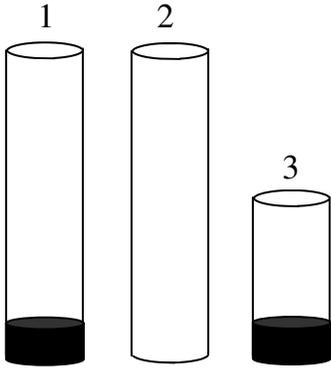
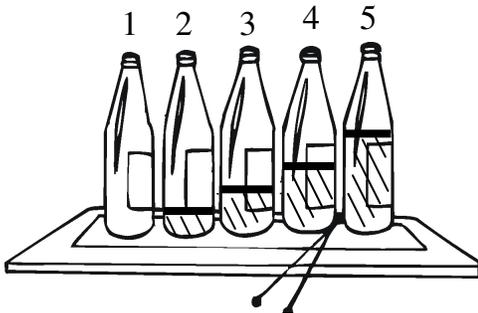


From "Sound Notes":

- For sound, an increase in volume is an increase in what?
- A higher pitched sound, is an increase in what?
- A lower pitched sound, is an increase in what?
- Which of these frequencies can we hear: 10 Hz; 12,000 Hz; 25,000 Hz?
- Does a low note have a high or low frequency? A long or short wavelength?
- Is sound a longitudinal or transverse wave?
- Twice as loud as 70 dB would be:
- A. What is the speed of sound in air?
 B. What is the wavelength of a sound with a frequency of 550 Hz?
- What is the wavelength of a 30 Hz sound?
- As a sound's wavelength goes up, the frequency goes _____, but the speed _____?
- You see lightening and 3 seconds later you hear the thunder. How far away is the storm?



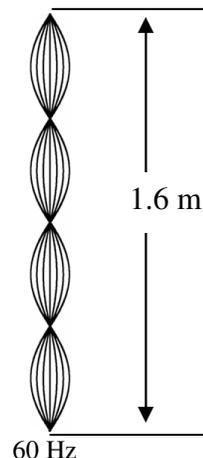
- Pipes 1 and 2 are exactly twice as long as pipe 3. Pipe 2 is open at both ends. Also, remember that a harmonic must have at least 1 node and 1 antinode. (If you don't remember this, come early to class and use the gear.)
 - Which pipe has a higher notes 1 or 2?
 - Which pipe has a lower note 1 or 3?
 - Which pipe has a lower note 2 or 3?
 - Is the open end of a pipe a node or antinode?
 - How many antinodes does pipe 1 have?
 - How many antinodes does pipe 2 have?
 - How many nodes does pipe 2 have?
 - Label the location of the nodes (N) and antinodes (A) for pipe 3.
 - How many wavelengths long is pipe 3?



- Which bottle will have the lowest note when I blow in it?
 - Which bottle will have the highest note when I hit it?
 - When you blow in the bottle, which has the shortest wavelength?
 - When you hit the bottle, which has the longest wavelength?
 - When you blow in the bottle what causes the sound: air or water?
 - When you hit the bottle, what causes the sound: air or water?
 - When you blow in the bottle, is the opening a node or antinode?
 - When you blow in the bottle, how many wavelengths long is it?

- A person yells at a cliff. After 2.4 seconds, they hear the echo.
 - How far does the sound travel? D or 2D?
 - What is the speed of the sound?
 - Find the distance TO THE CLIFF (just one way)!

- Draw the wave form on the diagram at the right (as if "freeze framed").
 - This harmonic's frequency is 60 Hz, what is the frequency of the fundamental (H_1)?
 - What is the wavelength of this harmonic?
 - Find the speed of the wave on this string.
 - Find the frequency of H_2 .
 - What is the wave speed of H_6 ?
 - What is the wavelength of the natural frequency for this string?



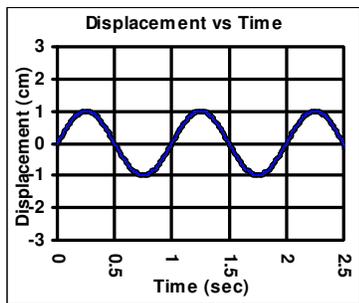
14. What do space movies show about space that is bogus?

15. Which of the following will change the speed of a wave?

- A. ___ Change the harmonic?
- B. ___ Change the length of the space?
- C. ___ Grab a harmonic at one of the nodes?
- D. ___ Tighten the string?
- E. ___ Change the string's mass or thickness?
- F. ___ Disturbing the string farther (more amplitude)?
- G. ___ Change the temperature of the medium?

Graph A: Amplitude: _____

Period: _____

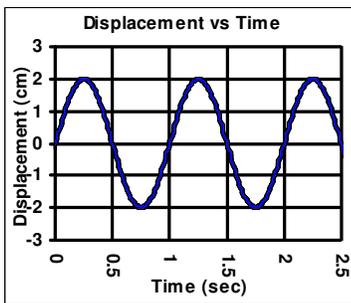


Pendulum: _____

Spring: _____

Graph B: Amplitude: _____

Period: _____

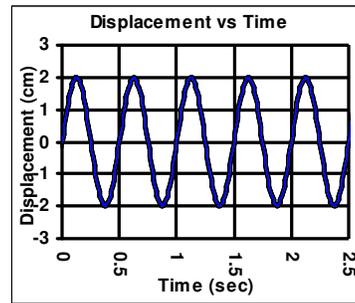


Pendulum: _____

Spring: _____

Graph C: Amplitude: _____

Period: _____



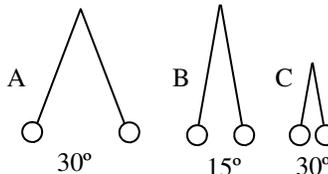
Pendulum: _____

Spring: _____

There is a study help for this.

This section checks that you understand pendulums, graphs, and spring. It is very important.

16. A. Fill in the information above each graph.
 B. Which pendulums have the same period?
 C. Which pendulums have the same amplitude?
 D. Now decide which graph is which pendulum.
 E. Which springs have the same period?
 F. Which springs have the same amplitude?
 G. Decide which graph is which spring.



Spring A; $k = 40 \text{ N/m}$



Spring B; $k = 20 \text{ N/m}$



Spring C; $k = 20 \text{ N/m}$

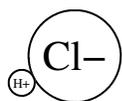


And do the TAKS Homework over "Acids and Bases".

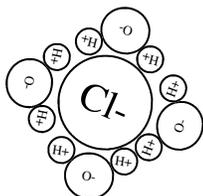
Day 21— Acids and Bases

Acids

Acids compounds make H⁺ ions when dissolved in water.



Dissolved in water



HCl: Hydrogen chloride (a very strong acid), found in your stomach.



Chlorine surrounded by the + side of water.

The released H⁺ ion (a proton) is very reactive, very corrosive: it wants to combine to neutralize. Strong acids (like HCl) can etch (eat away) glass and will burn your skin.

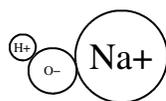


Acids tend to taste sour and feel squeaky clean. Most foods are acidic (like lemon juice).

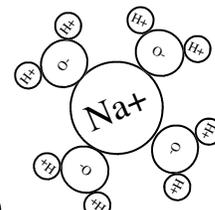
Acids range from pH 0-7, with 0 the most acidic.

Bases

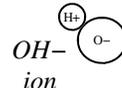
Bases are compounds that make OH⁻ ions when dissolved in water.



Dissolved in water



NaOH: Sodium Hydroxide [lye] (a very strong base), used as a drain cleaner.



Sodium surrounded by the - side of water.

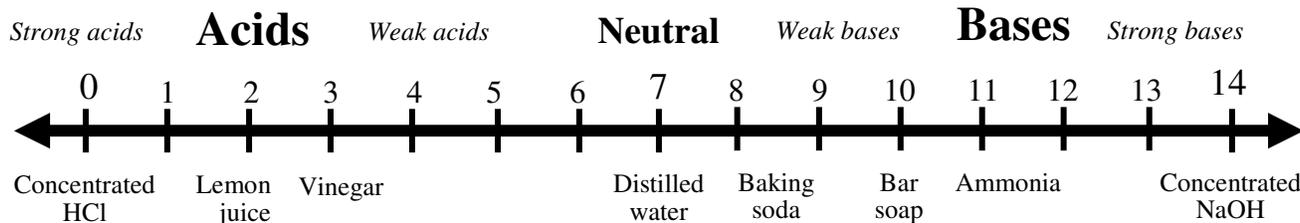
The released OH⁻ ion is also very reactive, very caustic. NaOH can etch Aluminum, can dissolve grease (like in oven cleaners), and can also badly burn your skin.



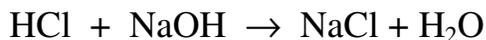
Bases tend to taste bitter and feel slippery. Many cleaning products are basic (like soap).

Bases range from pH 7-14, with 14 the most basic.

pH—The Measure of Acids and Bases



Neutralization—when an acids and bases are combine in equal concentrations they neutralize, forming salt water of pH 7.



Acids and bases are measured with an electronic pH meter or with **litmus paper**. Litmus paper turns different colors depending on the pH of the solution.

1. Acid or Base?

- | | | | |
|--|----------------------------|-------------------------------|--------------------------------|
| ___ Makes H ⁺ ions in water | ___ pH less than 7 | ___ Soap | ___ Tastes bitter |
| ___ Makes OH ⁻ ions in water. | ___ pH more than 7 | ___ Feels slippery | ___ Tastes sour |
| ___ HCl | ___ HCl when not in water. | ___ Feels squeaky | ___ Pure water |
| ___ Mg(OH) ₂ | ___ pH 13 | ___ Neutralizes a base. | ___ pH 7 |
| ___ H ₂ (CO ₃) | ___ pH 4 | ___ More H ⁺ ions. | ___ An antacid |
| ___ NaOH | ___ Lemon juice | ___ Less H ⁺ ions. | ___ Very caustic or corrosive. |

2. Give two ways chemists use to measure the pH concentration of solutions.

3. When diluting a concentrated acid, do you pour in acid into water or water into acid?

4. Solution A (pH 4); Solution B (pH 2):

- | | |
|--|-------------------------------------|
| A. Which has more H ⁺ ions? | B. Which more OH ⁻ ions? |
| C. Which is more basic? | D. Which is more acidic? |

5. A solution has a pH of 11. You need the solution to have a pH of 8. Do you add an acid or a base?