CHEMISTRY "WAVE ANATOMY" LAB

~Use your own paper~

WHAT TO TURN IN: Hypothesis, Data (Wave Drawings # 1-5), Calculations (N/A), Error Analysis, Conclusion, Questions # 1-8

OBJECTIVES

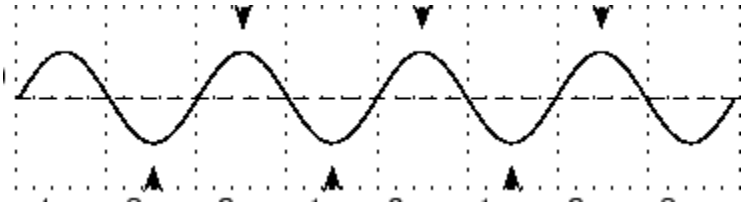
- To review the role of waves in everyday life.
- To review the parts of a simple wave.
- To practice drawing sample waves.

BACKGROUND INFORMATION

To fully understand how waves move and affect their surroundings, you should be familiar with the parts of a wave. Waves can change their shapes and dimensions. Review the parts of a wave as diagramed below.

Waves move in cycles. A *wave cycle* is one crest and one trough. The *frequency* of a wave is its speed—the rate of *cycles per second* during travel. The units for frequency are *cps* , sec^{-1} or *Hertz* (Hz).

Moving waves have energy. A wave with *high energy* is very tall (high amplitude and wave height) and/or very pushed together (low wavelength). *Low-energy* waves appear to be stretched out, because they have a longer wavelength.



Review the following terms:

CREST	**WAVELENGTH**
TROUGH	**FREQUENCY**
WAVE HEIGHT	**CYCLES**
AMPLITUDE	**ENERGY**

ORIGIN; ZERO LINE; BASE LINE

HYPOTHESIS

Write an "if-then" statement about the drawing of waves. Be creative, be specific.

QUESTIONS *(before doing the drawings)*

1) Give a simple definition for a wave.
2) Which types of waves can you see with the naked eye?
3) How are wavelength and frequency related?
4) How are wavelength and energy related?

Think back on what you have learned about types of waves in the past.

5) How do waves relate to earthquakes?
6) How do waves relate to ocean environments?
7) How do waves relate to the sun?
8) How do waves relate to sound?

PROCEDURE HINTS

- Follow all directions carefully.
- Use pencil!
- Use plain paper.
- Use a ruler, and **label all numerical measurements and parts of the waves.**
- Longer base lines require drawing the waves sideways to make more room to draw.

PROCEDURE

1) Draw the zero line on your paper.
2) Amplitude:
    a. Measure the amplitude above the zero line, and draw a dashed line at the top boundary. The wave will not go higher than this line.
    b. Measure the amplitude below the zero line, and draw a dashed line at the bottom boundary. The wave will not go lower than this line.
3) Wavelength:
    a. Sketch a crest rising from the zero line, and make a pencil mark on top of the crest, in the middle of the "hump."
    b. Measure the wavelength from the pencil mark and make another pencil mark to the right.
    c. Draw another crest so that the middle of the hump is where your second pencil mark is.
    d. Fill in the troughs so that the wavelengths are accurate.

WAVES TO DRAW

1) WAVE 1:
amplitude = 4 cm
two crests, two troughs (2 complete wave cycles)
wavelength = 9 cm
zero line = 20 cm

2) WAVE 2:
amplitude = 6 cm
4 complete wave cycles
wavelength = 3 cm
zero line = unspecified (at least as long as the wave is)

3) WAVE 3:
amplitude = 5 cm
8.5 wave cycles
wavelength = 2 cm
zero line = unspecified (at least as long as the wave is)

4) WAVE 4:
amplitude = 3 cm
4.5 wave cycles
wavelength = 2 cm
zero line = unspecified (at least as long as the wave is)

5) WAVE 5:
amplitude = 1.5 cm
5 complete wave cycles
wavelength = 3.5 cm
zero line = unspecified (at least as long as the wave is)