

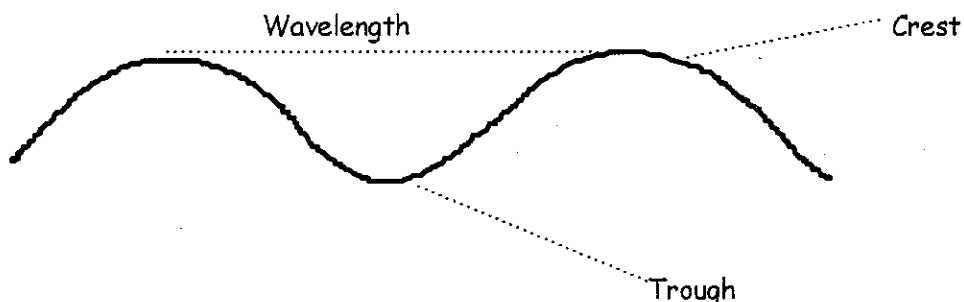
Teaching Activity: Wavelength and Energy

Objective: To demonstrate the relationship between wave frequency and energy in the electromagnetic spectrum.

Materials: A 50 foot length of rope

Procedure:

- 1) Have 2 students hold the stretched between them.
- 2) While one students hold his/her end of the rope still, have the other student shake the opposite end of the rope up and down at a moderate but steady rate.
- 3) Students should observe wave patterns created in the rope. Point out the parts of the wave (crest, trough).



- 4) Instruct students to estimate the wavelength (distance from crest to crest) and the frequency (number of waves reaching the far end of the rope each second).
 - 5) Have students shake the rope faster.
 - a) Estimate the wavelength and the frequency.
 - 6) Repeat #4 - 5 several times at different speeds.
 - a) Record their estimates on the Data Table.
 - 7) Stop the activity and ask the student shaking the rope if it is easier to produce low frequency (long wavelength) or higher frequency (short wavelength) waves.
- Note:** High frequency (short wavelength) waves represent more energy than low frequency (short wave length) waves.
- 8) Answer the questions in the **Analysis and Comprehension** section.

Student Activity Sheet #1

ANALYSIS AND COMPREHENSION:

1. Measure and label the wavelengths in the diagrams below.

Diagram A.

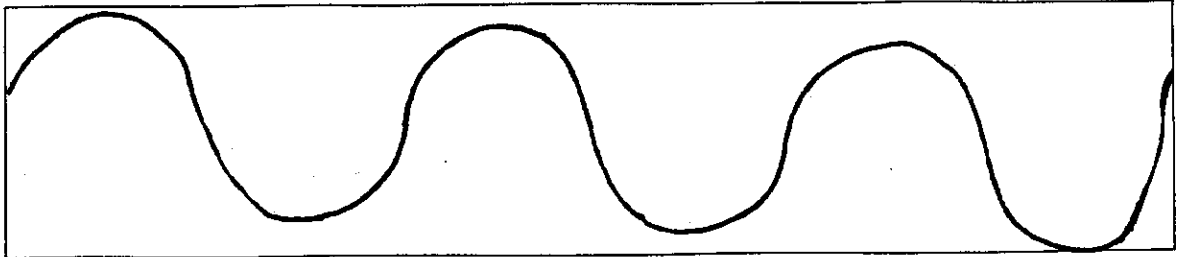
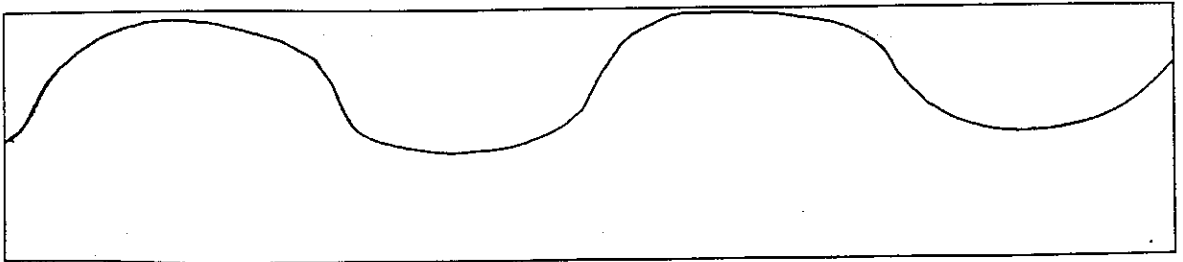


Diagram B:



2) What relationship do you see between wavelength and frequency?

3) Which type of wavelength (short/long) has a higher frequency of energy?

Extension:

1) Conduct the same activity again using a Slinky.

2) Make an overhead transparency of the spectrum chart provided. Discuss with students the relationship between energy and the electromagnetic wavelengths depicted.