

In infrared (IR) spectroscopy a molecule can be considered as a series of weights (atoms) held together by springs (bonds). The IR spectrum shows energies of the different bonds within a molecule as they stretch and bend. The energy of bond stretching is directly related to frequency at which the bond stretches and compresses (frequency = number of stretches/compressions in a given time). In terms of weights on a spring this would be the frequency that the weights would bounce. Before coming to class, go through the online demonstration and answer the questions below. You may need to turn off/on the friction to help answer the questions.

http://phet.colorado.edu/sims/mass-spring-lab/mass-spring-lab_en.html

1. Compare two different weights side by side. What happens to the bounce frequency as the mass gets smaller?
2. Based on your answer to Question 1, how would you expect the mass of the atoms at the ends of a bond to affect the stretching frequency observed in IR spectroscopy?
3. Examine two 100 g weights side by side. What happens to the bounce frequency as the spring gets harder (stronger bonds)?
4. Based on your answer to Question 3, how would you expect bond type (single, double, triple) to affect the stretching frequency observed in IR spectroscopy?