

3.1.5a TASK CARD: Resonance Models – Carbon Dioxide, Methane and Nitrogen

You will be exploring three different greenhouse gases, each one represented by a model. Your group will use the models to make observations about the RESONANT FREQUENCY of each gas.

WHAT TO DO

Hold your model by the center atom and shake it (for nitrogen, hold one of the ends). Keep the amplitude of vibration (the shaking distance) less than 6 inches. Be sure to try very slow frequencies ($\sim 2/\text{second}$) as well as fast ones.

OBSERVATIONS

When is it much easier to keep the model vibrating? At this frequency your model molecule better absorbs and retains your energy output. If there is such a frequency, determine what it is in vibrations per second by counting the number of vibrations in a 5-second interval and dividing by 5. When told rotate through different stations or switch models with other groups. Repeat this procedure for all three models.

DATA

Record your data on the back of your greenhouse gas notes and then add to the classroom data table.

DISCUSSION: As a group, discuss the following questions.

1. How do the resonant frequencies of the 3 models compare?
2. What hypothesis can you formulate to explain your observations?