

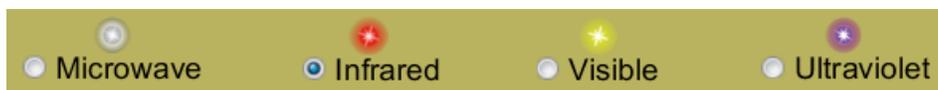
Student Directions [Molecules and Light PhET](#):  
Relating radiation to your life on a molecular level

**Learning Goals:** Students to be able to

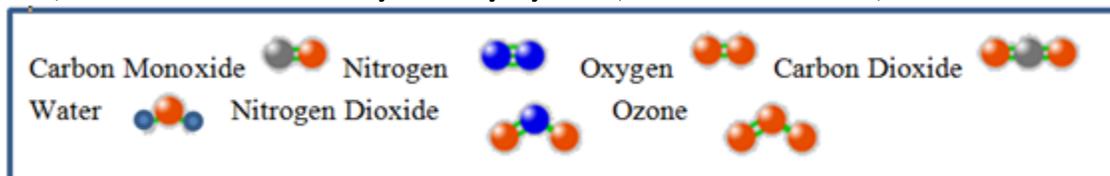
- Design experiments to describe how some types of electromagnetic radiation may interact with molecules found in large amounts in our atmosphere.
- Relate the amount of energy of the electromagnetic radiation to resulting molecular motion.
- Use ideas about radiation and molecular motion to explain some common phenomena.

**Pre-lab homework:**

- Using prior knowledge or research (cite references if used):
  - Describe the differences/similarities between the four types of radiation in *Molecules and Light*. Include terms like frequency, wavelength, energy, speed, etc
  - For all 4 types, give at least one example of how the radiation is relevant to your life.

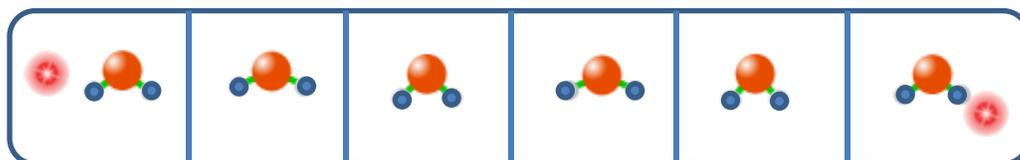


- For the 7 gases used in the simulation:
  - What do you notice about the differences/similarities between the gas molecules?
  - How is each relevant to your everyday life? (cite references if used)



**Directions using [Molecules and Light](#) :**

- Below are scenes, in sequence, that you might see when infrared light is focused on a water molecule. Experiment with the sim to make similar “movie” scenes.
  - Describe what you did to make the movie.
  - Write what you think is causing the changes that occur from scene to scene. (You may change your thinking after more experimentation).



- Design experiments and data table(s) to determine and clearly describe what happens for each molecule with each type of radiation. Make sure to vary light brightness as well as wavelength.
- Examine your data table(s)
  - What patterns can you identify from your experiments?
  - What ideas do you have about relationships between radiation and molecular motion?
  - Did your ideas from 1b change? If so, explain.
- Use your understanding about radiation and gas molecules to answer these questions
  - How do you think **microwaves** ovens heat up food? Using your data, give some evidence to support your answer.
  - Which of the gases would be considered “**greenhouse gases**”? Using your data, give some evidence to support your answer.
  - Many people argue that the **ozone layer** is important. Using your data, give some evidence to support your answer.

