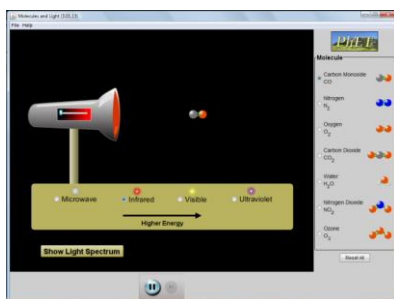


MOLECULES and LIGHT

Today you are going to use a sim to explore how light interacts with molecules in our atmosphere.

I. Explore the sim with a partner.



What are some of your observations?

Comment [K1]: The main learning goal of the activity is for students to:

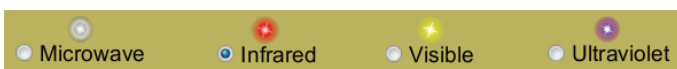
- identify that absorption of light depends on the molecule and the type of light.

Other learning goals include:

- relate the type of light to its absorption process,
- identify how the structure of a molecule affects how it absorbs light.

Comment [K2]: We find that students interact with the sim more if they explore the sim at the beginning of an activity. This should take about 5 minutes.

II. Explore what happens for each type of light.



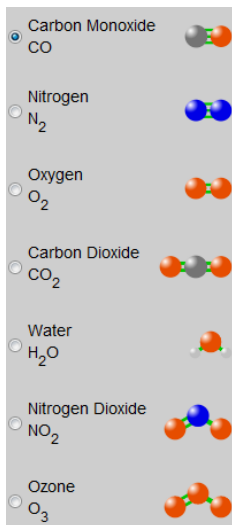
What patterns did you find?

What ideas do you have about how the sim relates to your everyday life?

Comment [K3]: An example pattern is that infrared light makes some molecules vibrate.

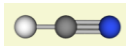
Comment [K4]: Many students try to connect the sim to what they know about water.

III. Explore what happens for each molecule.



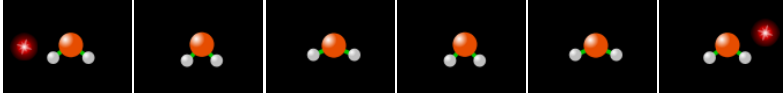
What patterns did you find?

Based on your observations, how would you predict HCN to interact with microwaves?



Comment [K5]: An example pattern is that molecules with two atoms only absorb in the infrared when the atoms are different.

IV. Look closer at how infrared light affects water in the sim or in the movie below.

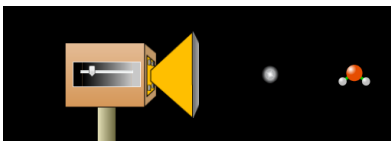


What do you think is happening?

Comment [K6]: We find that students are less likely to say the photon "collides" with the molecule if they slow the rate of photons or pause and step the sim. We want students to say the molecule "absorbs" the light.

V. Pick one of the topics below to study in more depth. Prepare to share your ideas with the class by making sense of what you discover.

1. Microwaves



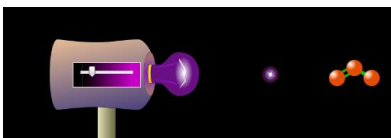
How do microwave ovens work?

2. Greenhouse effect



What is a greenhouse gas?

3. Ozone layer



Why is the ozone layer important?

Comment [K7]: The snapshots of the sim are meant as hints, but students may need to use the internet. You could also point students to the PhET sims on Microwaves and the Greenhouse effect.