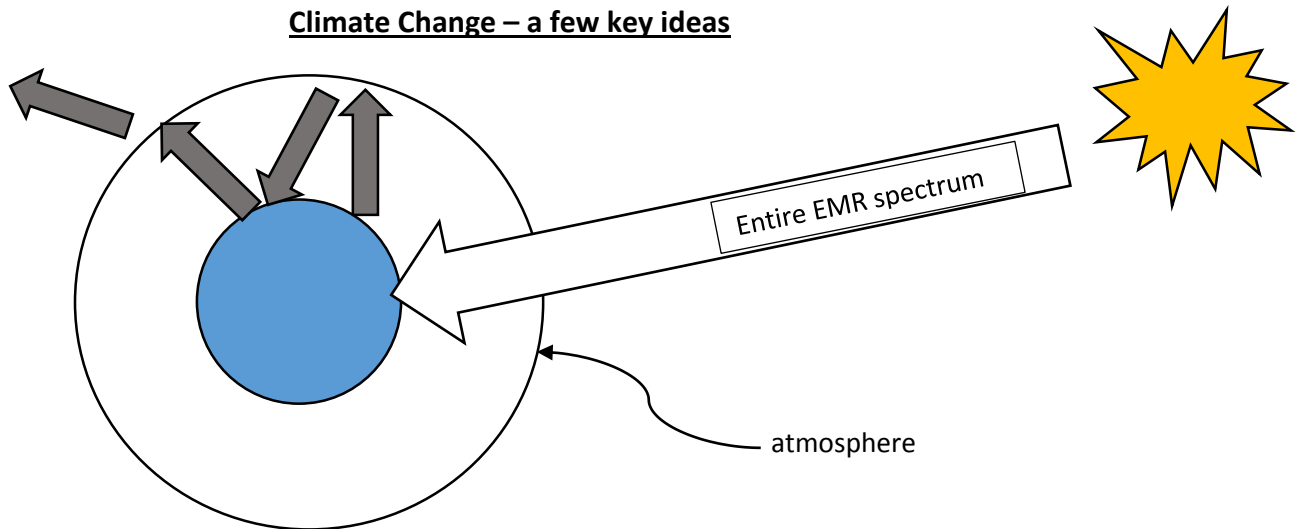


## Climate Change – a few key ideas

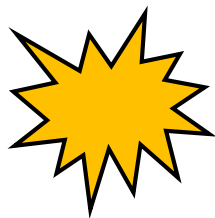


Only radiowaves, microwaves, infrared, visible light and ultraviolet get through the atmosphere to reach earth. So our atmosphere protects us from harmful x-rays and gamma rays and some of the ultraviolet (UV) rays.

The light heats up earth and it re-emits infrared heat.

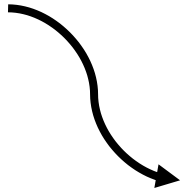
Some of this infrared heat gets reflected back to earth keeping it warm. It is like putting a warming blanket on earth. Without our atmosphere, our earth

Analogy: Think of how a car heats up in the summer sun if you leave the windows rolled up! You sunlight gets in, heats up the car and the heat (infrared radiation) cannot escape through the glass. It is trapped! This is just like greenhouse gases in our atmosphere trap the infrared radiation (heat). The more greenhouse gases, the more heat they trap!



What is a photon? A photon is a bundle of EMR energy. So the energy of visible light and heat (infrared radiation) comes in bundles. It is somewhat similar to money – it comes in bundles too: 5 cents, 10 cents, 25 cents, \$1 loonies etc... More light photons = brighter light. More infrared photons = more heat! Just like more loonies = more money!

What is a greenhouse gas? Although we tend to just think of carbon dioxide (CO<sub>2</sub>) there are a handful of greenhouse gases. Each of these gases has the ability to reflect infrared radiation (heat) back to earth instead of allowing it to travel out to space. The more infrared is reflected back to earth, the warmer earth gets. Greenhouse gases include:



(use your textbook to list. Start with the index @ back of book).

### **Investigating Climate Change: A computer simulation lab**

Task: You will use 2 pHet simulations to explore and understand how warming temperatures are affecting glaciers (we have some in Canada!) and how greenhouse gases trap heat.

#### Finding the simulation

1. Google 'phet'. The first hit is what you want. Choose simulations. You can search ALL the simulations. They are listed alphabetically. Or you can narrow your search by choosing the topic 'Earth Science' on the left side.
2. You want to 'run' the simulation. There is no need to download it.
3. Open up 2 simulations on 2 different tabs: 'Glaciers' and 'Greenhouse Effect'

#### Troubleshooting

1. pHet simulations sometimes work better on another browser. I believe 'FireFox' works well as does Internet Explorer. I believe 'Google Chrome' is the least effective. You need to experiment a bit here.
2. If trying at home, your computer needs to have 'Java'. It is an easy free download if you don't already have it.
3. At school if you are prompted to update programmes, choose 'not now'.

If you have both 'Glaciers' and 'Greenhouse Effect' open on your computer, you can ask for the assignment.

This is a summative assignment and is due: \_\_\_\_\_