



# GLOBAL CLIMATE CHANGE

Please write down all of the words in black





# Atmosphere

- Atmosphere = Layer of gases surrounding a planet.
- Over the all 4 billion years of earth's history many chemicals have comprised earth's atmosphere.
  - First=mostly hydrogen
  - Second= Mostly nitrogen and Carbon Dioxide
  - Third=mostly Nitrogen and Oxygen-→ this shift occurred with the evolution of cyanobacteria

# What can cause a change in atmosphere?

- Catastrophic events (volcanoes, meteors)
- Evolution (cyanobacteria, photosynthetic beings etc..)
- Excess of waste materials (Carbon dioxide from industrial waste)

# Global warming Vs. Global Climate Change

- Turn to a neighbor and discuss what you think the difference is between global warming and global climate change?

# Global Warming Vs. Global Climate Change

- **Global warming** is a perceived phenomenon in which the average global temperature rises due to human activity.
- **Global climate change** is a change in the existing function of earth's routines based on a change in atmosphere accelerated by human activity

# Global Climate Change

- “a change of climate that **is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is** in addition to natural climate variability observed over comparable time periods.”
  - *United Nations Framework Convention on Climate Change February 2011*
- “**a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and** that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity.”
  - *Intergovernmental Panel on Climate Change 2010*

Turn to a neighbor and discuss the similarities and differences between these two definitions.

# Anthropogenic

- Anthro=human
- Genic= genesis= cause or origin
- “anthropogenic sources are causing global climate change”



# How is climate change anthropogenic?

- In your groups come up with five reasons why humans are causing global climate change.
  - *Write these on post-its and come up to place them on the board.*

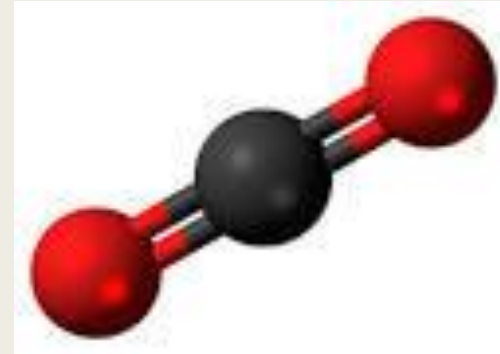
# How is climate change anthropogenic?

- Excess of **carbon dioxide** released by burning fossil fuels
- Excess of methane released by industry and mass food production
- Excess of fluoridated gases caused by refrigerants and propellants (CFC's)

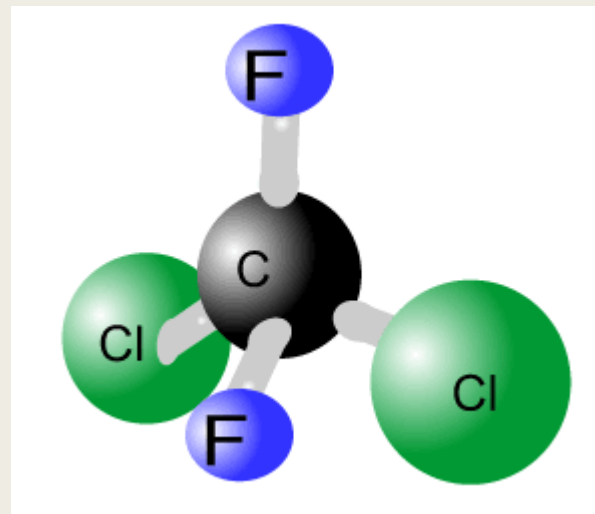
# Chemistry review

- Carbon Dioxide=  $\text{CO}_2$ . Two oxygen molecules bonded to a Carbon Molecule
- Methane=  $\text{CH}_4$ . Four Hydrogen molecules bonded to a carbon molecule
- Chlorofluorocarbons= CFC's.

Carbon Dioxide molecule

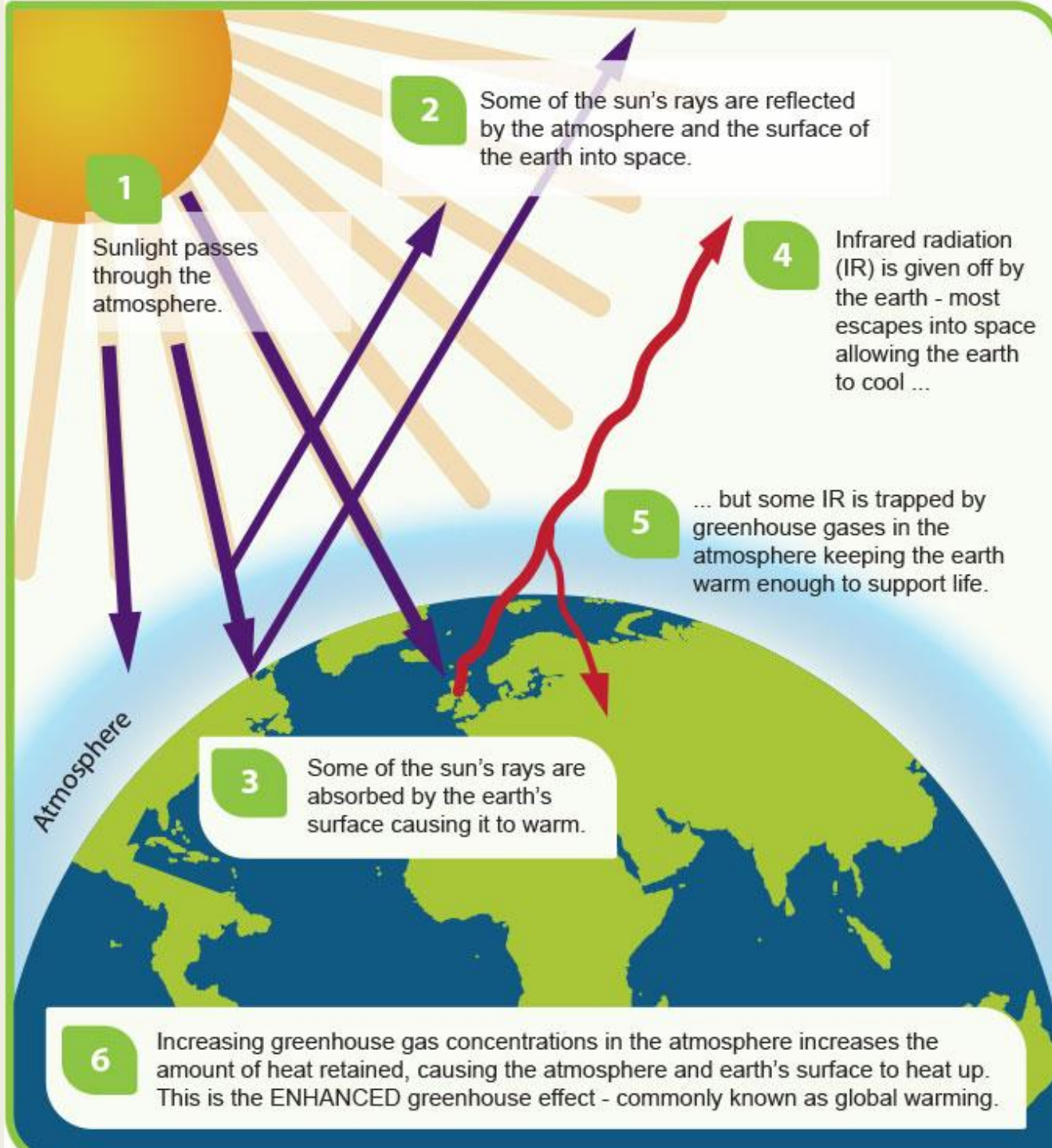


CFC molecule →



# Greenhouse Gases

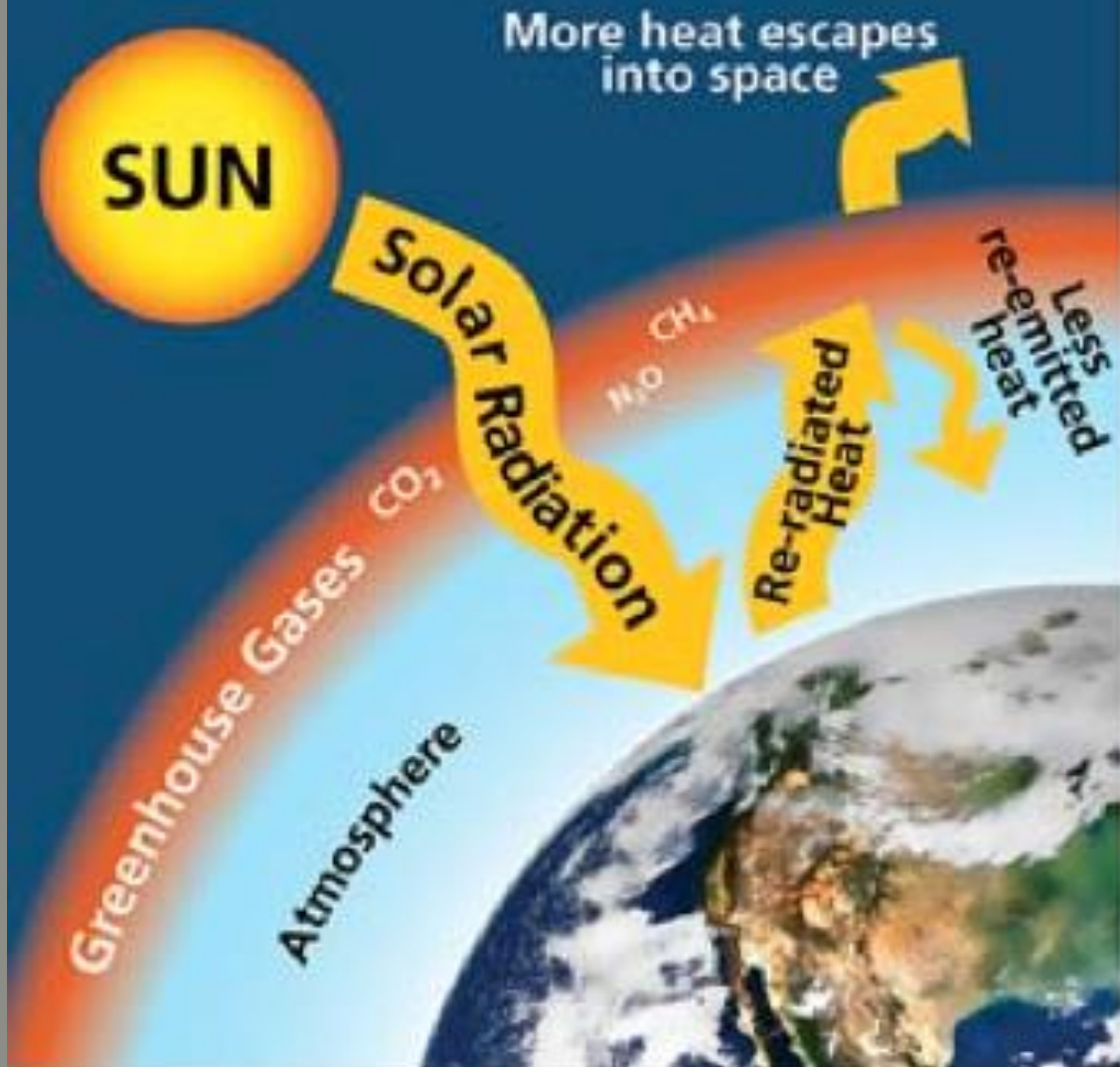
- The previously described chemicals are all dangerous because they are known as greenhouse gases.
- Green house gases are gases that instead of traveling through the layers of the atmosphere, stay trapped in the lower layers by earth's surface and retain heat from the sun.



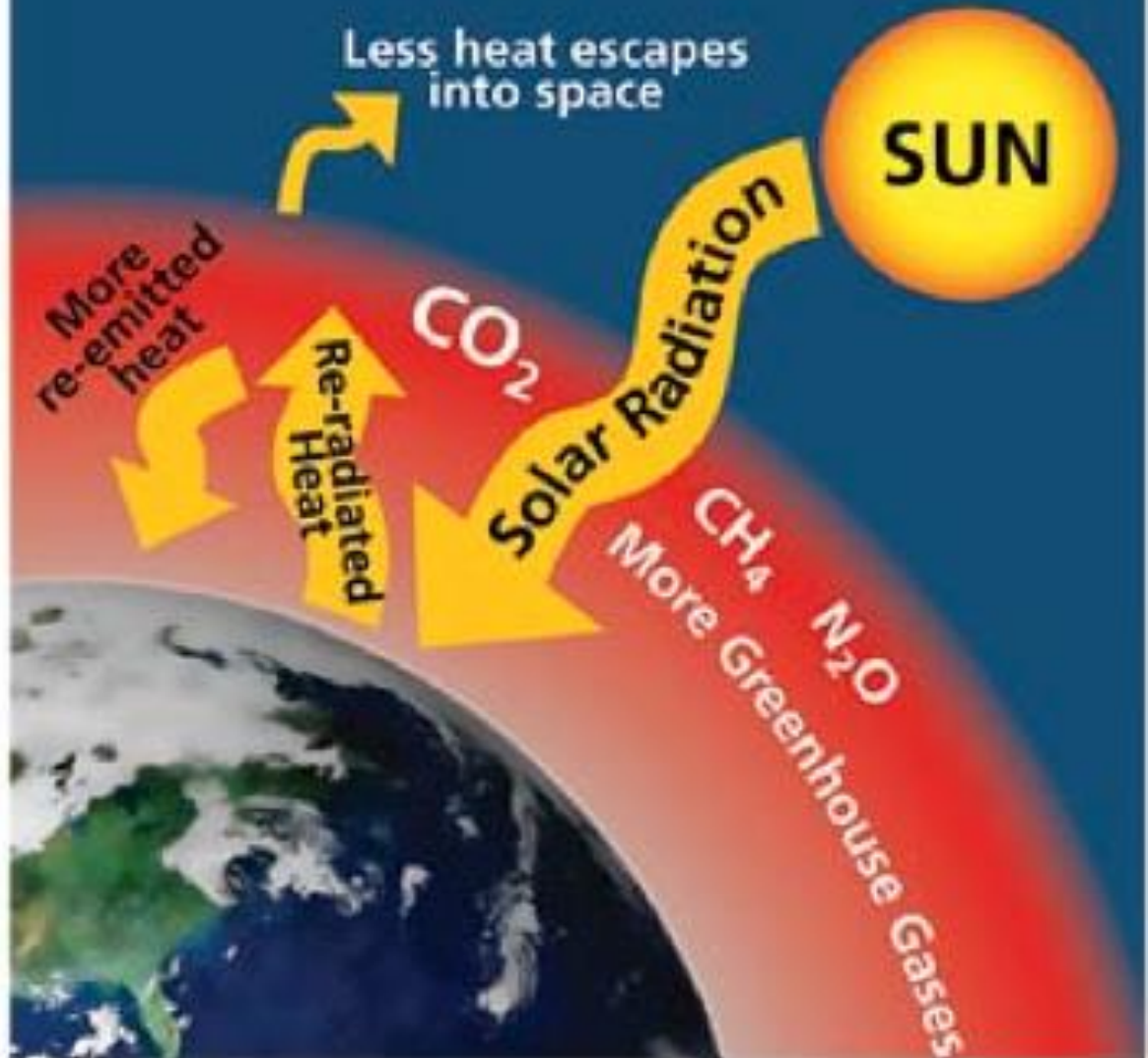
# Please write steps 1, 3, 6

- 1. Sunlight passes through the atmosphere
- 3. Some of the sun's rays are absorbed by the earth's surface causing it to warm
- 6. Increasing amounts of greenhouse gas concentrations increases the amount of heat retained.

# Natural Greenhouse Effect



# Human Enhanced Greenhouse Effect

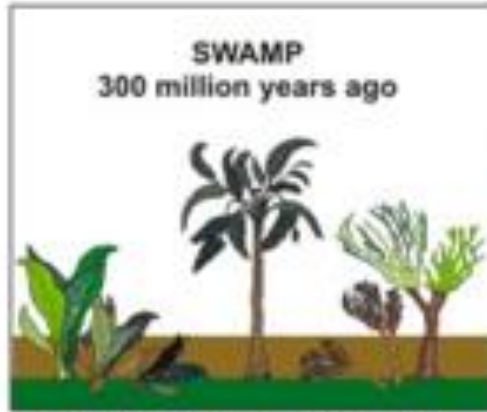


What does the industrial revolution have to do with climate change?

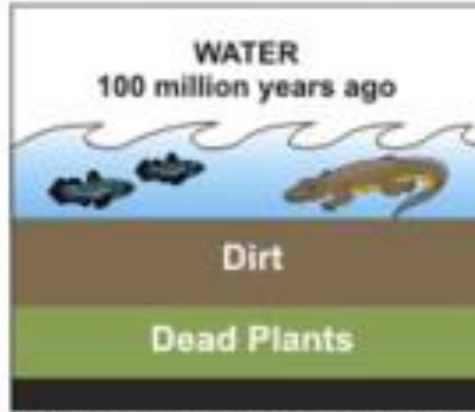


# Fossil fuels

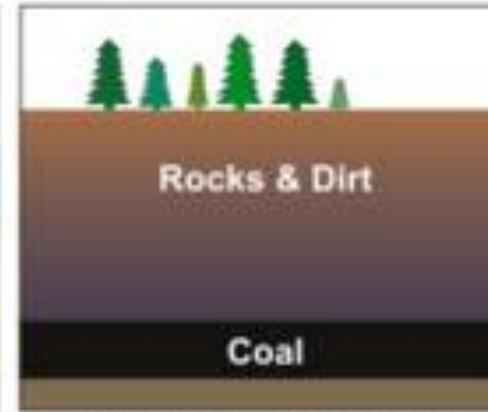
## HOW COAL WAS FORMED



Before the dinosaurs, many giant plants died in swamps.

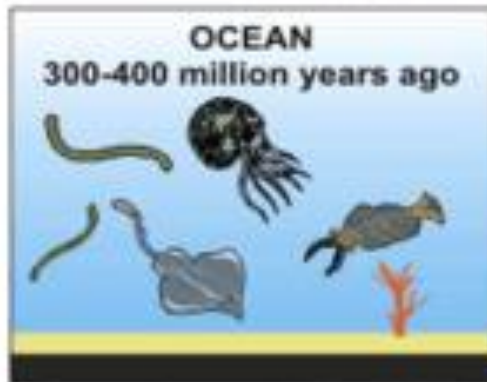


Over millions of years, the plants were buried under water and dirt.

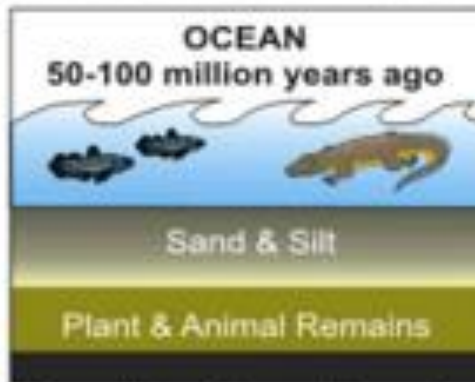


Heat and pressure turned the dead plants into coal.

## PETROLEUM & NATURAL GAS FORMATION



Tiny sea plants and animals died and were buried on the ocean floor. Over time, they were covered by layers of silt and sand.



Over millions of years, the remains were buried deeper and deeper. The enormous heat and pressure turned them into oil and gas.



Today, we drill down through layers of sand, silt, and rock to reach the rock formations that contain oil and gas deposits.



# Fossil fuels

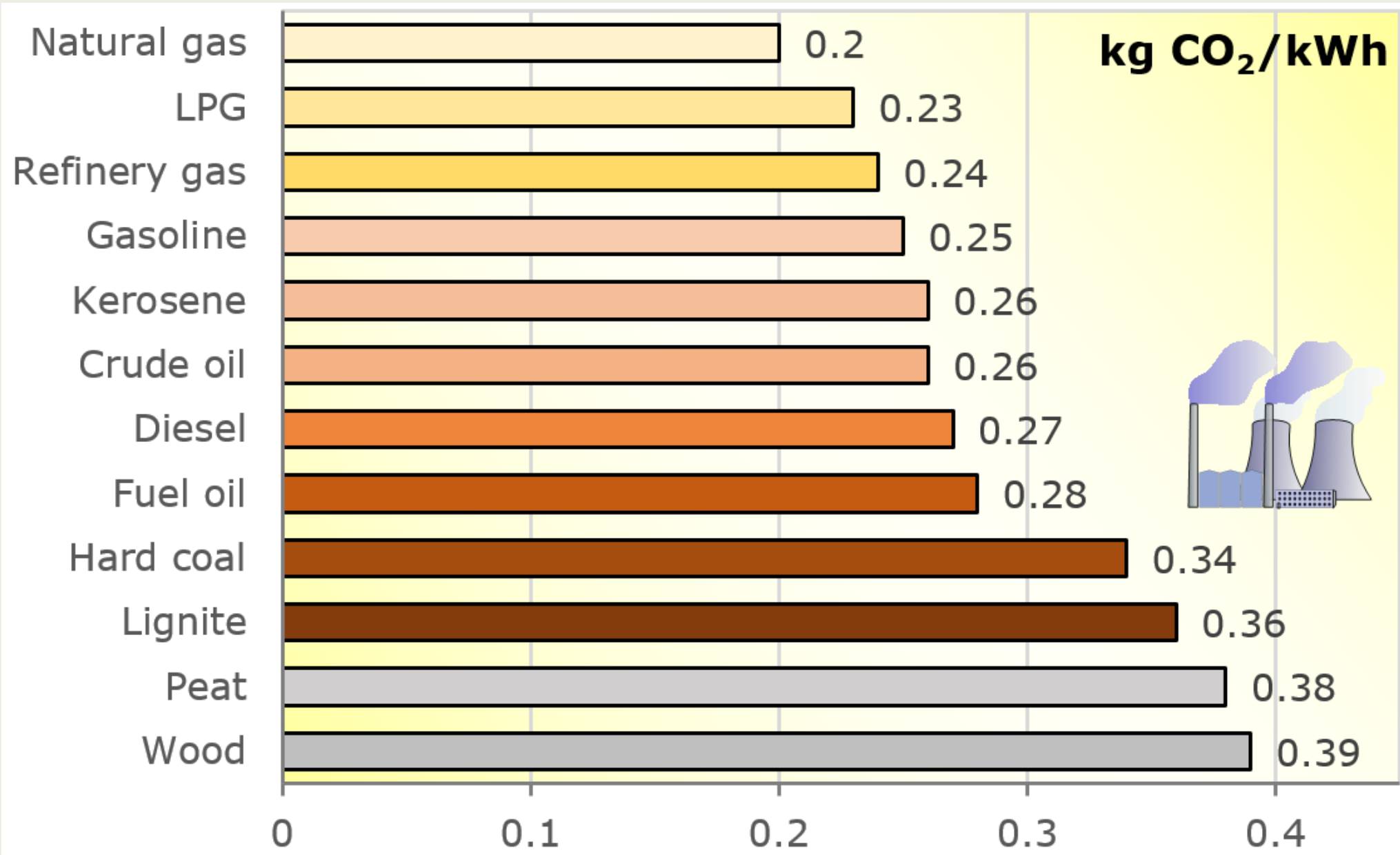
- Major source of energy,
- gas, gas power plants, coal plants, factories, boats, airplanes, etc... all run on the combustion of fossil fuels

# Why should we care?

- Recall from Chemistry

- *A combustion is a specific chemical reaction that occurs when a hydrocarbon (carbohydrates, oils, gases) reacts with oxygen to produce carbon dioxide and water.*

- Basically, fossil fuels output carbon dioxide– a known greenhouse gas, and general ecological toxin.



# Brain break!

- Thanks for being patient! Turn and talk to your table about the best dessert you have ever eaten