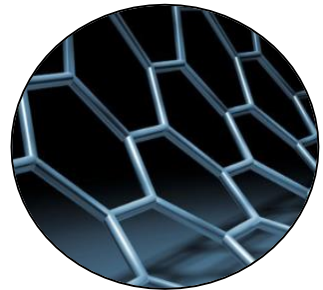
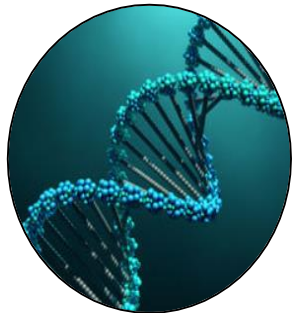




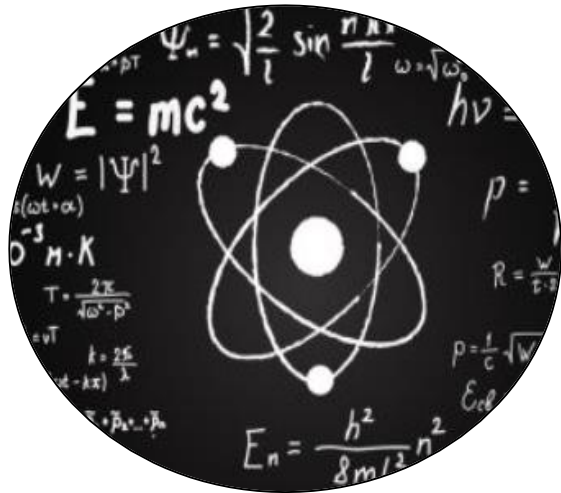
Cutting Edge Science

With Dr. Declan McGlade



Different Branches of Science

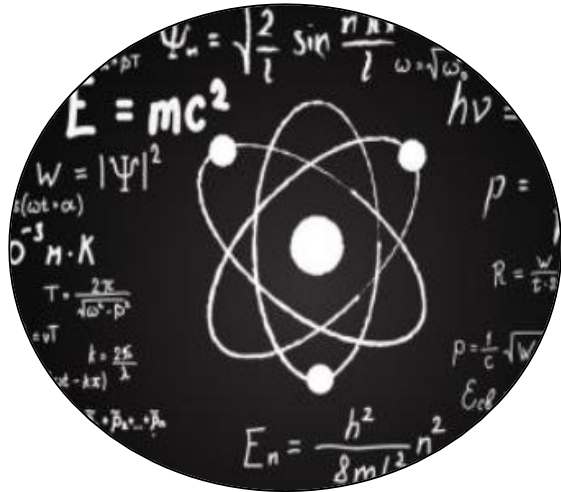
Physics



The study of forces

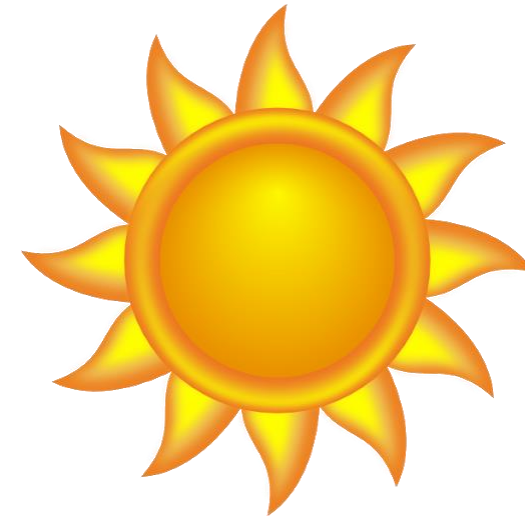
Different Branches of Science

Physics



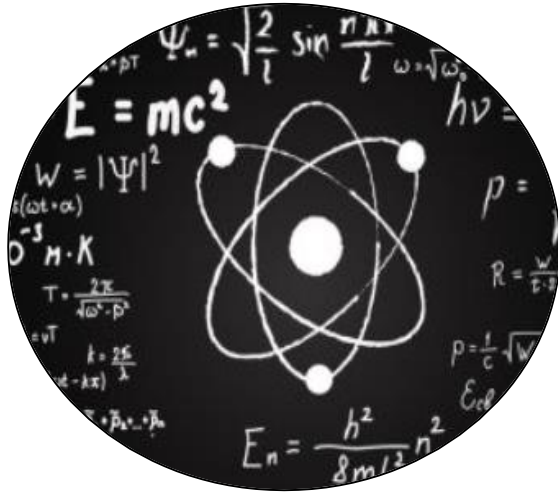
The study of forces

Light & Microscopes



Different Branches of Science

Physics



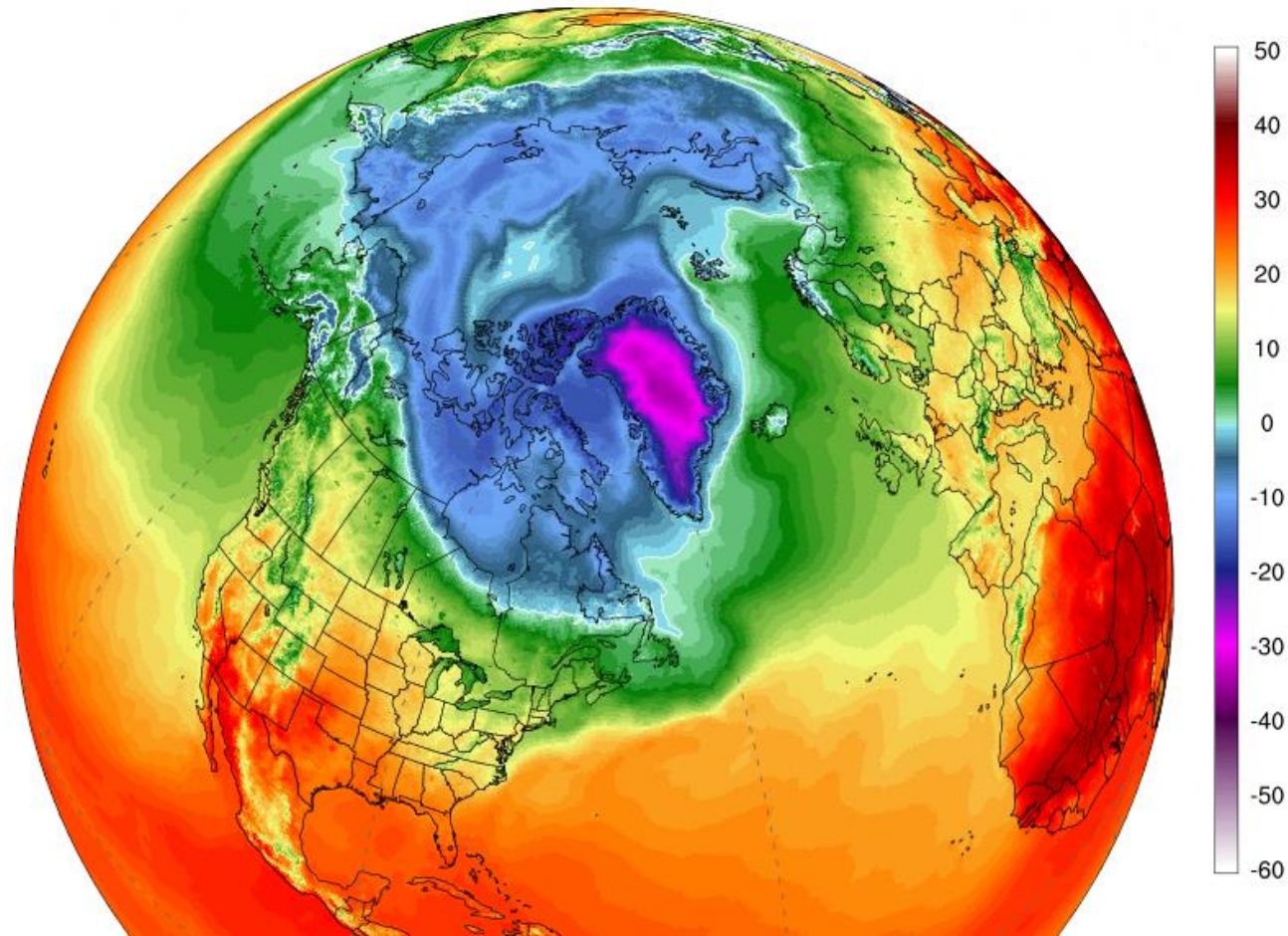
The study of forces

Chemistry



The study of chemicals

Climate Science



Can humans change the weather?



Humans have figured out how to “make it rain”

Cloud seeding

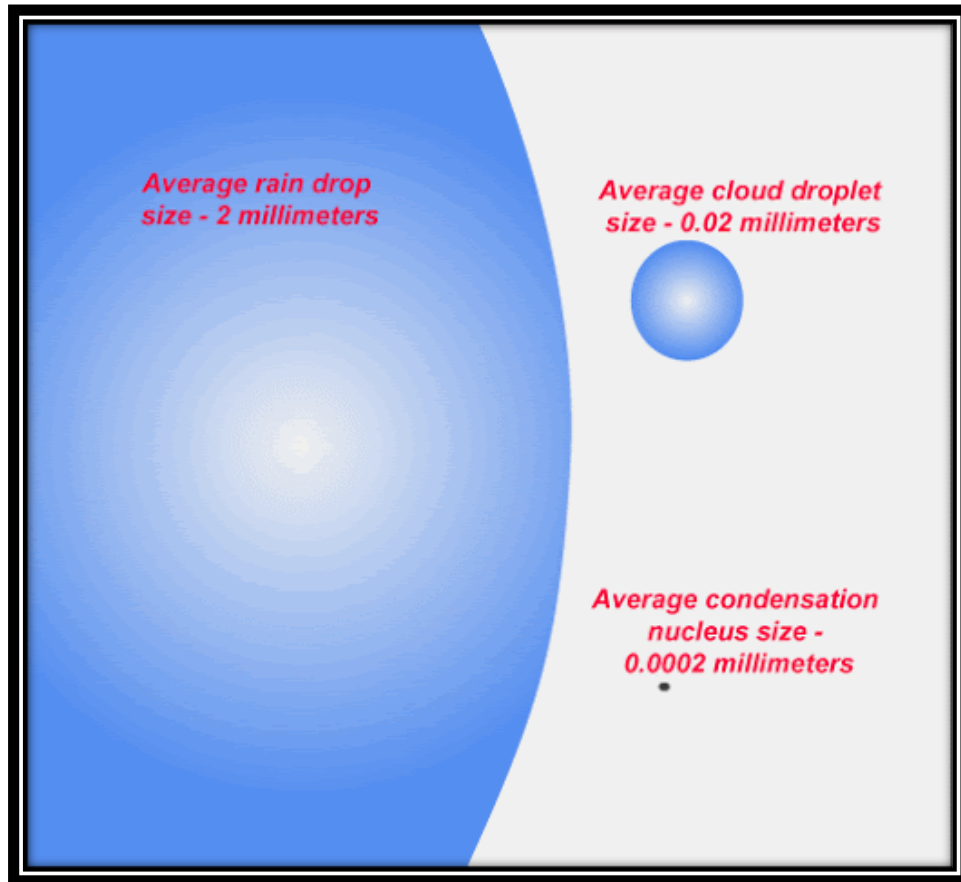
But first we need to talk about clouds



Clouds form when cold air meets hot air and there is water vapour present

The cloud is made of water vapour that ***condenses*** enough for us to see it but it isn't heavy enough to fall as rain

Nucleation points



Rain drops can form faster if there are tiny particles in the air for the water to form on

The tiny particles give a surface to the water

The water can condense onto that surface and the rain drop can get started

If there are lots of particles then the drops can start to stick to each other and get bigger faster

It can be very useful for places that need more rain



Humans can use it for silly things too though...



In 2019 the Chinese government used cloud seeding for a few days before a big military parade

They wanted to get rid of all the clouds around Beijing so that it would be sunny on the day of the parade







I want to talk about probably the most important
thing in modern science

Climate Change

Something important

- Climate change occurs naturally...
- But when we talk about “Climate Change” in the news
- We usually mean “human driven climate change”
- There is a very particular word we use for things from Human sources
- **Anthropogenic**

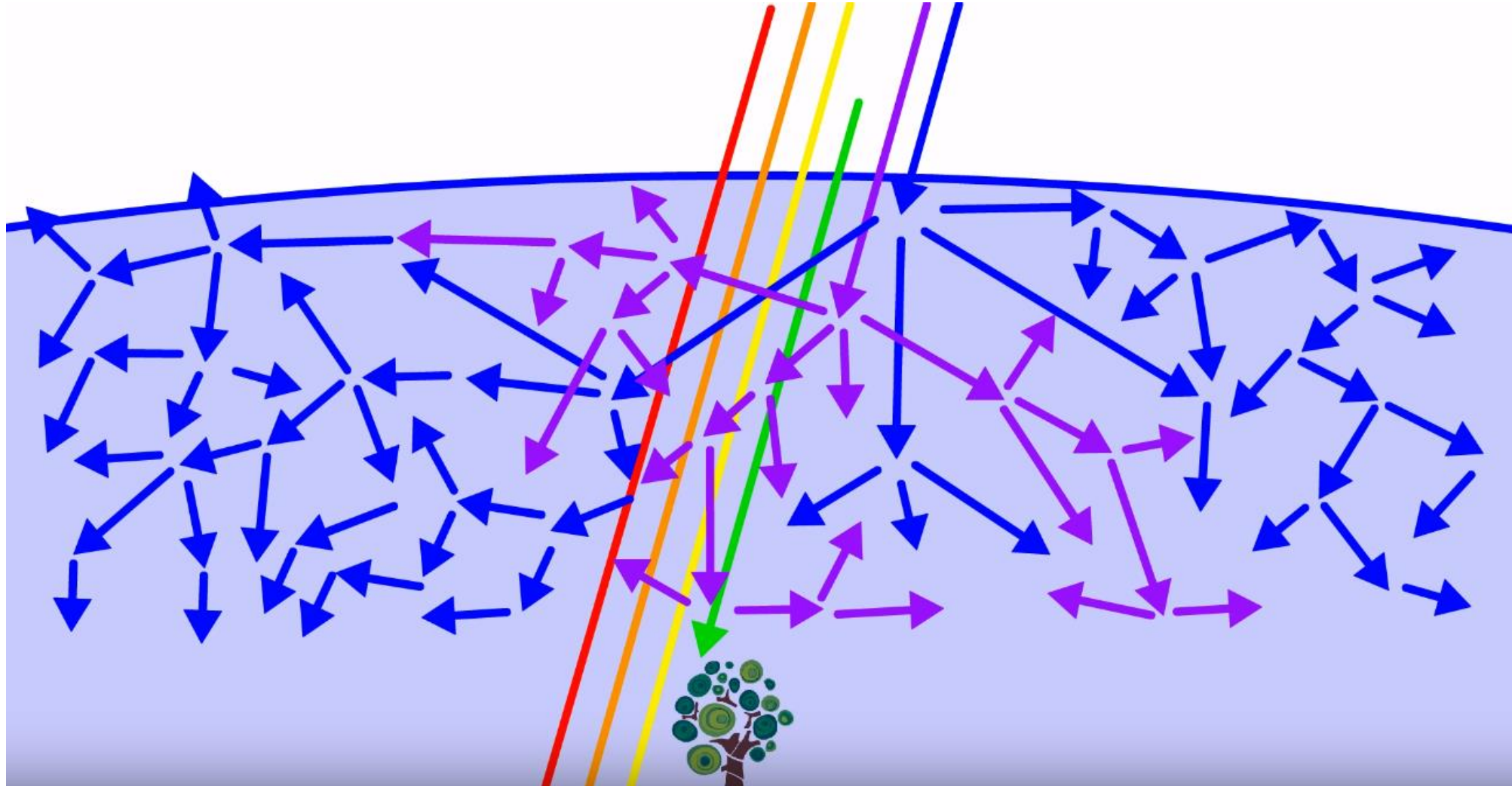
Anthropogenic Climate Change – Significant change to the climate because of human actions



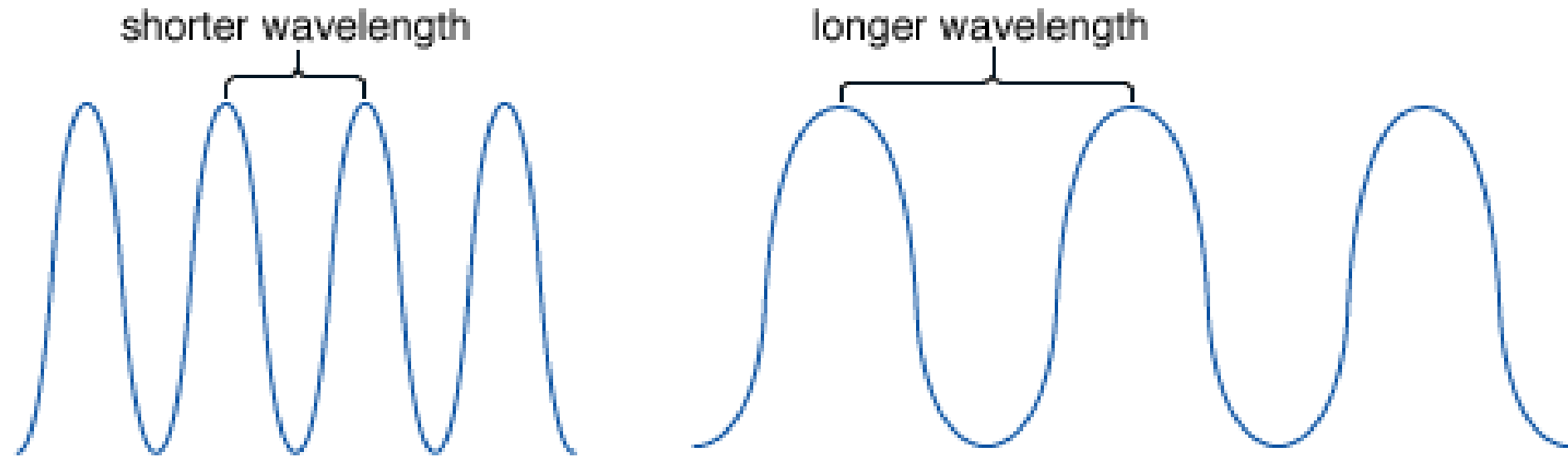
- There are lots of different types of pollution
- But for climate change the most important chemicals we put into our atmosphere are...
- Greenhouse gasses
- What do they do?
 - They trap heat inside the earth – like a greenhouse

Think about our class on light and microscopes

- I answered the question “why is the sky blue”?

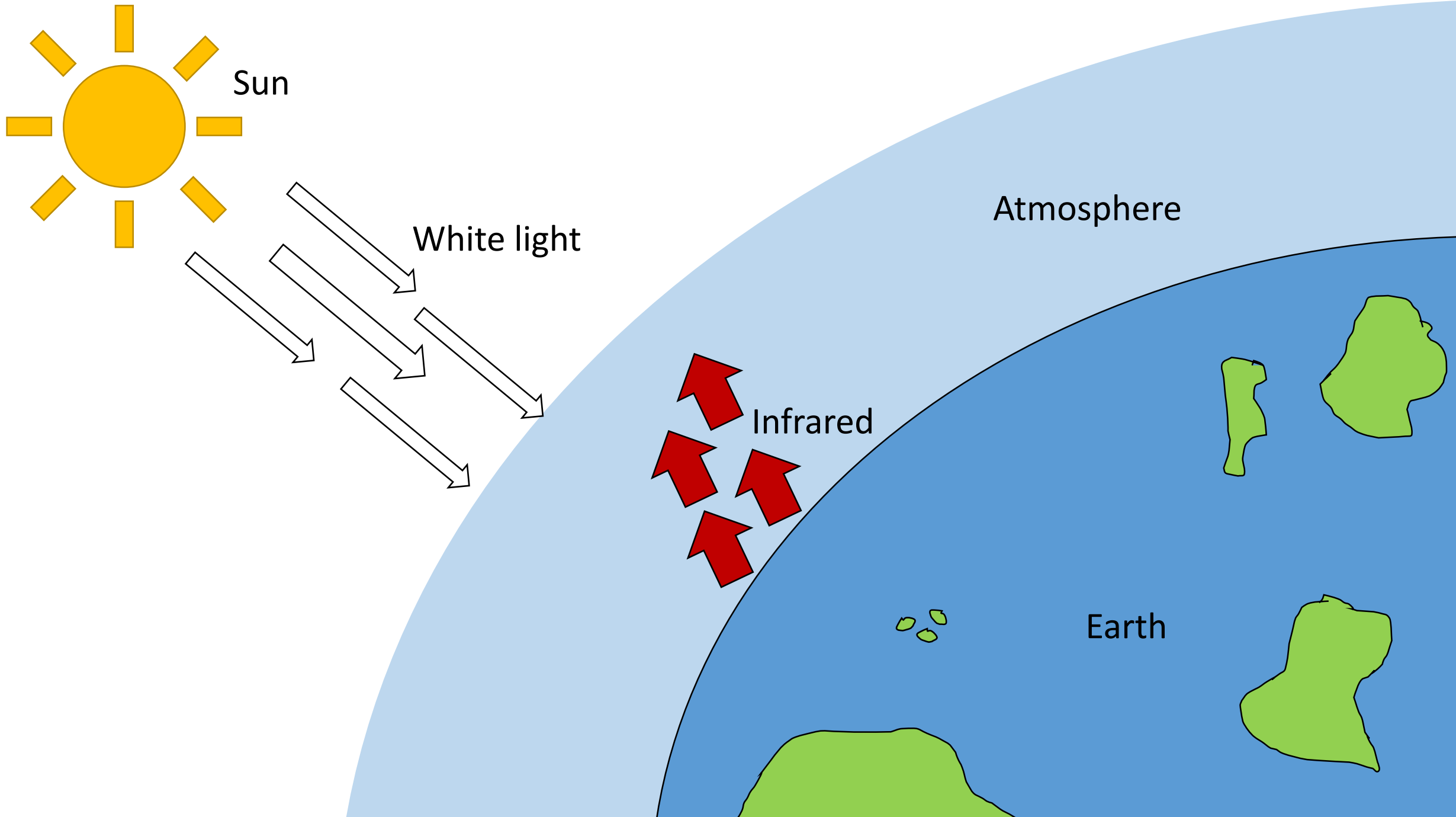


We talked about the wavelength of light



Some of the light gets bounced around in the atmosphere

- That's why the sky is blue... but some of it comes down to the earth Obviously!
- Because without that light coming down here we wouldn't be able to see
- We would also be freezing cold
- But... just like the way that the blue and purple light can bounce around up in the atmosphere...
- The light that hits the earth itself also gets bounced around



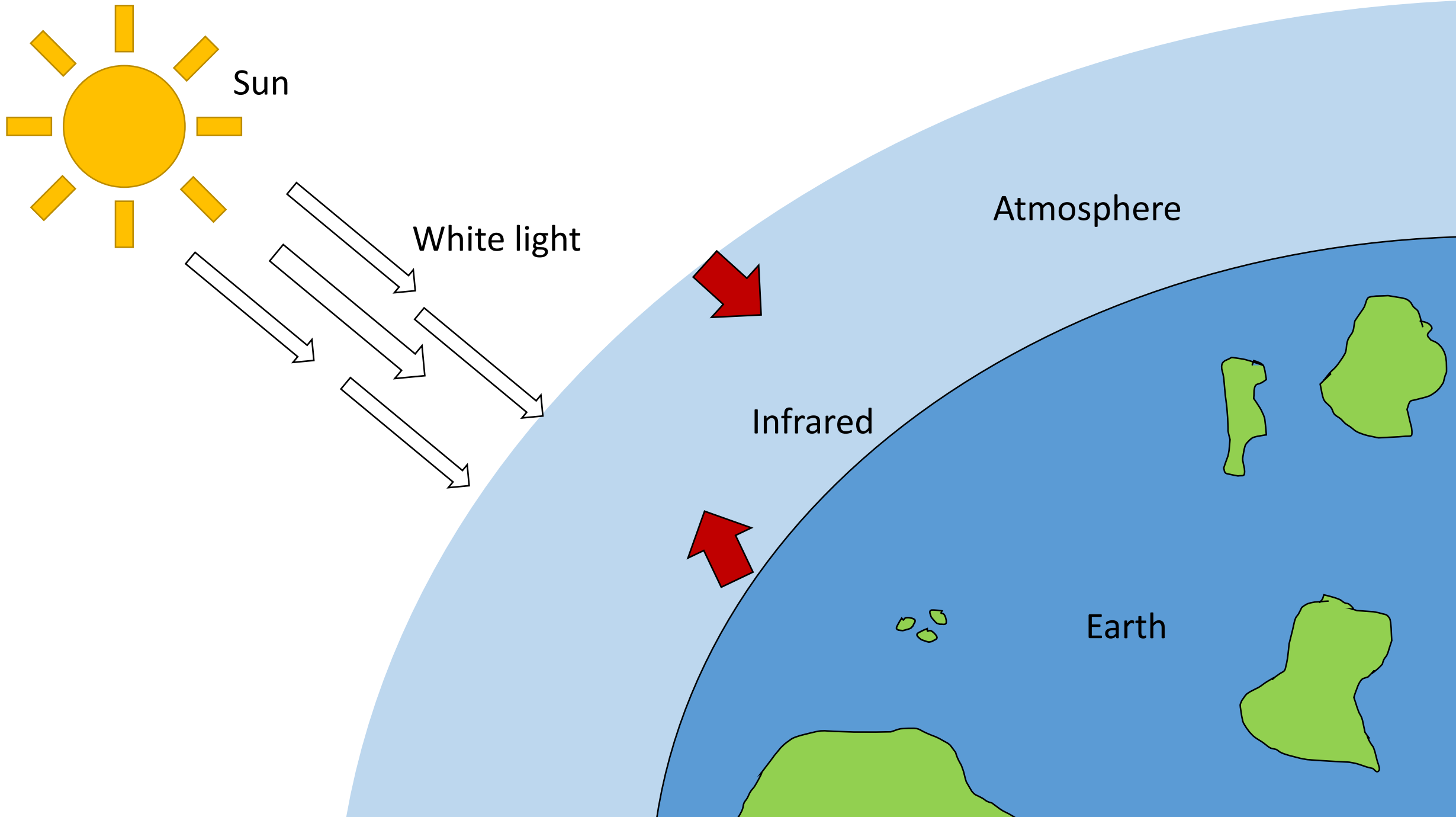
Sun

White light

Atmosphere

Infrared

Earth



Sun

White light

Atmosphere

Infrared

Earth

We don't want it to happen too much!

- And it's a little bit more complicated than that too...
- It has to do with which gasses are in the atmosphere
- Because not all gasses are greenhouse gasses

Water vapour



Methane



Carbon Dioxide



John Tyndall

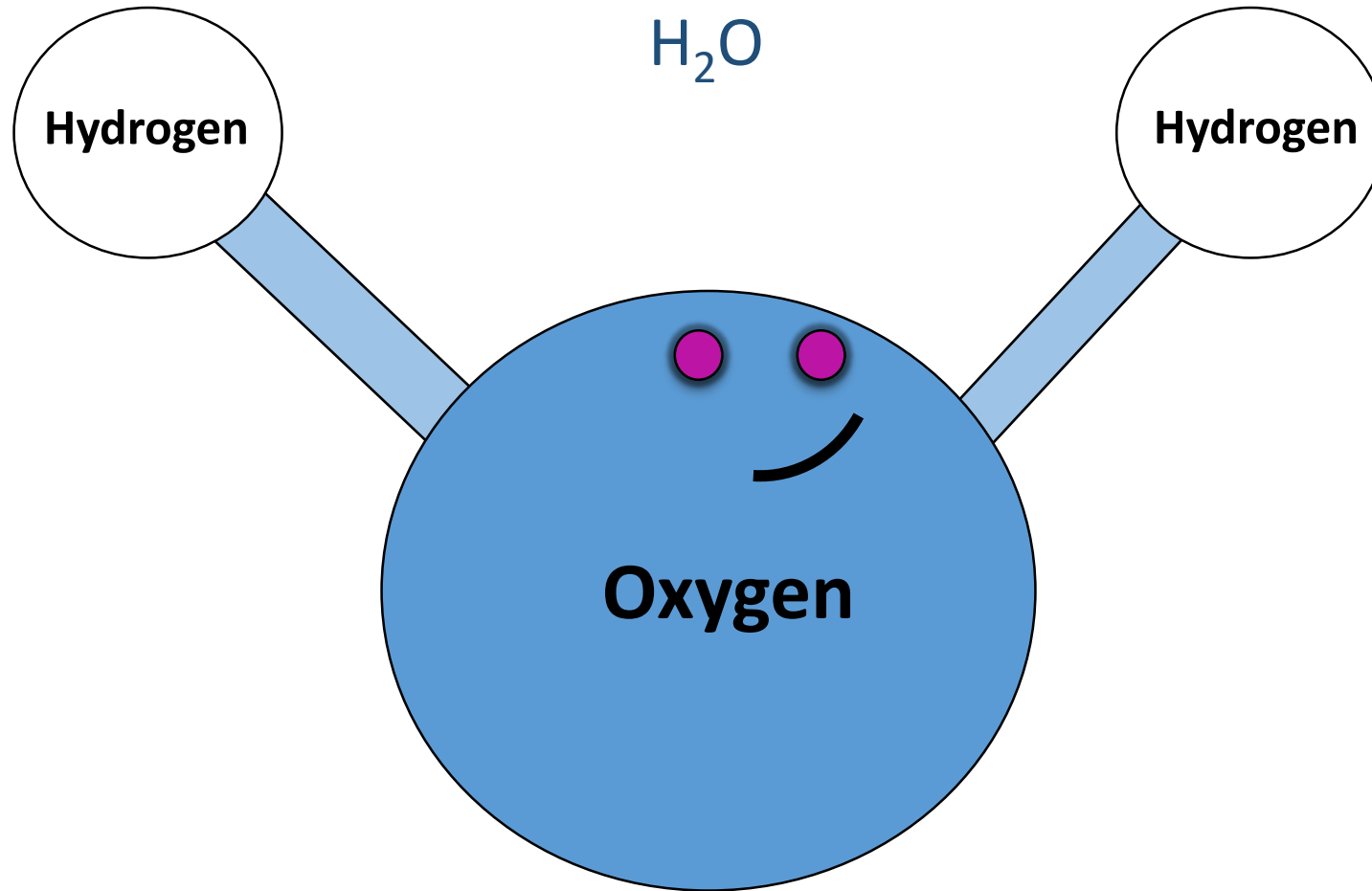
- Very famous Irish environmental scientist – 19th Century
- Proved that gasses like CO₂ act like “greenhouse gasses” in the atmosphere
- Sound familiar?
 - Irish
 - Environmental scientist
 - Really nice beard

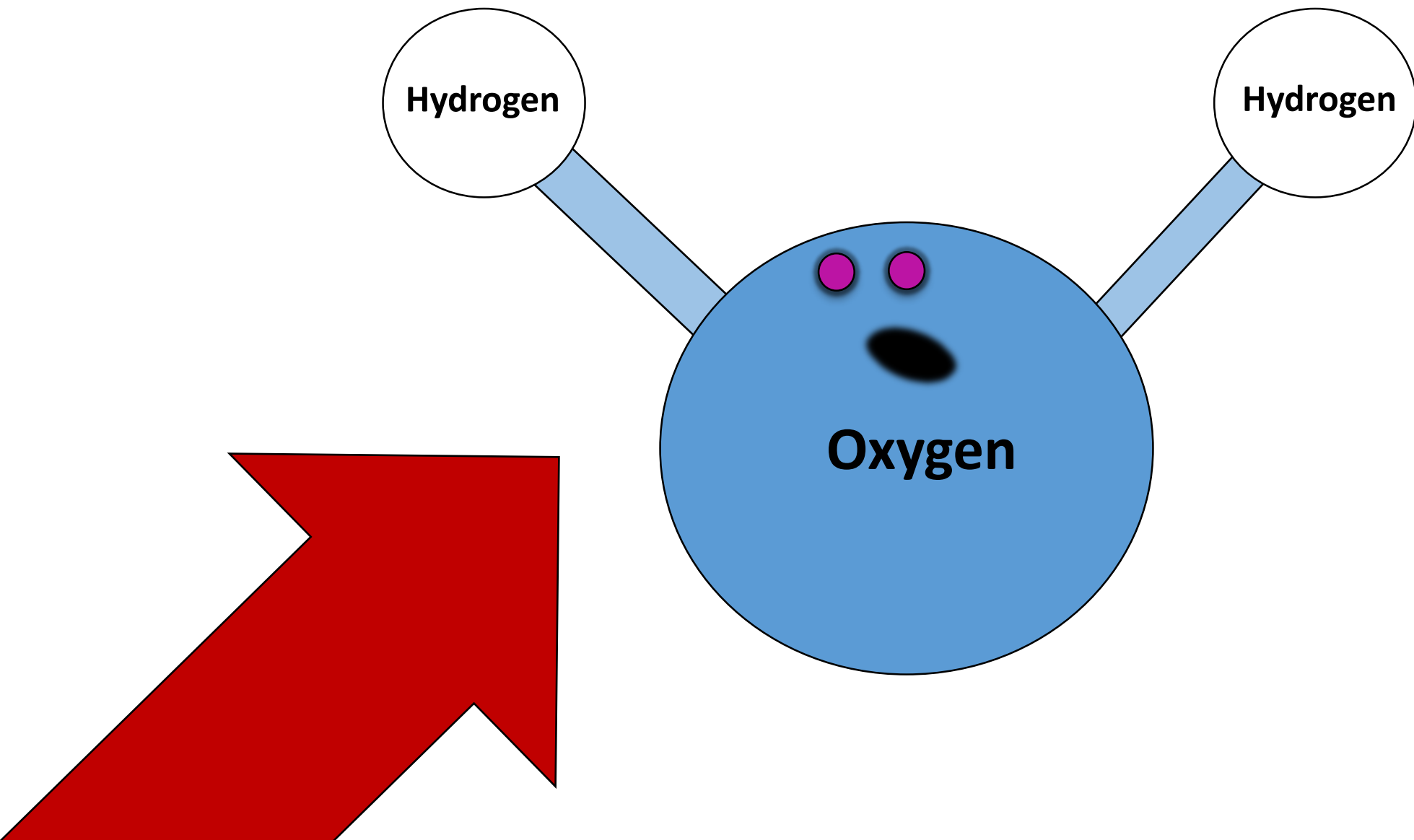


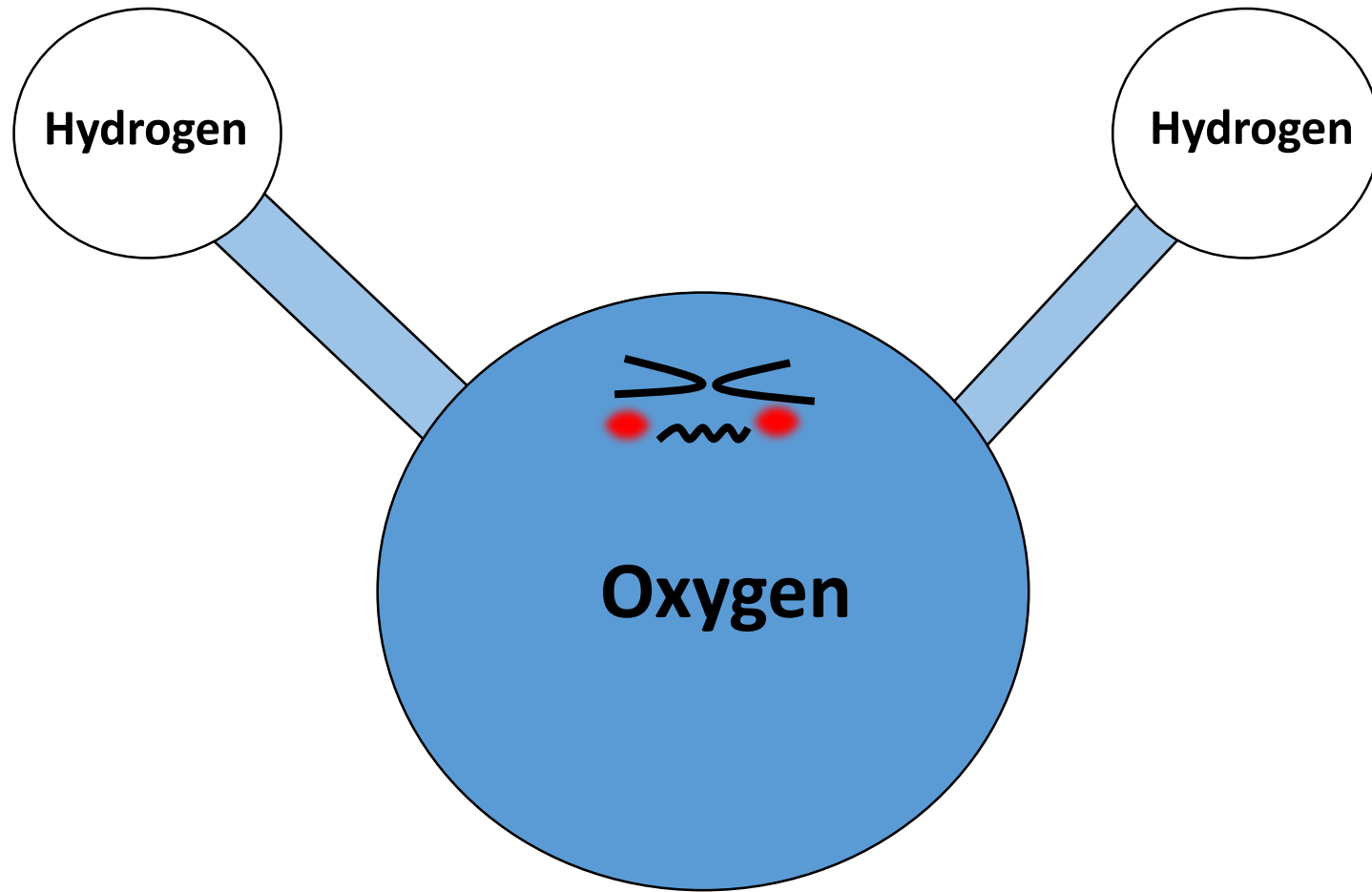
Water vapour in the atmosphere

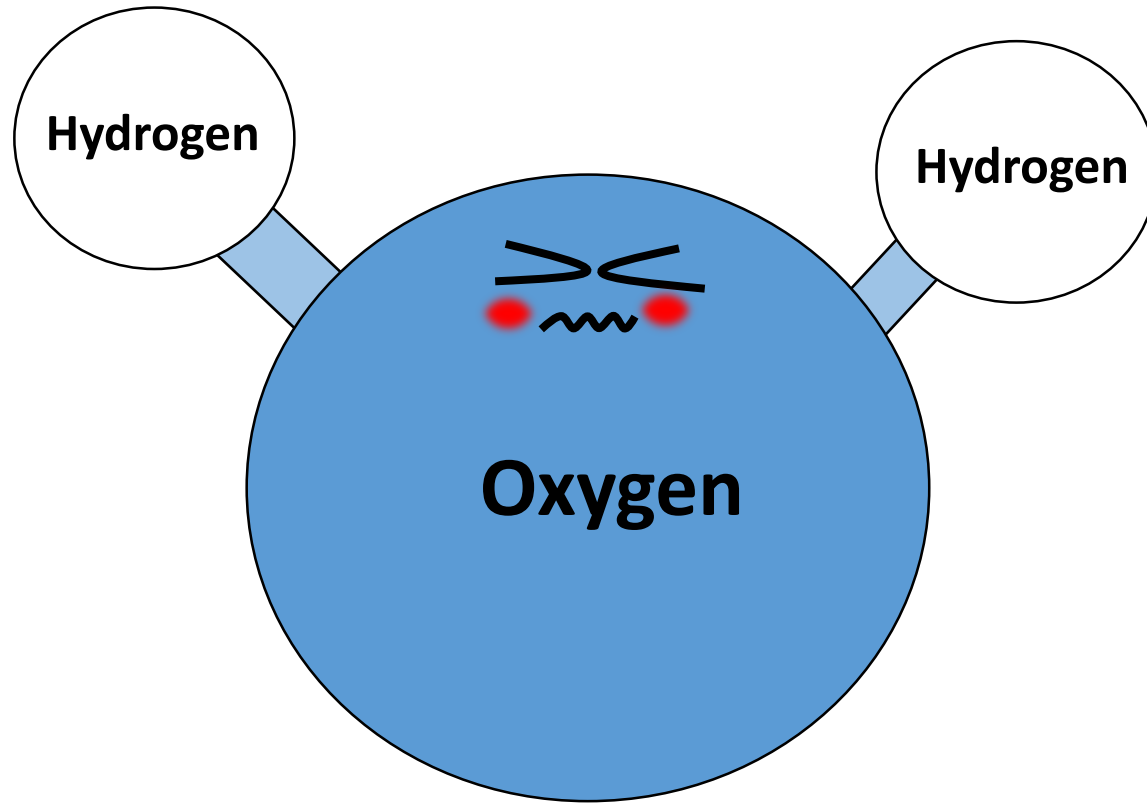


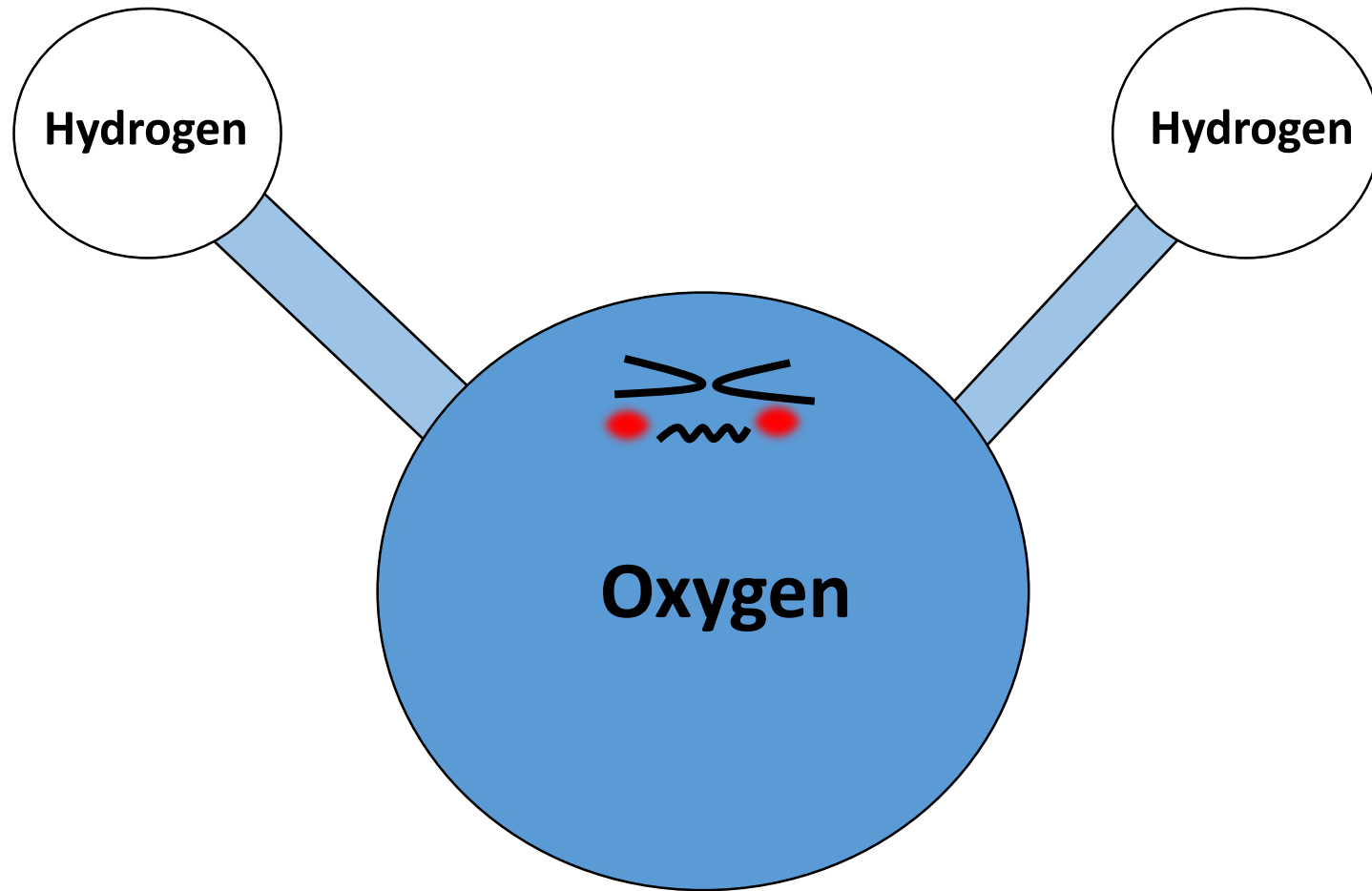
Water vapour

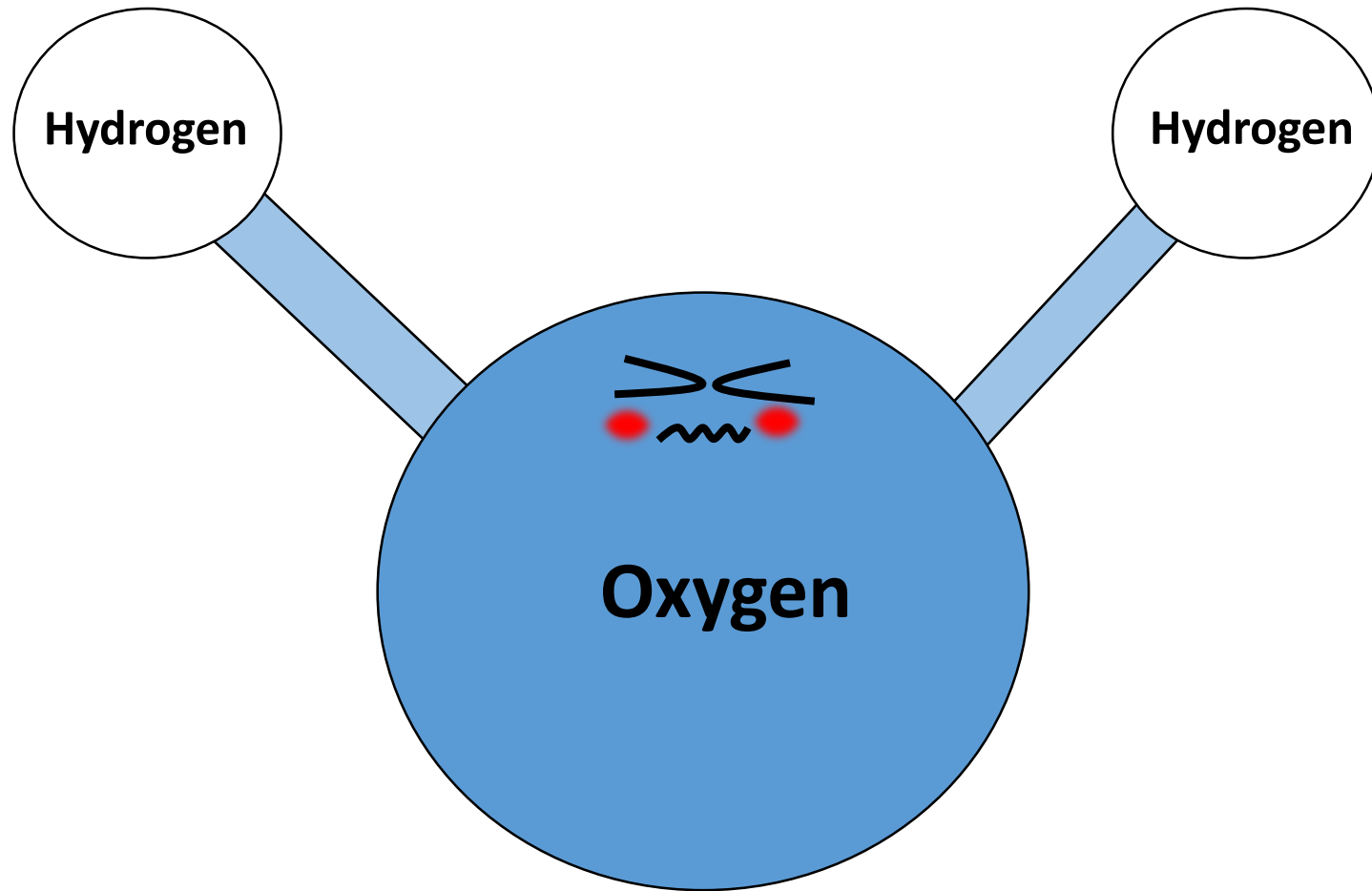


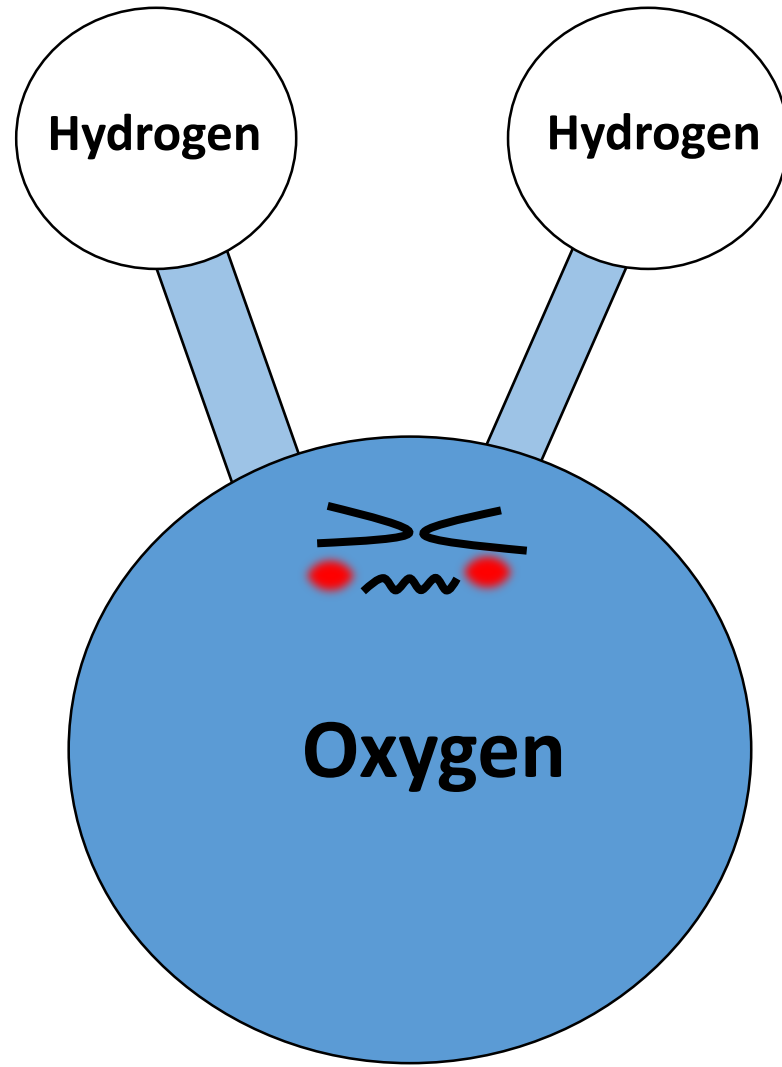




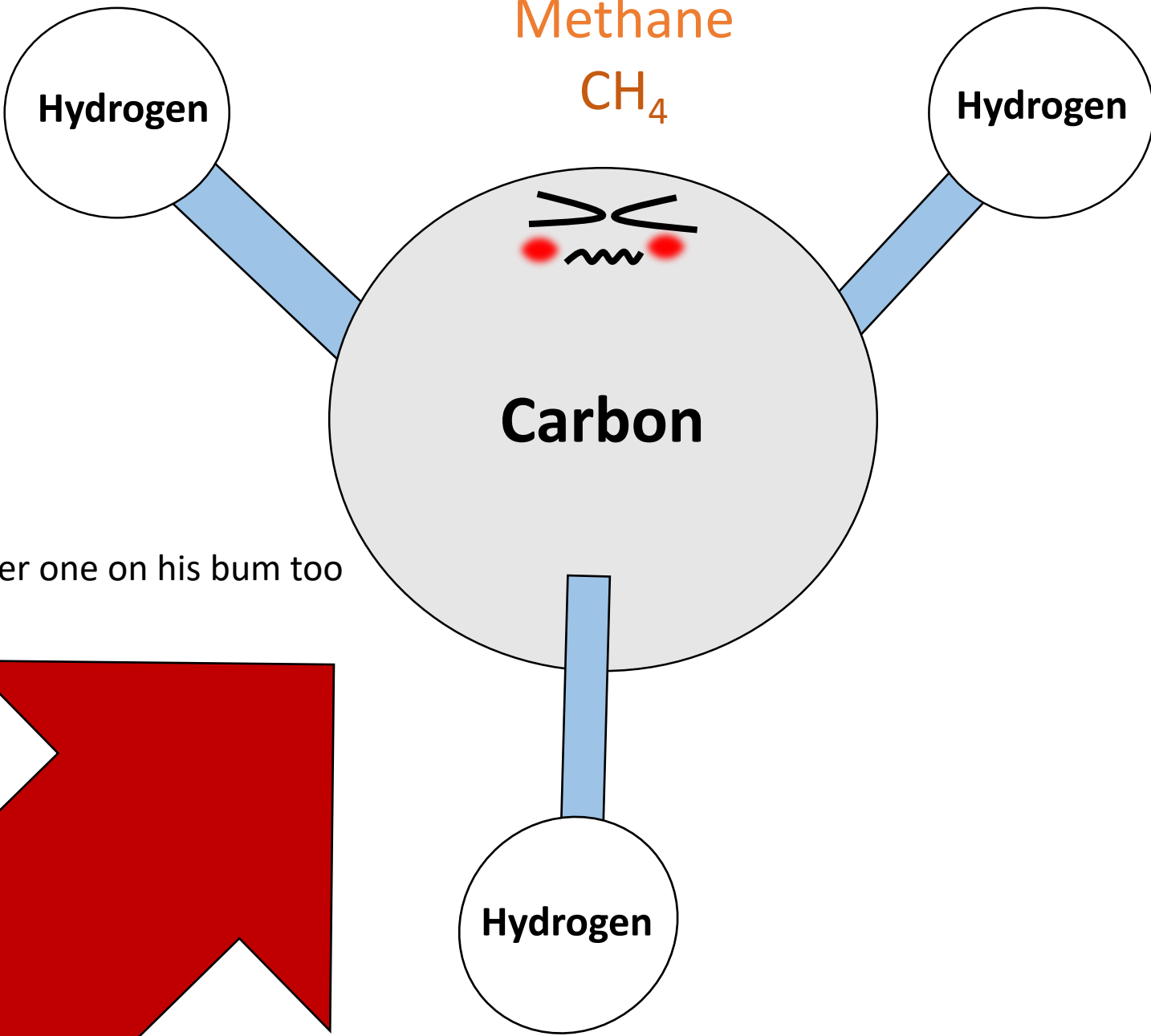




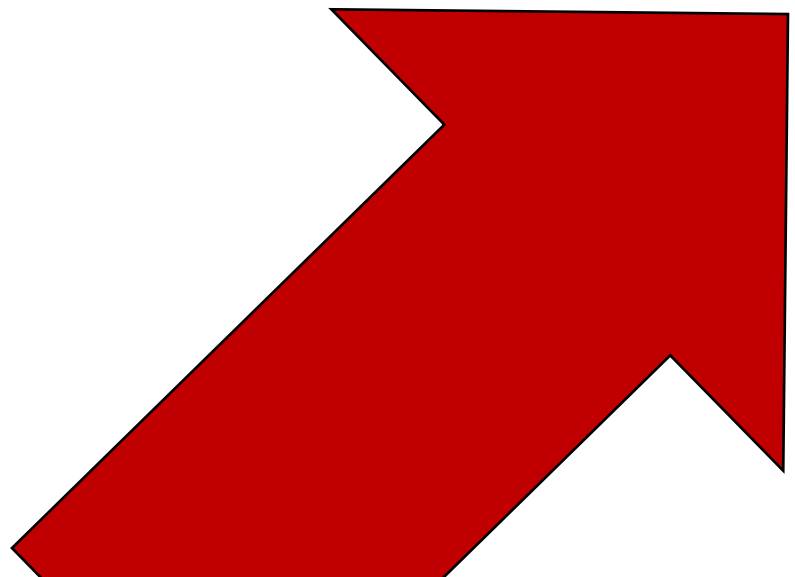




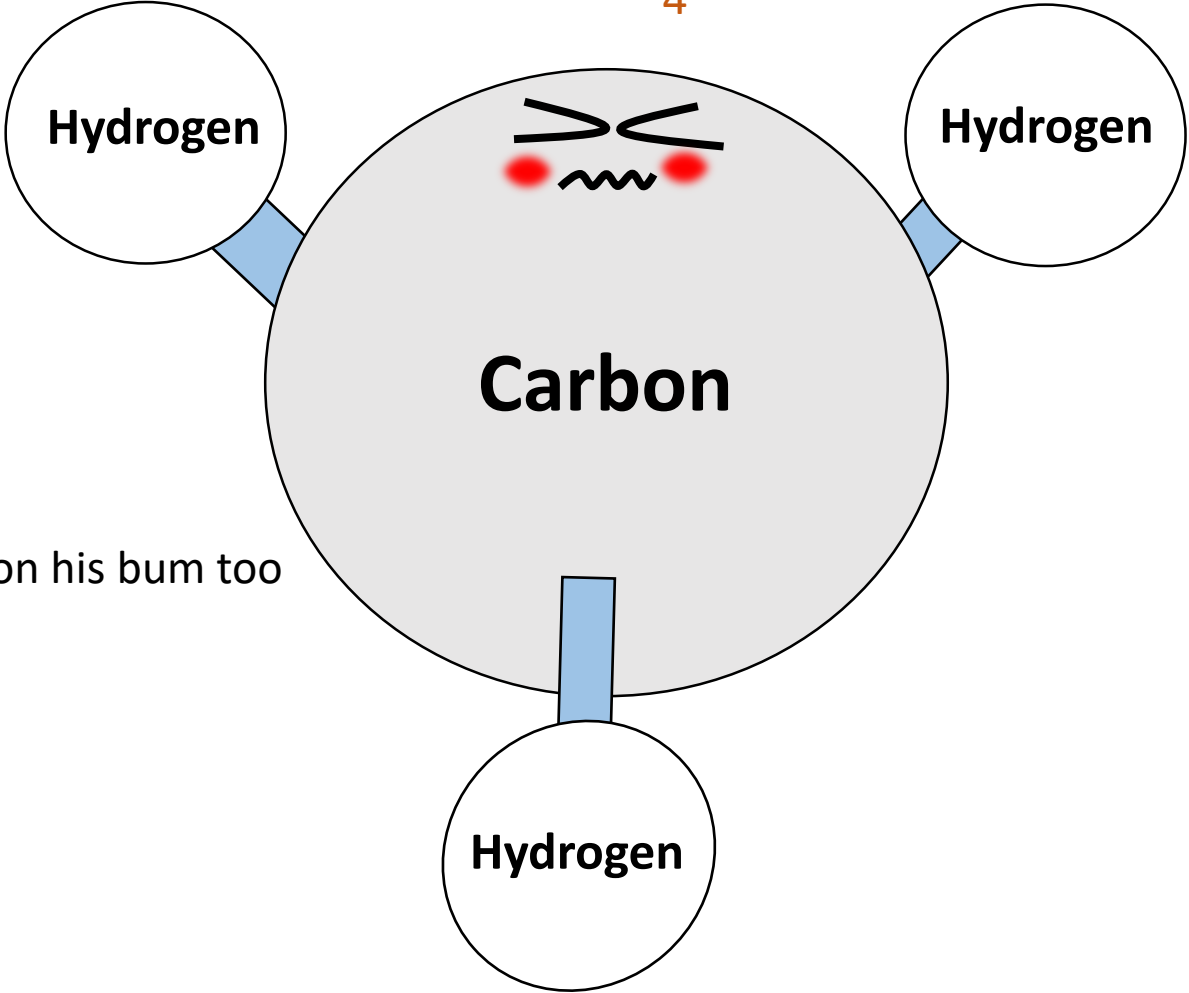
Methane
 CH_4



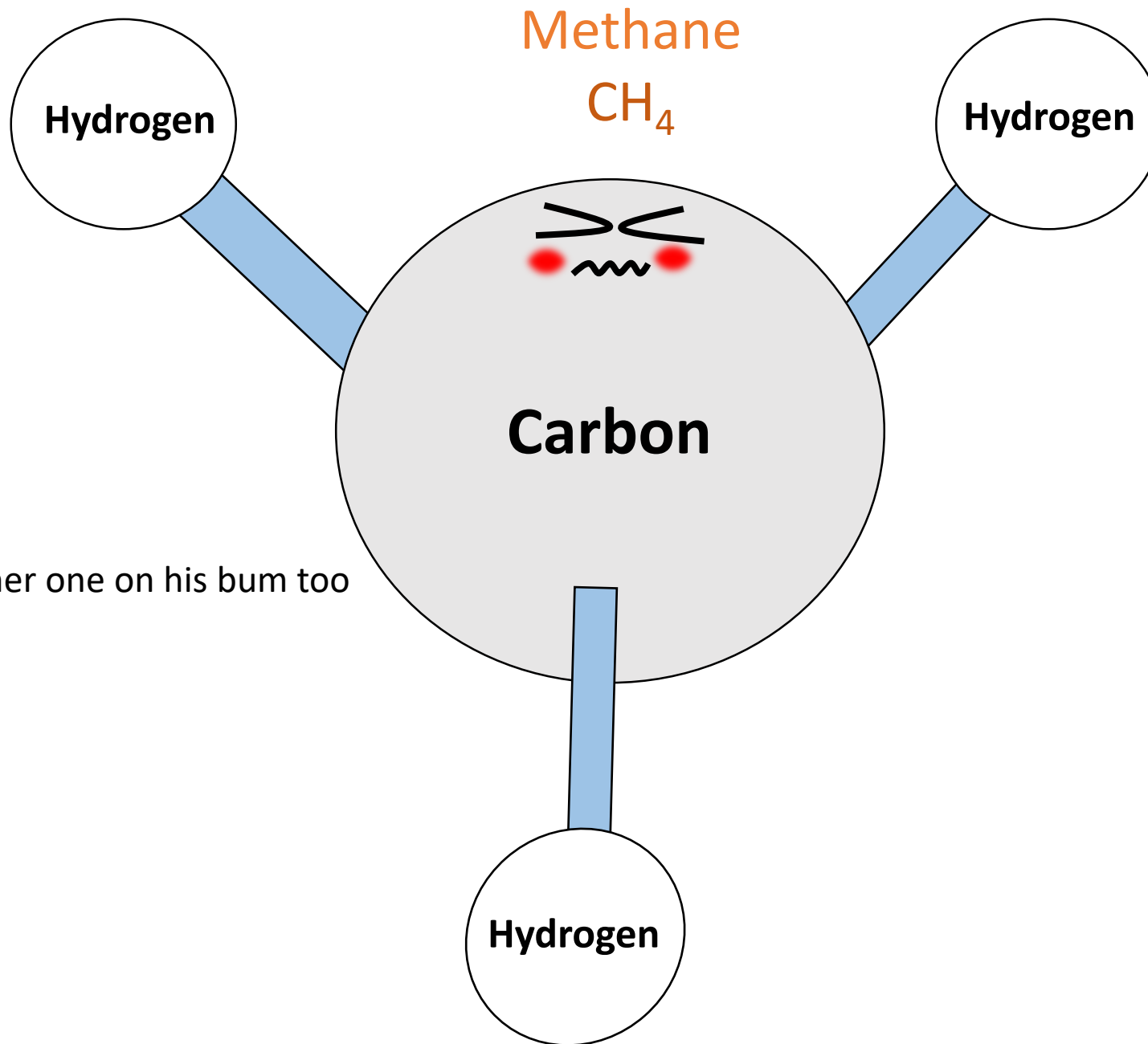
He's got another one on his bum too



Methane

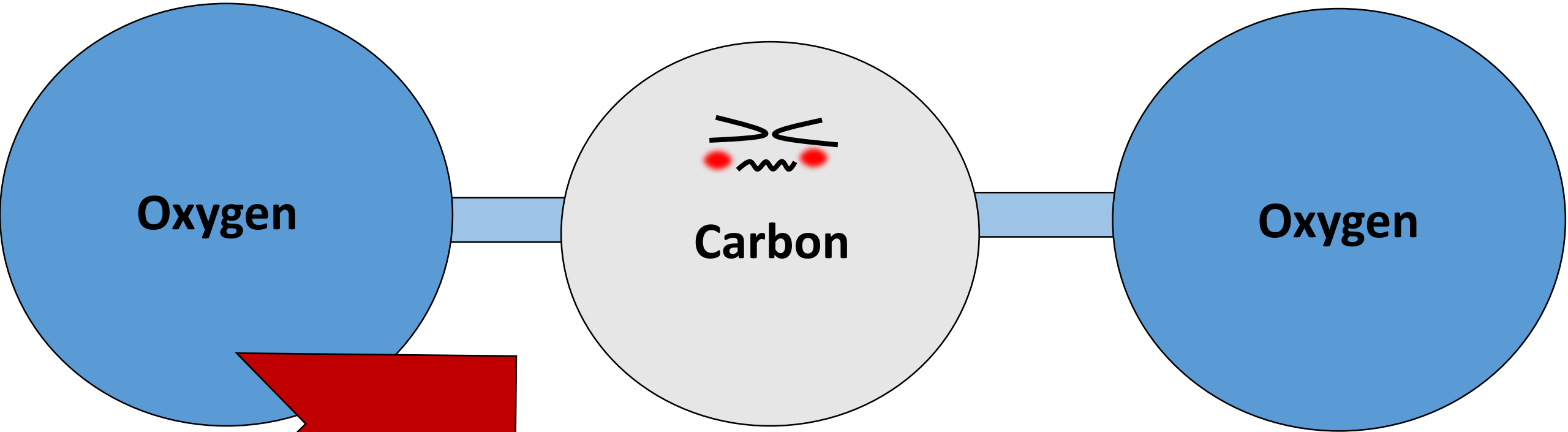


He's got another one on his bum too



Carbon Dioxide

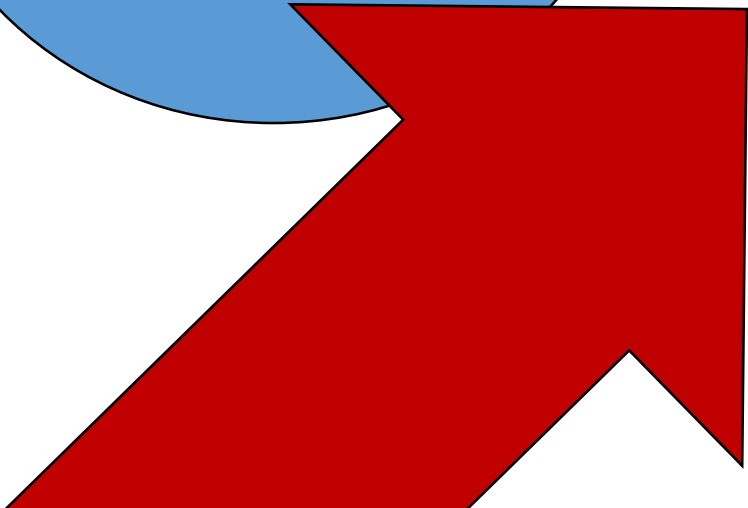
CO₂



Oxygen

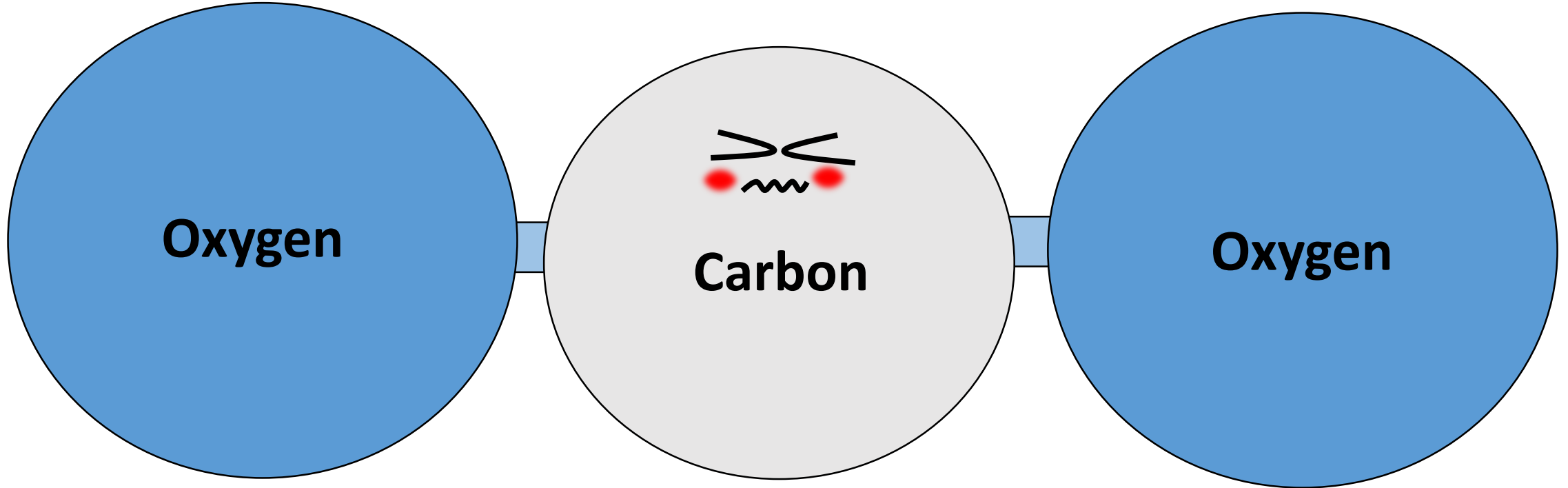
Carbon

Oxygen



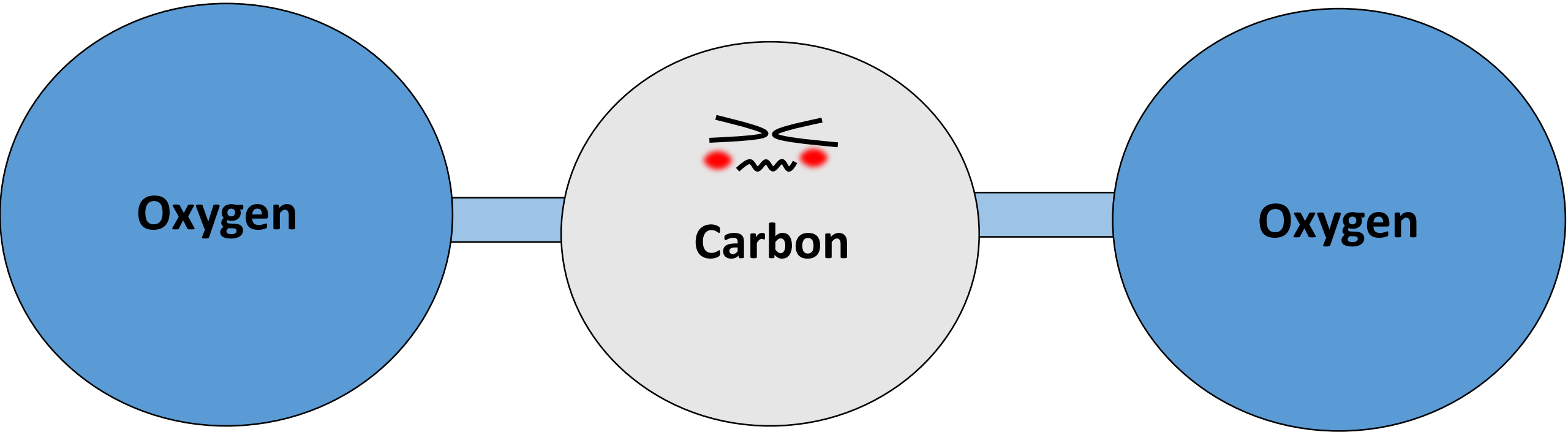
Carbon Dioxide

CO₂



Carbon Dioxide

CO₂

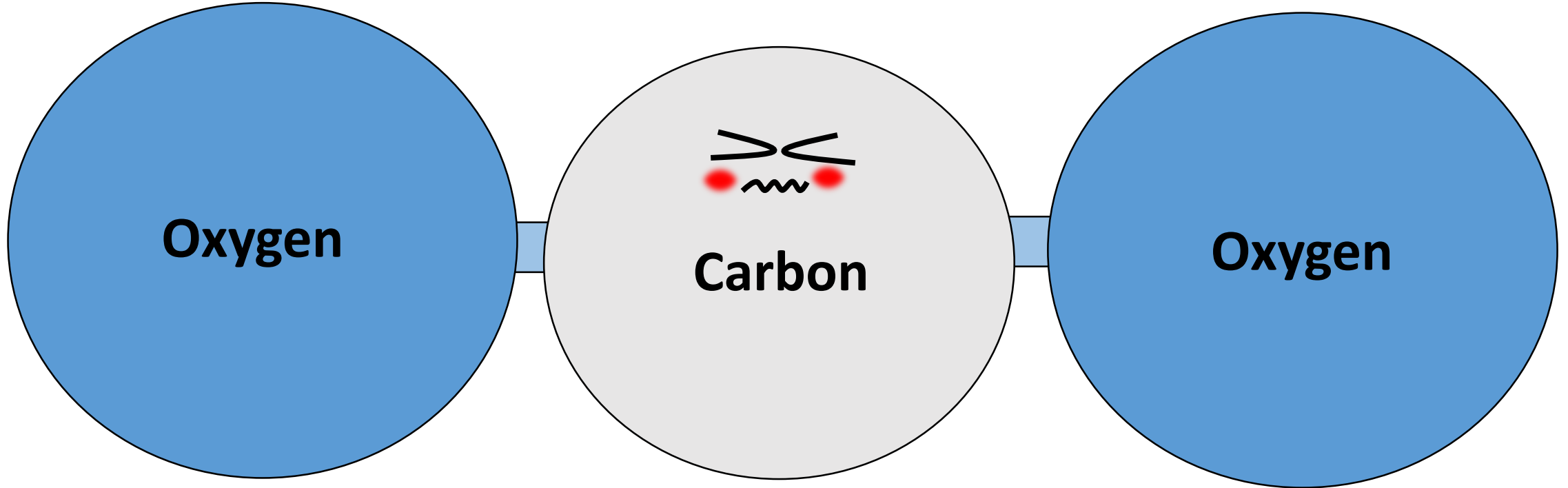
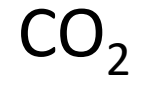


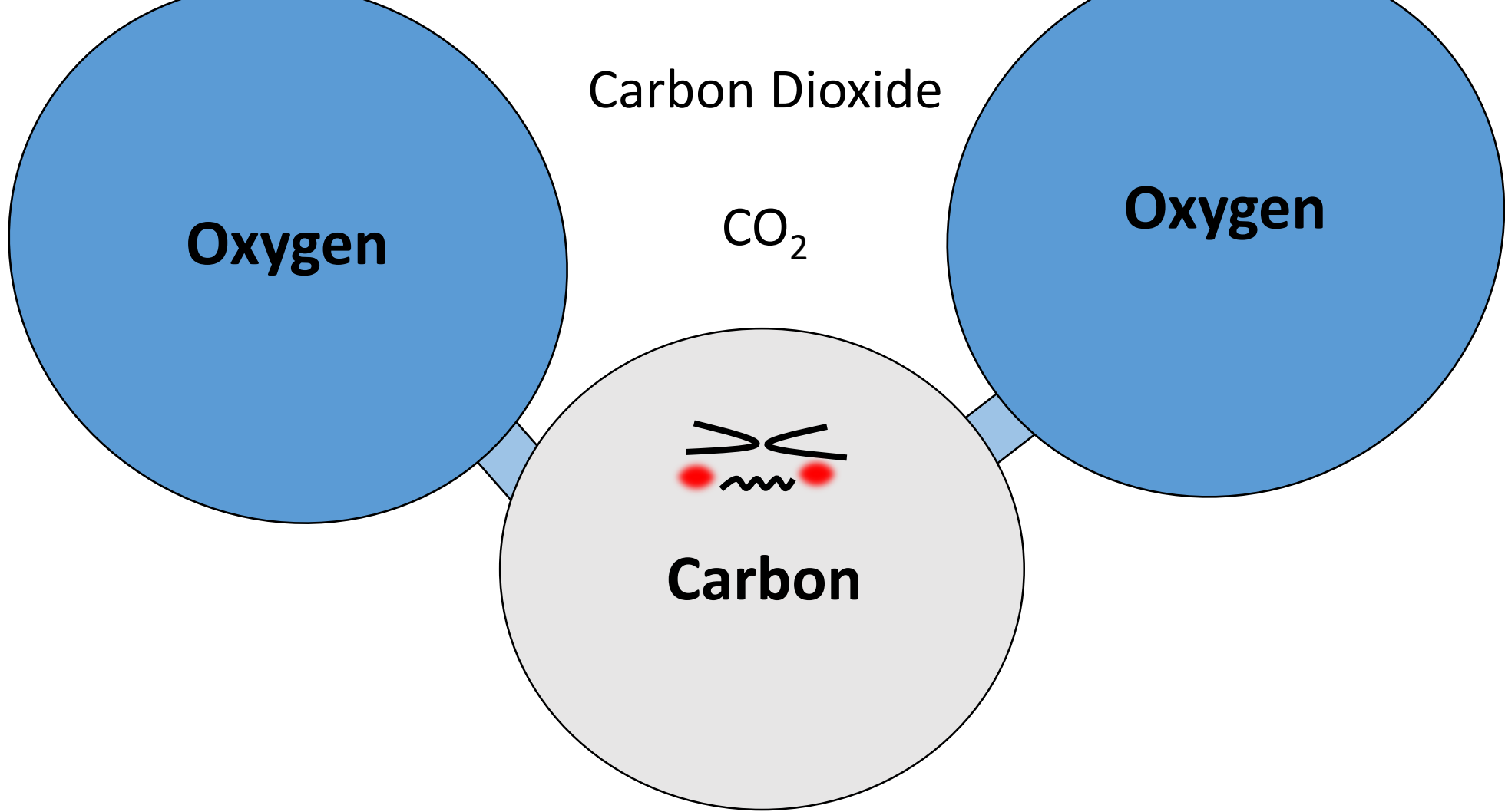
Oxygen

Carbon

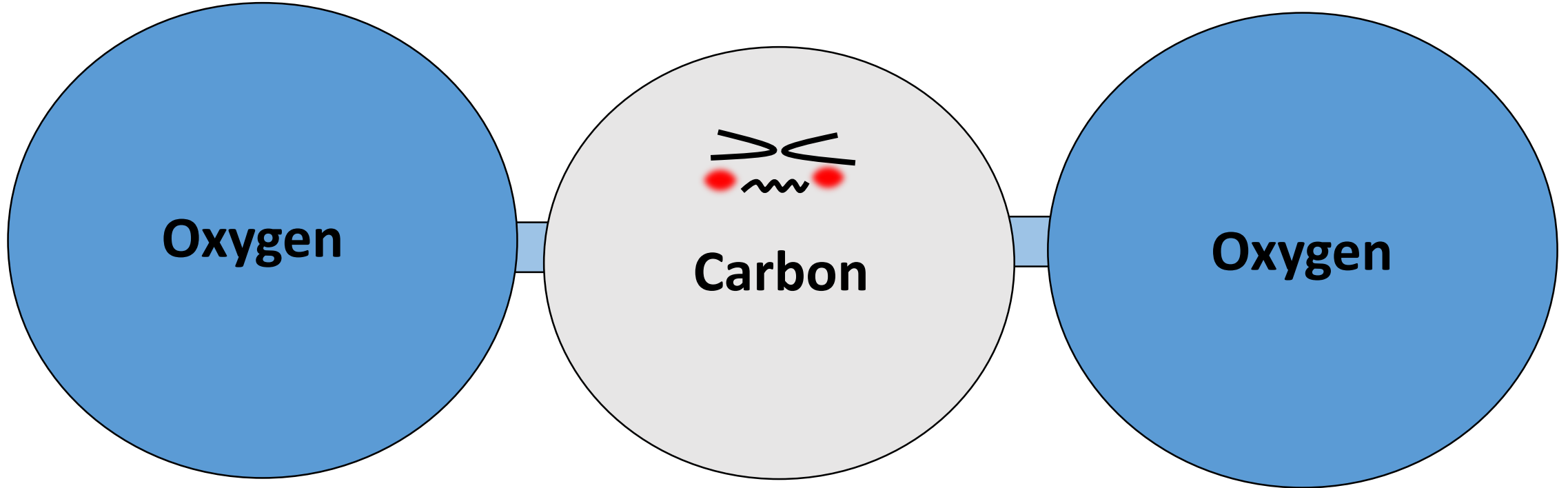
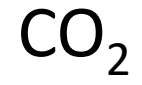
Oxygen

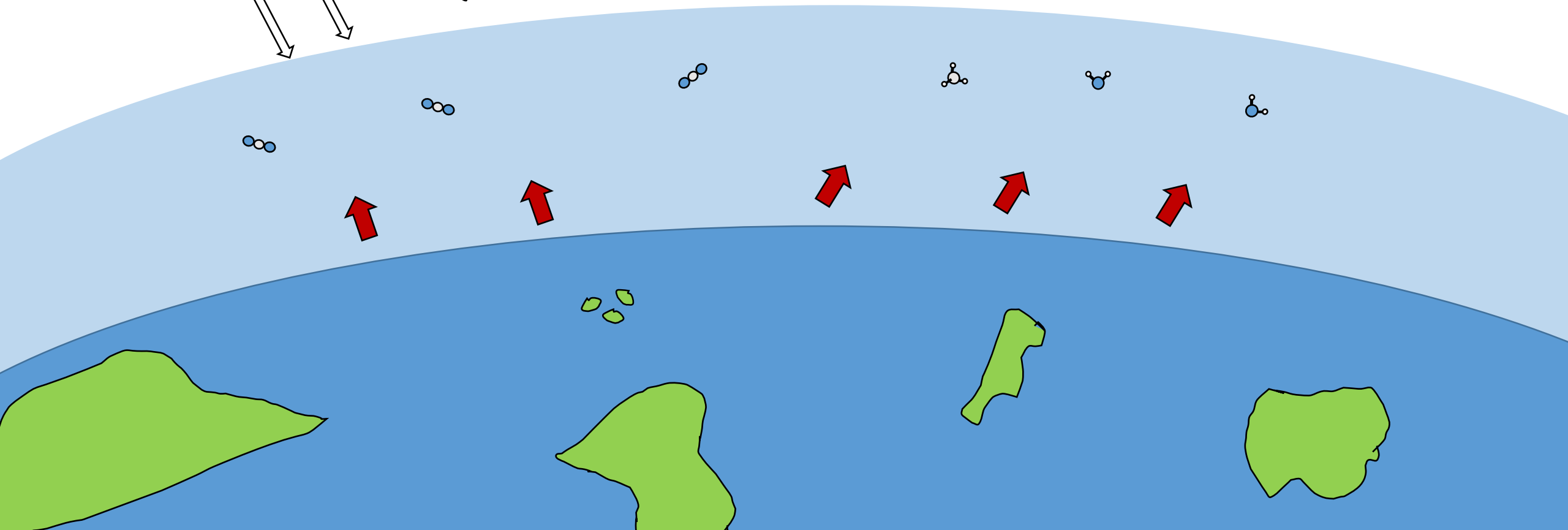
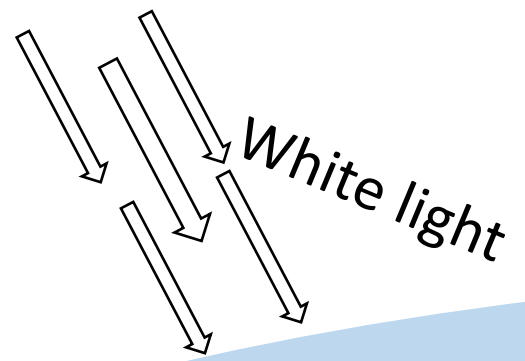
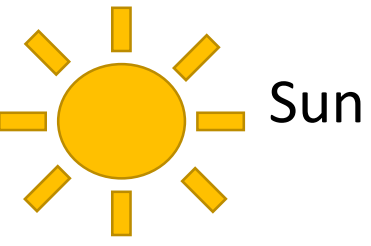
Carbon Dioxide

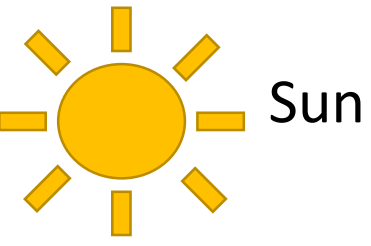




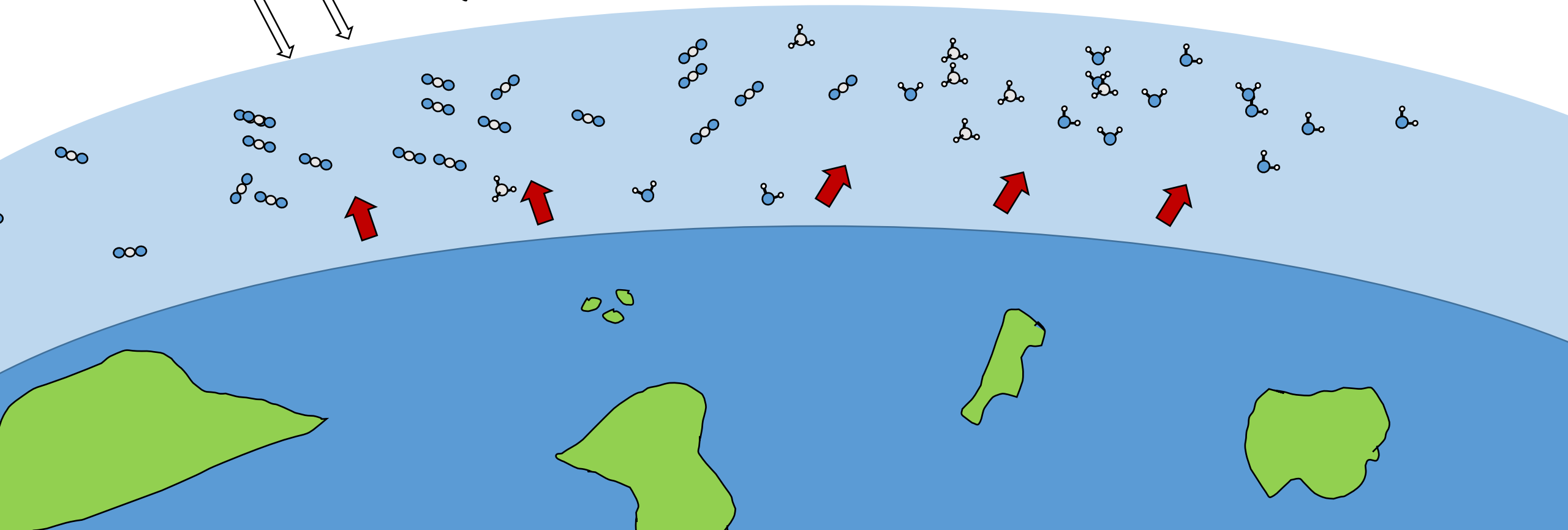
Carbon Dioxide

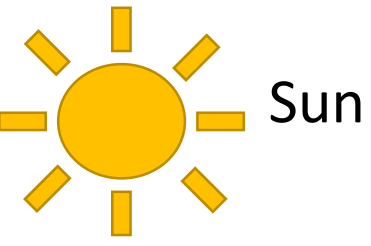




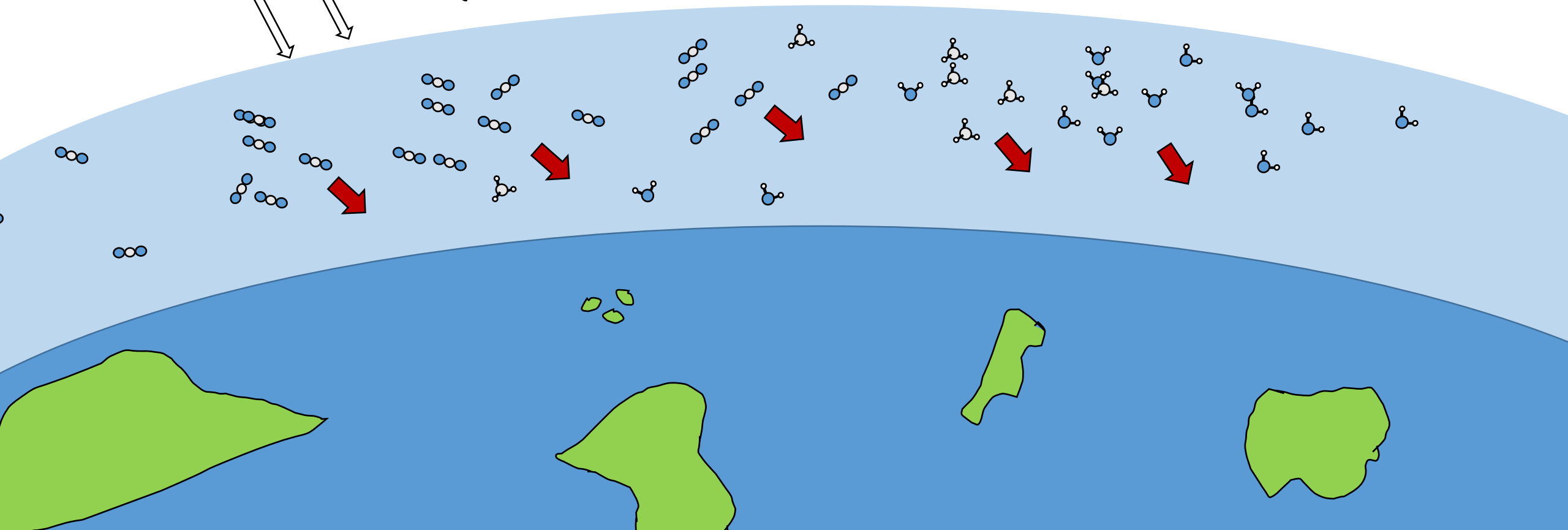


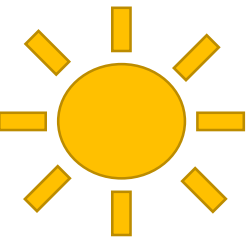
White light



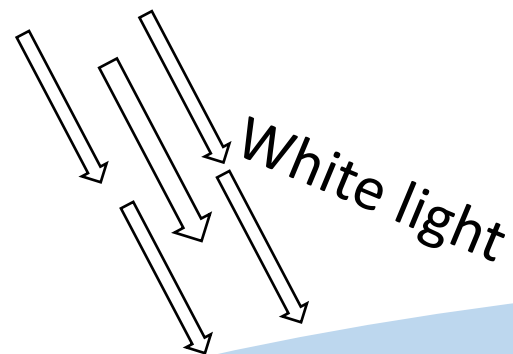


White light

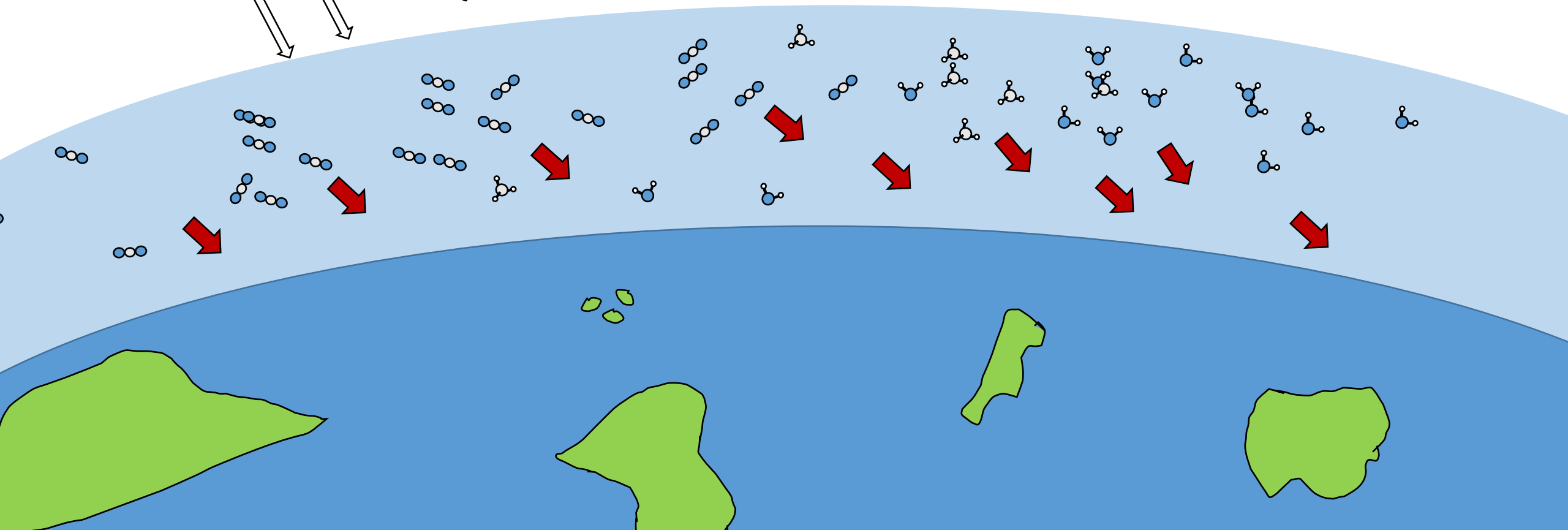




Sun



White light







Think about your actions

- Do you need to take the car?
- Do you need to buy that thing?
- Companies will make more things if people buy them – even if they don't need them
 - If people don't buy them they won't be made
 - If they don't get made then all the energy and electricity needed to make them won't be used
 - That means less greenhouse gasses
- So all of our actions make a difference! We just need to stop and think