Climate change and its natural causes

Learning Questions:

- What is climate change?

Learning Objectives:

- I can explain the greenhouse effect.
- I can judge the evidence of natural climate change.

WaterAid/ Basile Ouedraogo

WaterAid

Climate Change - What would you like to ask?

If you could ask one question, any question, about climate change what would it be?

We will share some of these questions as a class and see if we can find an answer by the end of the topic.

WaterAid

What is Climate Change?

What is difference between Weather and Climate?

Weather:
Weather can be described as the condition of the atmosphere around us over a short period of time.

It is about being hot or cold, wet or dry, stormy or calm, cloudy or sunny.

Climate:
Climate is the **average** weather conditions over **longer** periods of time (years!) and over **large areas** (countries and continents).

WaterAid

What is climate change?

Climate change describes a **long-term change** in the **average weather** - such as temperature and rainfall - in a region over a long period of time.

Earth’s climate is constantly changing it has been this way since long before humans came along.

However, scientists have observed unusual changes recently. These unusual changes are concerning as they have impacts around the world.

WaterAid

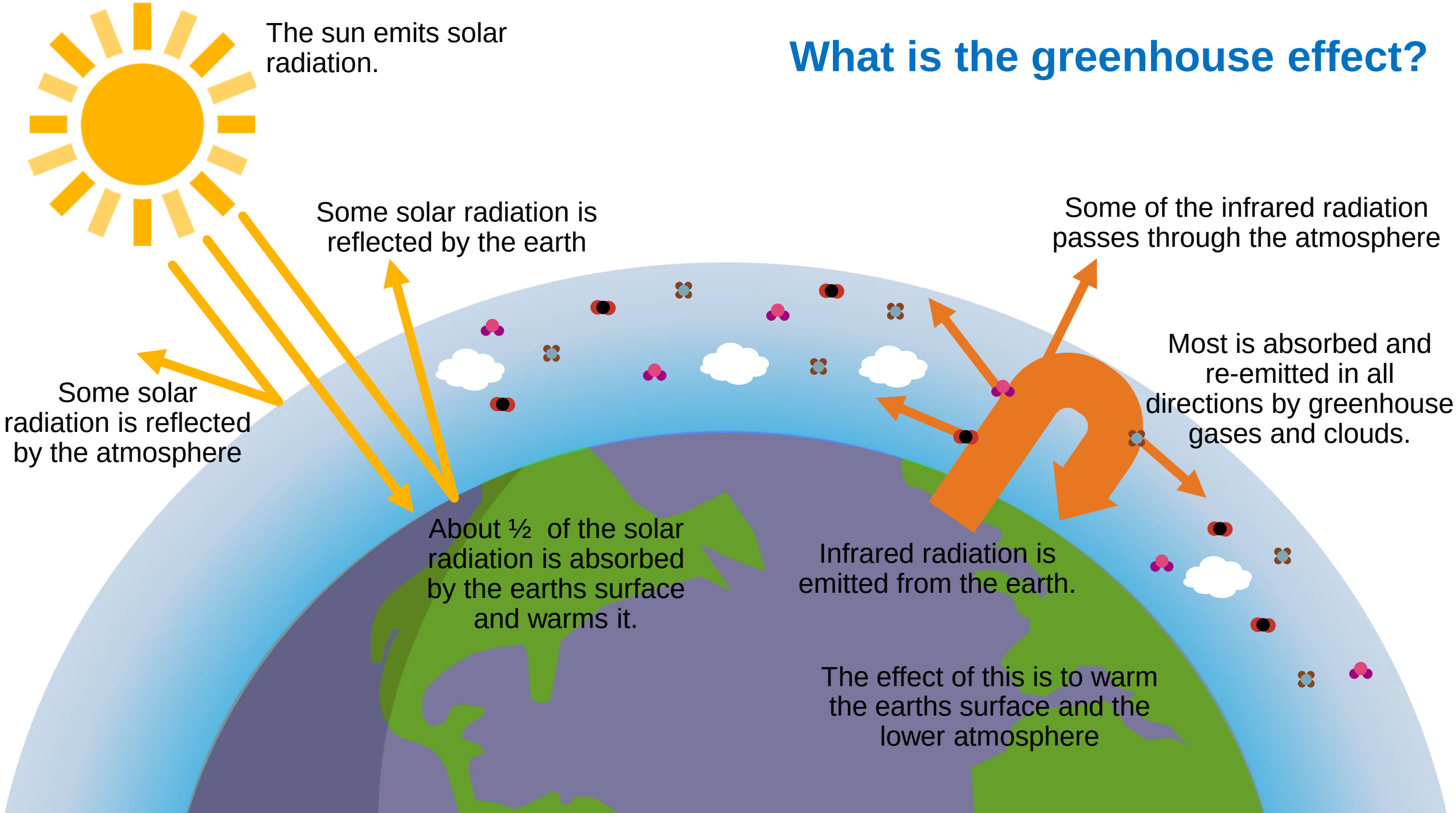
What is the greenhouse effect?

The greenhouse effect is a natural process that allows heat from the sun to be trapped on earth keeping us warm.

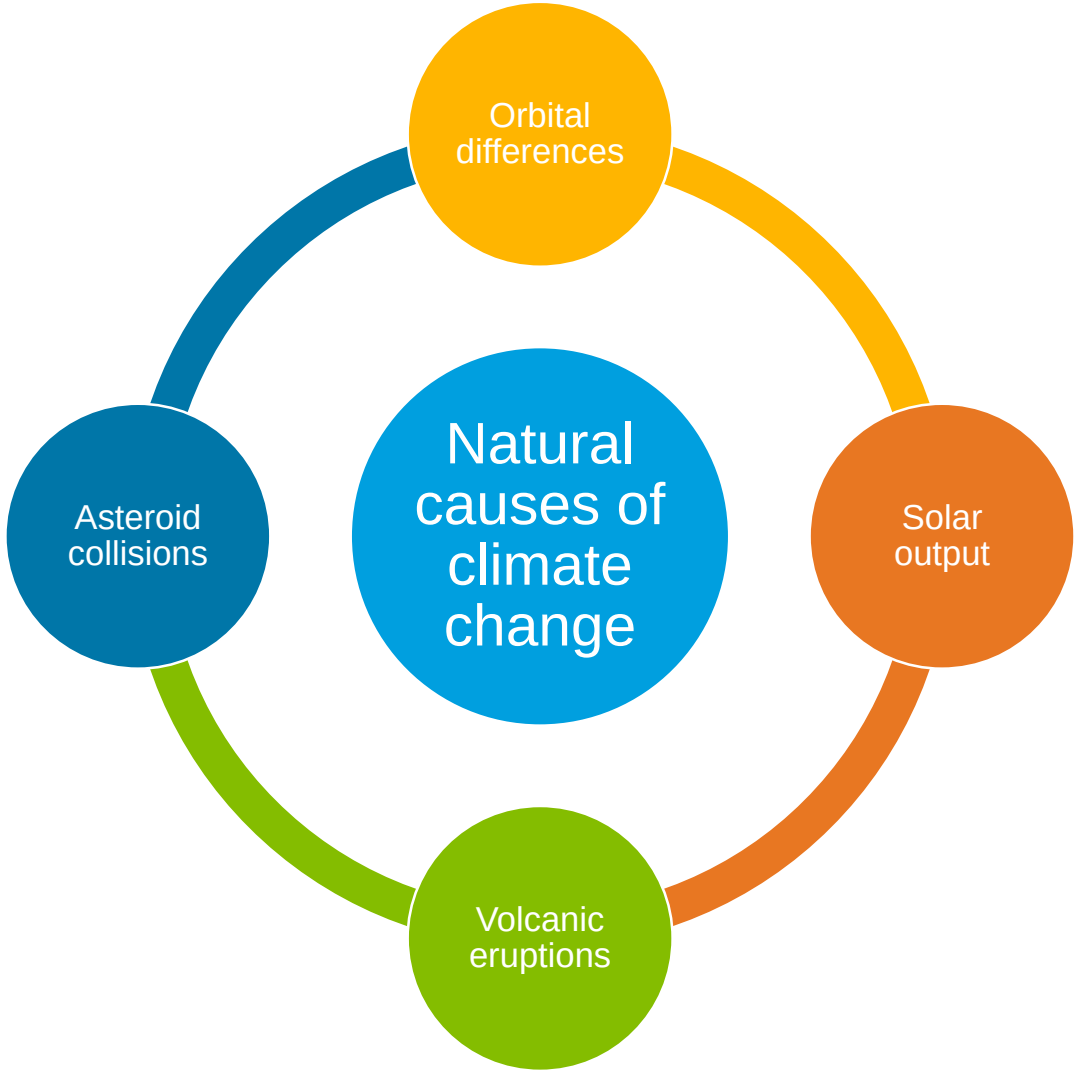
The greenhouse effect acts as a blanket keeping us warm.

WaterAid

What is the greenhouse effect?



Natural causes of climate change



Task: As we go through the natural causes of climate change summarise them on your sheet.

You should:

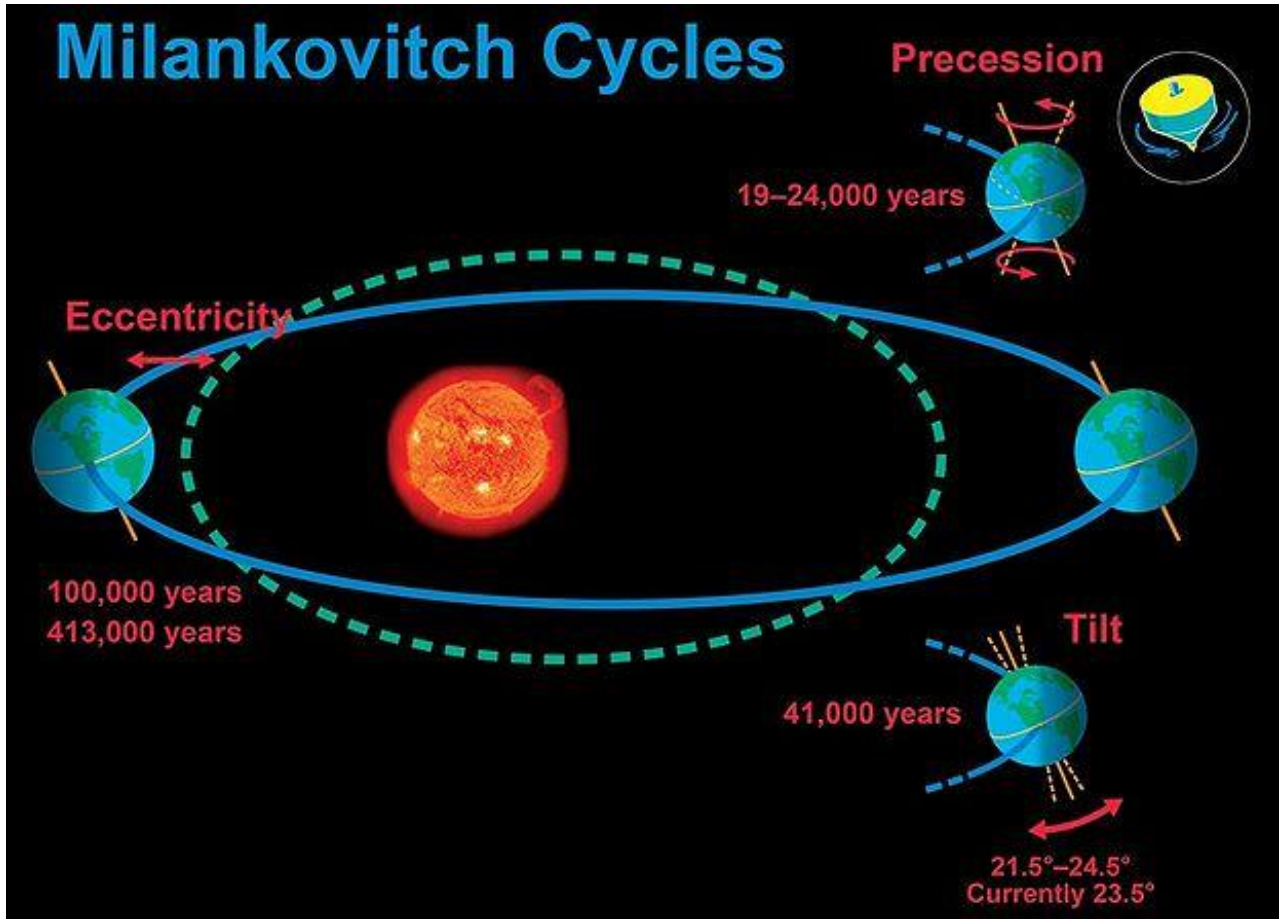
- Draw and annotate a diagram
- Show how often these causes change
- Summarise its impact on earth

WaterAid

Orbital differences

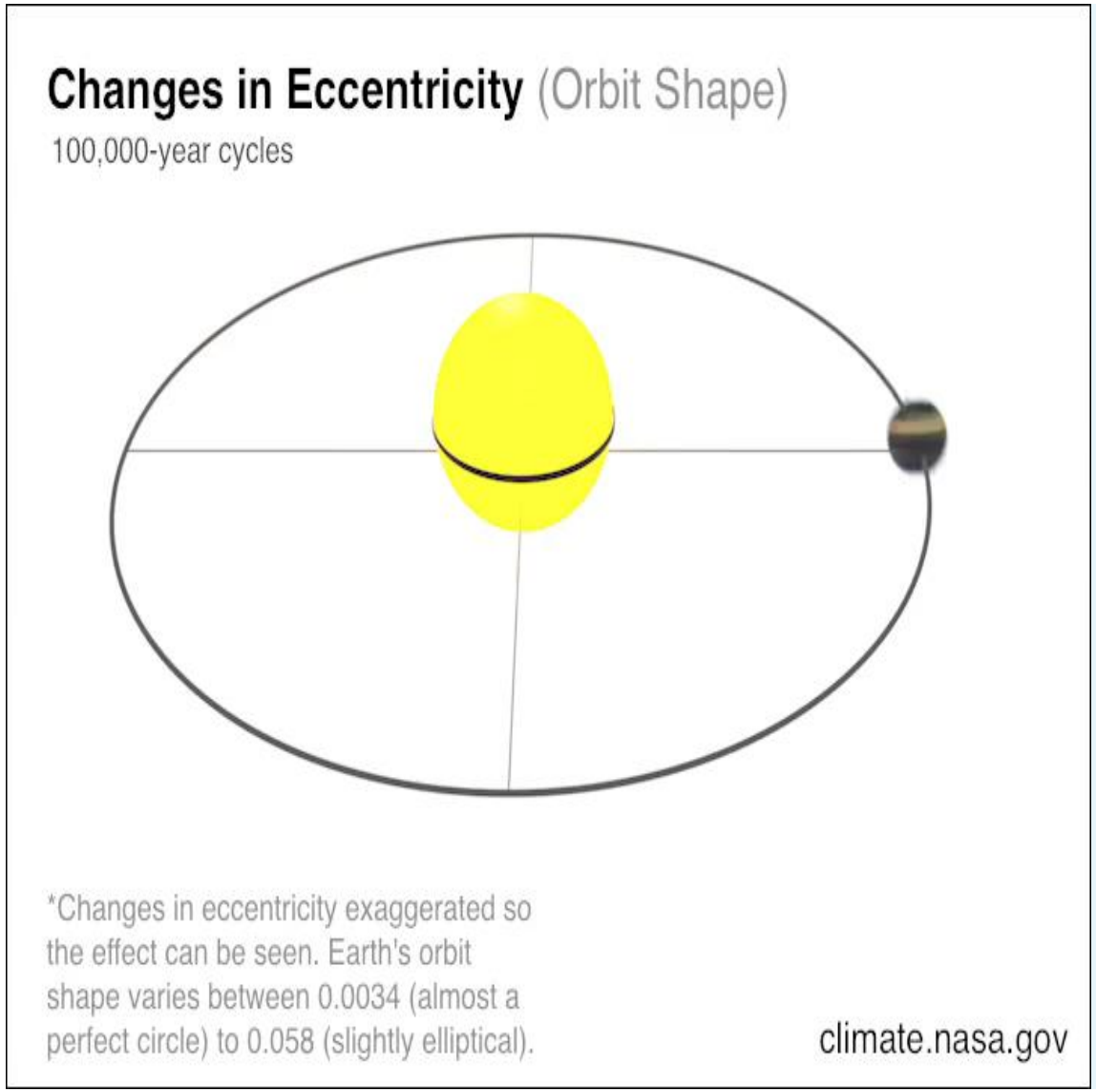
The way that the earth orbits the sun can impact the climate of our earth in three different ways.

Over the span of thousands of years the earths orbit changes slightly causing our climate to change.



WaterAid

The shape of earths orbit changes every 100,000 years from circular to more oval.



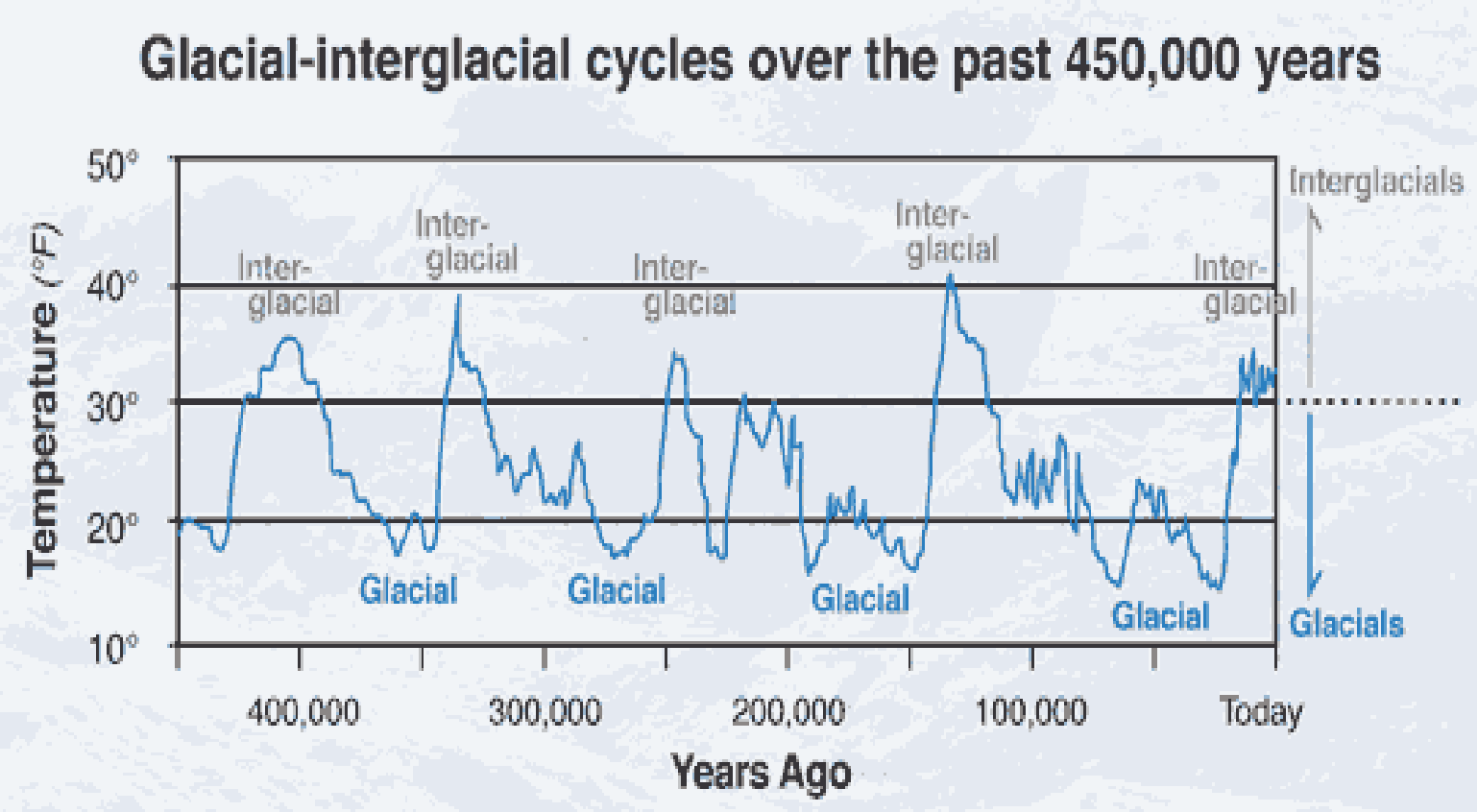
A circular orbit makes earth slightly warmer – **Interglacial Period**

An oval orbit makes earth slightly cooler – **Glacial Period**

The more oval the orbit the colder earth.

WaterAid

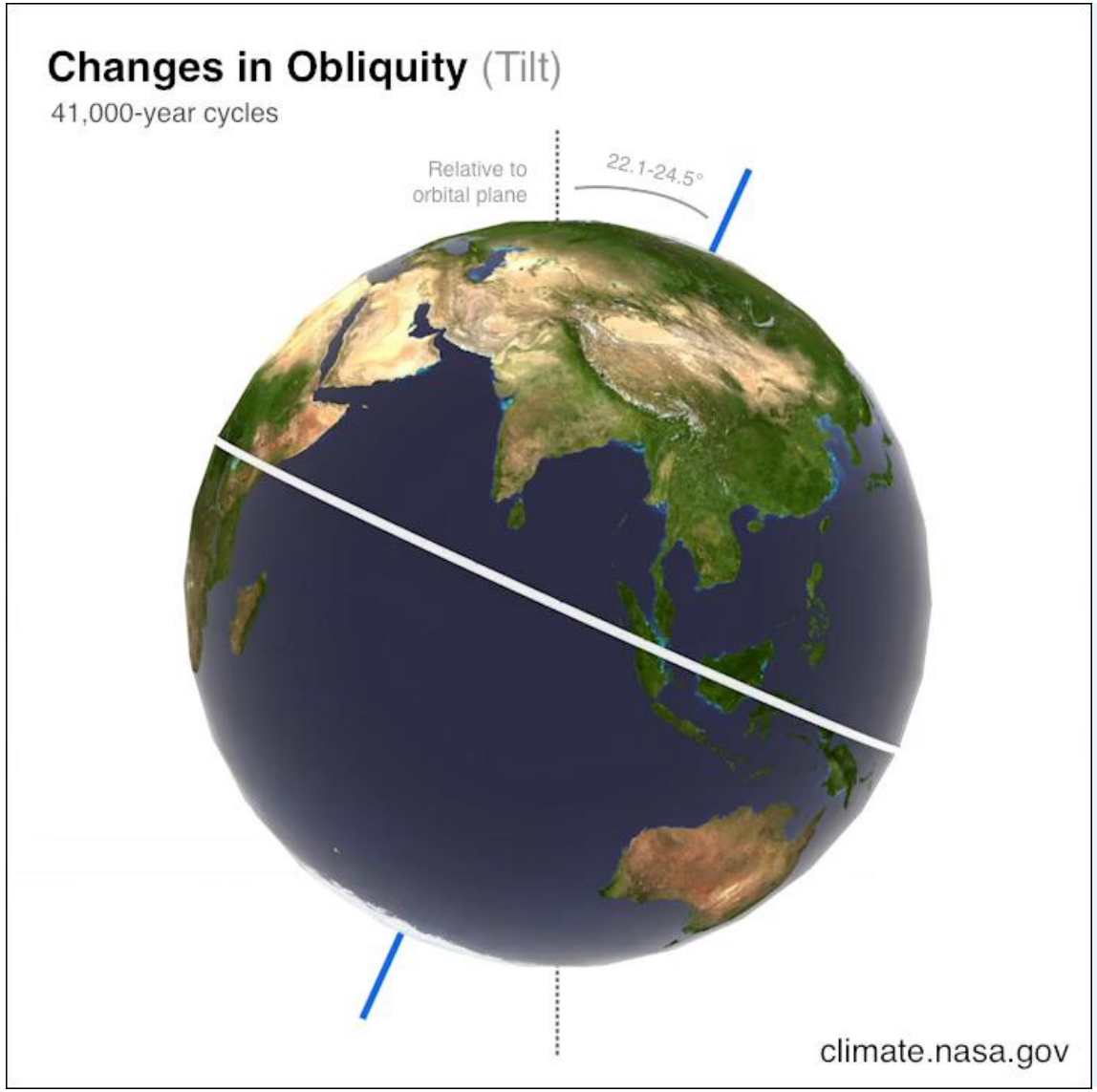
This graph shows the cycle of cold and warm climates



This graph shows how the earth's temperature has varied over the last 450,000 years.

WaterAid

The tilt of the earth changes slightly every 41,000 years.

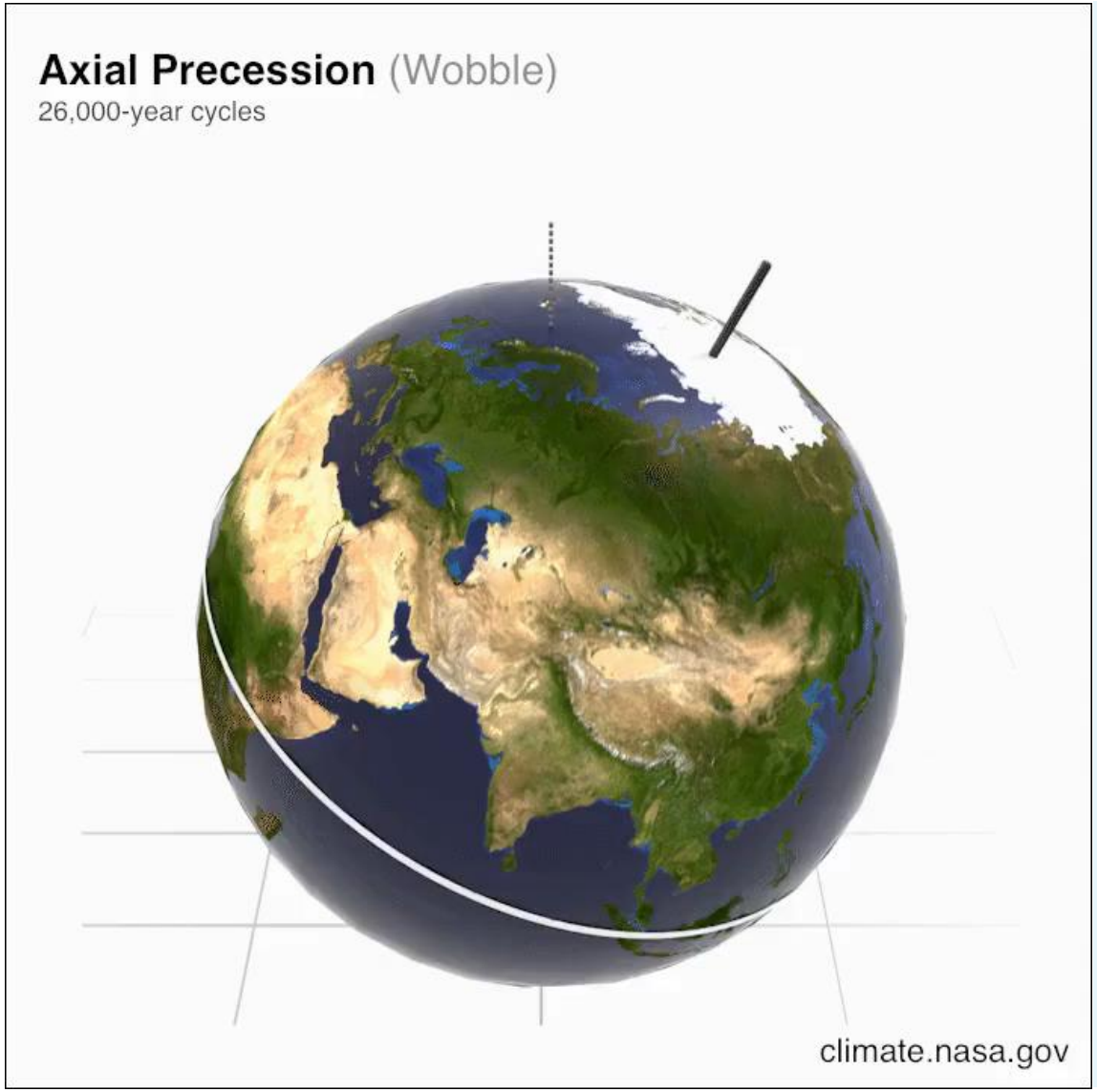


Bigger tilt → bigger influence. Summers are warmer. Winters are colder.

Smaller tilt → smaller influence. Summers are cooler. Winters are milder (warmer).

WaterAid

The wobble of the earth rotation changes every 26,000 years.



Bigger wobble = bigger influence. Summers are warmer. Winters are colder.

Smaller wobble = smaller influence. Summers are cooler. Winters are milder (warmer).

WaterAid

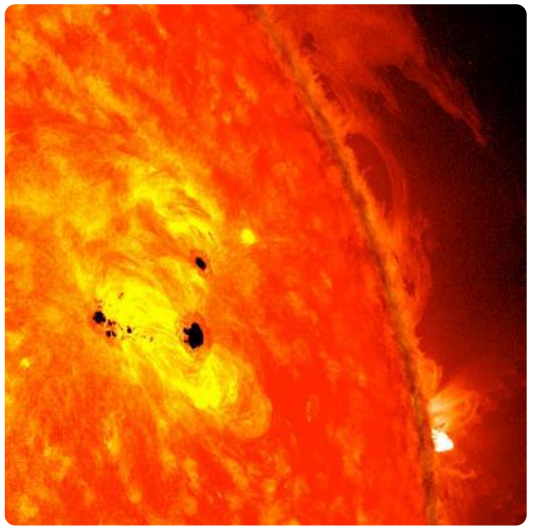
Solar Output

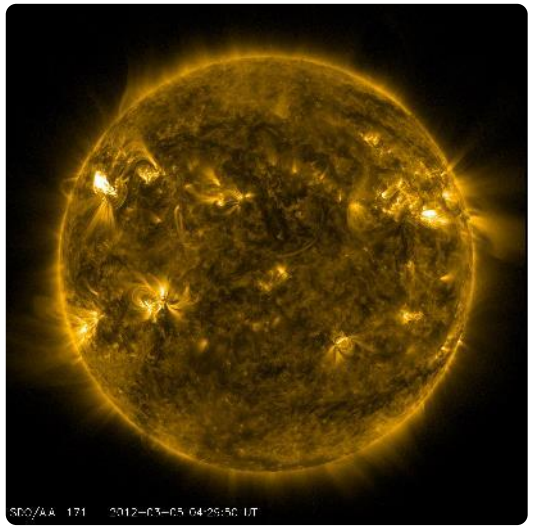
The amount of solar energy output is not always the same.

The sun has an 11 year cycle which increase and reduce the amount of energy it emits.

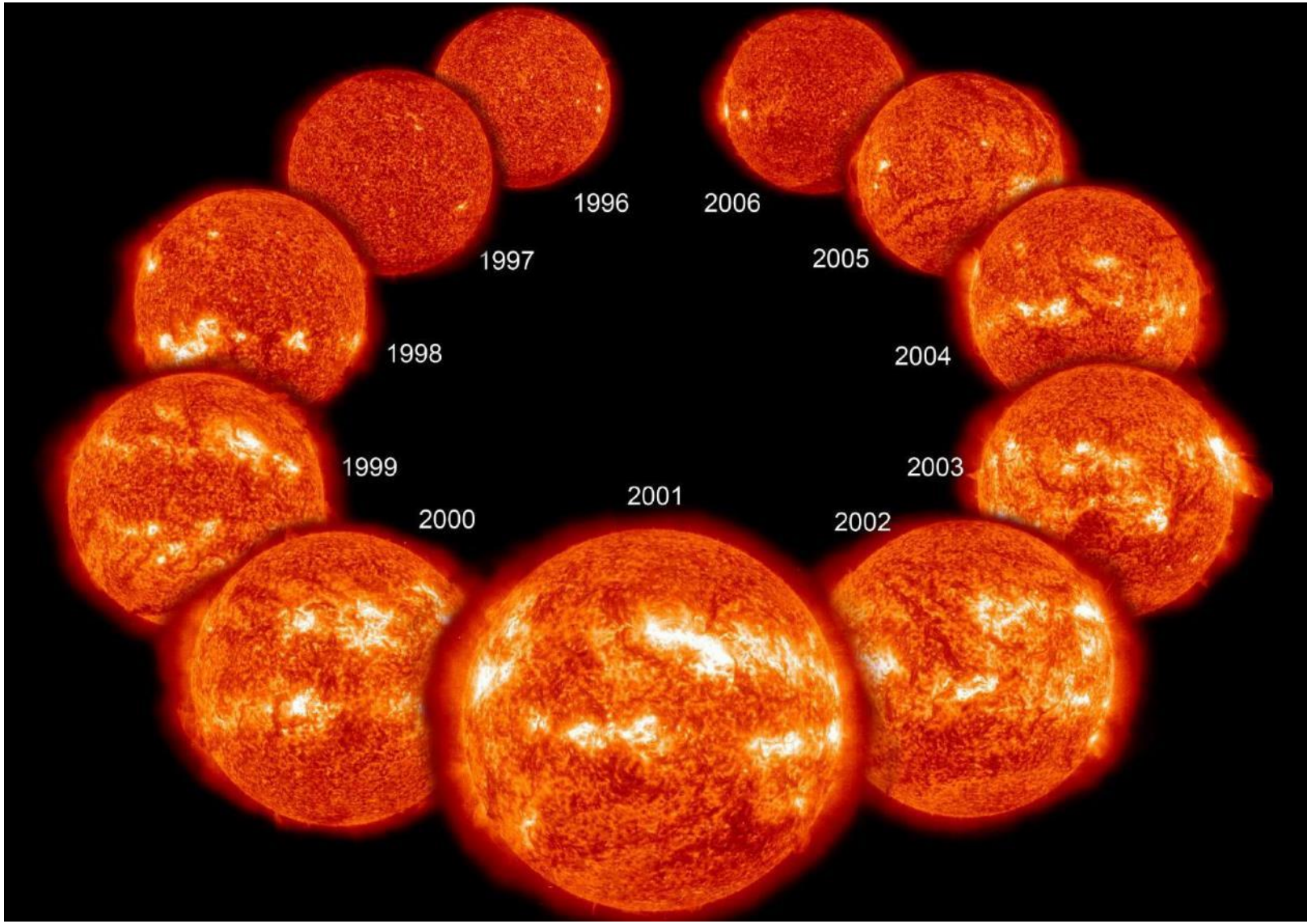
Sunspots also increase the amount of UV rays reaching earth. This means an increase in global temperature.

So the more sunspots, the higher temperatures will be.





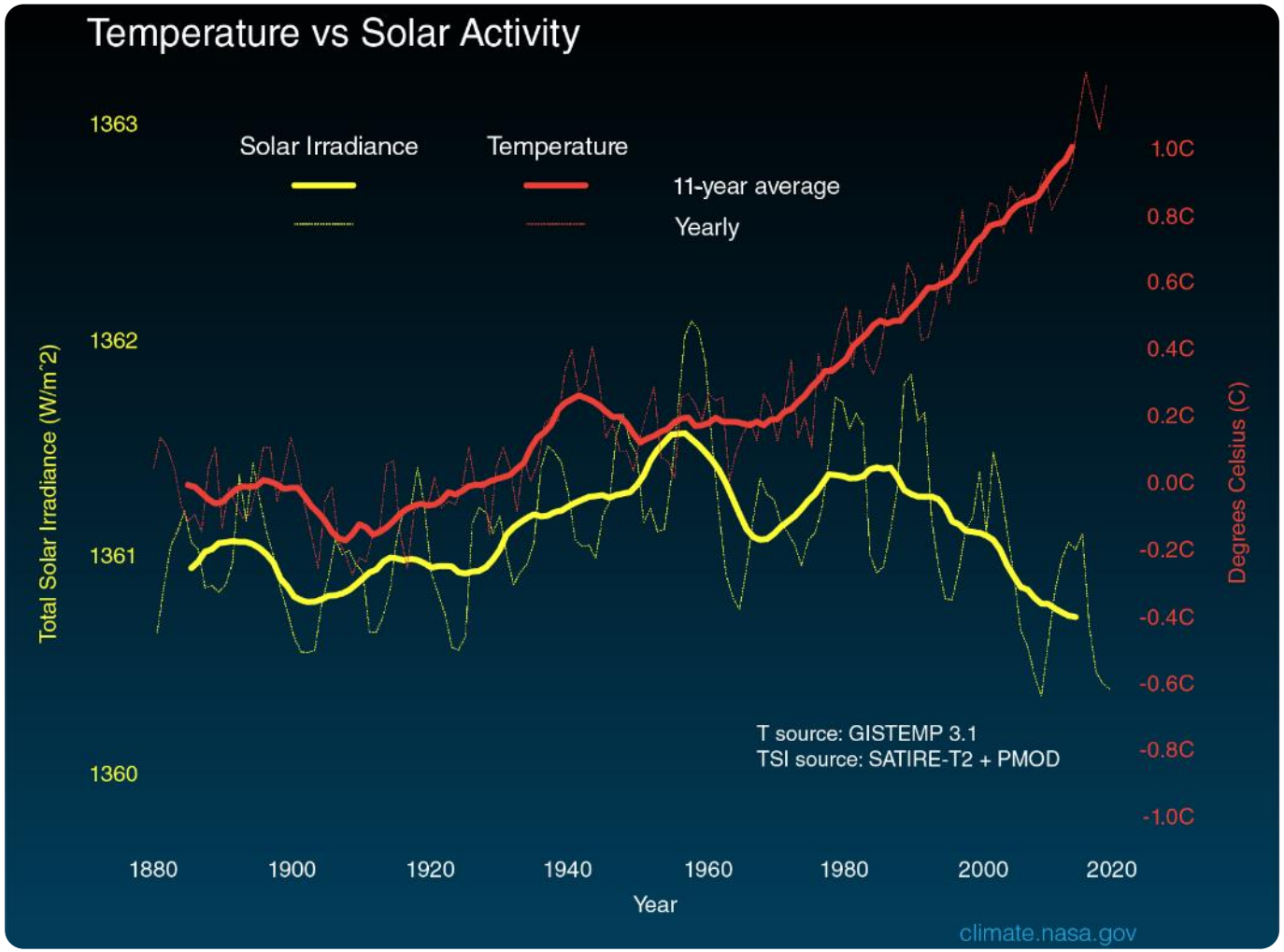
WaterAid



These pictures show the sun's cycle from 1996 – 2006.

WaterAid

Solar Output



This graph shows solar output (yellow line) since 1880 and temperature increase (red line).

The yellow line shows that despite reductions in solar output temperatures continue to increase.

Since 1750, human caused warming is 50 times greater than warming from output over that same time.

WaterAid

Volcanic Eruptions

Gases emitted during eruptions have two different impacts on climate.

Cooling

Gases such as **sulphur dioxide cool the earth** by reflecting radiation back to space. Cooling the earth.

Volcanic eruptions release aerosol particles that **cool** the earth.

Warming

Gases such as **carbon dioxide traps heat** keeping heat in the atmosphere. Heating the earth.

Volcanic eruptions release greenhouse gases that **warm** the earth.

WaterAid

Animals and People

Breathing

- Carbon dioxide is produced naturally when people and animals breathe.
- Plants and trees take in CO_2 to live.

WaterAid/Ernest Randriarimalala

Farting

- Methane is produced from animals as they digest food. Also, from rice fields.
- 7% of all greenhouse gases produced are methane.

WaterAid/Ranita Roy

WaterAid

Answer the following questions

Which of the 6 natural causes of climate change do you believe is the most significant?

Why is it difficult to explain current climate changes using only the natural causes of climate change?

Can you answer your question from the beginning of the lesson yet?

WaterAid

WaterAid