



Erasmus+



## Valuable STEAM lesson plan

Ali TUNÇ, Physics,

### Topic

Global Warming

### The main goal (objective)

- ❖ Understanding the effects of global warming on our planet.

### Didactic goal (objective)

- ❖ Participate in group brainstorming sessions and class discussions related to the impact of the greenhouse effect and global warming.
- ❖ Form definitions of the greenhouse effect based on prior knowledge, class discussion, and viewing diagrams.
- ❖ Hypothesize about the effects of global warming on the climate and the world's populations.

### Real problem or situation that is going to be analysed and discussed

Global warming and climate change affect everything from geopolitics to economies to migration. How do people cause global warming? What can we do to slow global warming down?

### Critical thinking: evoking and motivating students

- ❖ Groups of two students will find relevant words about global warming from a wordsearch. (Attached)
- ❖ A pre-quiz about global warming will be completed by groups of three students. (Attached)

## Team work

Yes

No

## Expected results

- ❖ Increase the awareness about global warming.
- ❖ Learning the actions which can slow down the global warming.
- ❖ Be aware of this planet is everyone's and our every action affects other people's life.

## Integrated things (fields, activities, etc.)

- ❖ Brainstorming
- ❖ Group works

Attachments

1) Wordsearch

# GLOBAL WARMING WORDSEARCH

H	I	G	H	T	E	M	P	E	R	A	T	U	R	E	S
S	D	F	T	E	M	P	T	E	L	O	E	N	E	L	O
E	T	Y	L	U	E	C	I	G	N	I	T	L	E	M	U
N	S	E	L	O	E	N	V	I	R	O	N	M	E	N	T
A	E	E	K	M	O	Z	O	N	E	L	A	Y	E	R	L
S	N	E	N	O	P	D	V	N	N	C	I	R	O	N	I
E	A	E	T	E	M	P	S	M	A	N	I	N	G	D	P
R	C	E	N	R	E	N	R	E	C	Z	T	O	R	N	O
U	I	H	C	L	I	M	A	T	E	D	N	O	M	A	Y
H	R	T	G	V	I	E	N	G	I	C	U	L	N	C	G
R	R	N	V	I	R	O	N	R	E	G	A	E	T	I	R
U	U	N	C	L	I	M	C	L	H	V	I	E	N	R	E
H	H	N	V	I	R	O	N	T	P	E	R	A	T	N	N
S	E	I	C	E	P	S	D	E	T	C	N	I	T	X	E
I	I	G	N	I	I	G	E	N	V	I	E	N	G	N	I
R	I	S	I	N	G	S	E	A	L	E	V	E	L	S	A



FLOODS    DROUGHTS    MELTING ICE  
 HURRICANES    EXTINCTED  
 SPECIES    RISING SEA LEVELS  
 OZONE LAYER    ENERGY  
 HIGHTEMPERATURES  
 CLIMATE    ENVIRONMENT

1. What is Greenhouse Effect?

2. What are the Greenhouse Gases?

3. What is Global Warming?

4. How global warming does affect living things?

5. What can we do?

3) Presentation

WILLKOMMEN

RECEBER      ДОБРО ПОЖАЛОВАТЬ      欢迎      SVEIKI

**HOŞGELDİNİZ**

DR. ALİ TUNÇ  
Physics Teacher

اهلا سهلا

VITAJTE      DOBRODOŠLI      ようこそ      BIENVENIDOS

Sveicināti

BIENVENUTO      BIENVENUE

# GLOBAL WARMING

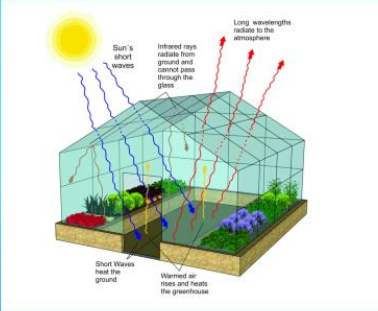
## GREENHOUSE

### What is Global Warming?



<https://www.youtube.com/watch?v=Y3gqoDUtm4>

### HOW DOES GREENHOUSE WORK?



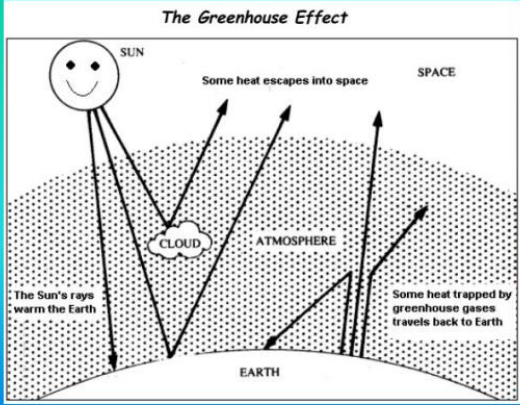
Sun's short waves

Infrared rays radiate from ground and cannot pass through the glass

Long wavelengths radiate to the atmosphere

Short Waves heat the ground

Warmed air rises and heats the greenhouse



**The Greenhouse Effect**

SUN

Some heat escapes into space

SPACE

CLOUD

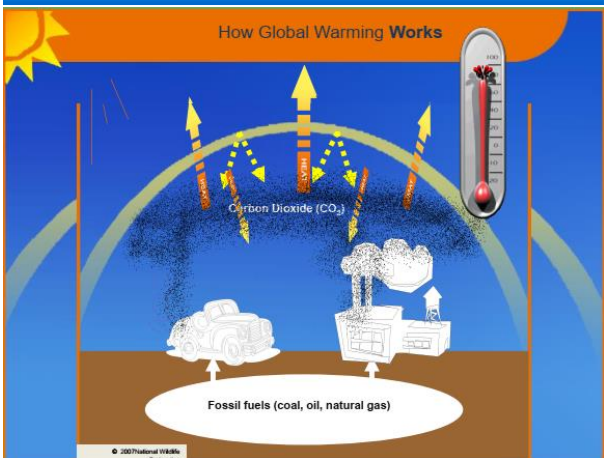
ATMOSPHERE

Some heat trapped by greenhouse gases travels back to Earth

EARTH

The Sun's rays warm the Earth

### How Global Warming Works



Fossil fuels (coal, oil, natural gas)

Carbon Dioxide (CO<sub>2</sub>)

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### Planets and atmospheres

Planet	Atmosphere Description	Average Temperature
Mars	Thin atmosphere (Almost all CO <sub>2</sub> in ground)	- 60°C
Earth	0,03% of CO <sub>2</sub> in the atmosphere	+ 15°C
Venus	Thick atmosphere containing 96% of CO <sub>2</sub>	+ 420°C

GERLID A F I R E S T

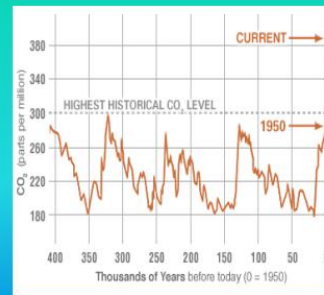
GRAPHIC DESIGN: PAULINE ROUSSELOTT

Source: Cabin J. Hamilton, Views of the solar system, www.planetphotos.com; Bill Arnett, The nine planets, a multimedia tour of the solar system, www.seds.org/bill/9planets.html

## What are the Greenhouse Gases?

Greenhouse gas	Natural sources	Anthropogenic sources
H <sub>2</sub> O (Water, Steam)	evaporation of water from oceans, rivers and lakes	irrigation
CO <sub>2</sub> (Carbon Dioxide)	forest fires, volcanic eruptions, evaporation of water from oceans	burning fossil fuels in power plants and cars, burning forests
CH <sub>4</sub> (Methane)	wetlands, oceans, lakes and rivers, termites	flooded rice fields, farm animals, processing of coal, natural gas and oil, burning biomass
N <sub>2</sub> O (Nitrous Oxide)	forests, oceans, soil and grasslands	burning fossil fuels, manufacture of cement, fertilisers, deforestation (reduction of nitrogen fixation in plants)

CO<sub>2</sub>



Source: NASA Climate, Data from NOAA  
[http://climate.nasa.gov/key\\_indicators#co2](http://climate.nasa.gov/key_indicators#co2)

Shall we remove all the greenhouse gases?  
 (If we could)

[Simulation](#)

Is it Global Warming or Cooling?



What's the difference?

### GLOBAL WARMING

Is the increase of the Earth's average surface temperature due to a build-up of greenhouse gases in the atmosphere.

### CLIMATE CHANGE

Is the long-term changes in climate, including average temperature and precipitation. It recognizes that, although the average surface temperature may increase, the regional or local temperature may decrease or remain constant.

Hurricanes  
 Storms  
 Droughts  
 Deforestation



## Glaciers are melting

So are ice caps on both North and South  
poll. Pictured example: Portage Glacier,  
Alaska

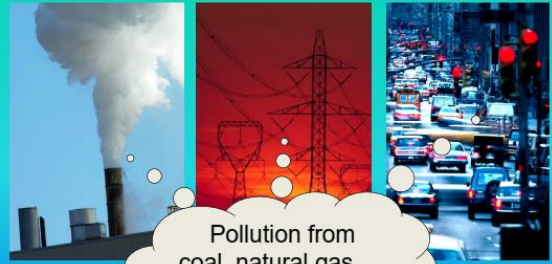


1914



2004

## Why is climate change happening?



Pollution from  
coal, natural gas,  
and oil

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What can we do?