

# Implementation of sustainability and space in VET education



# Planet Change

- Target group: VET students and teachers
- Aim: Raising awareness about sustainability and training 21st century skills in the context of space technology
- Developed: 18 activities to be used in class about sustainability and space



# Planet Change - partners

- Netherlands:
  - Leidse instrumentmakers School
  - NEMO Science Museum
- Norway: Andøya Space
- Spain: Instituto Astrofísica de Canarias
- Portugal: Virtual Campus
- Italy: CRES



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# Activities

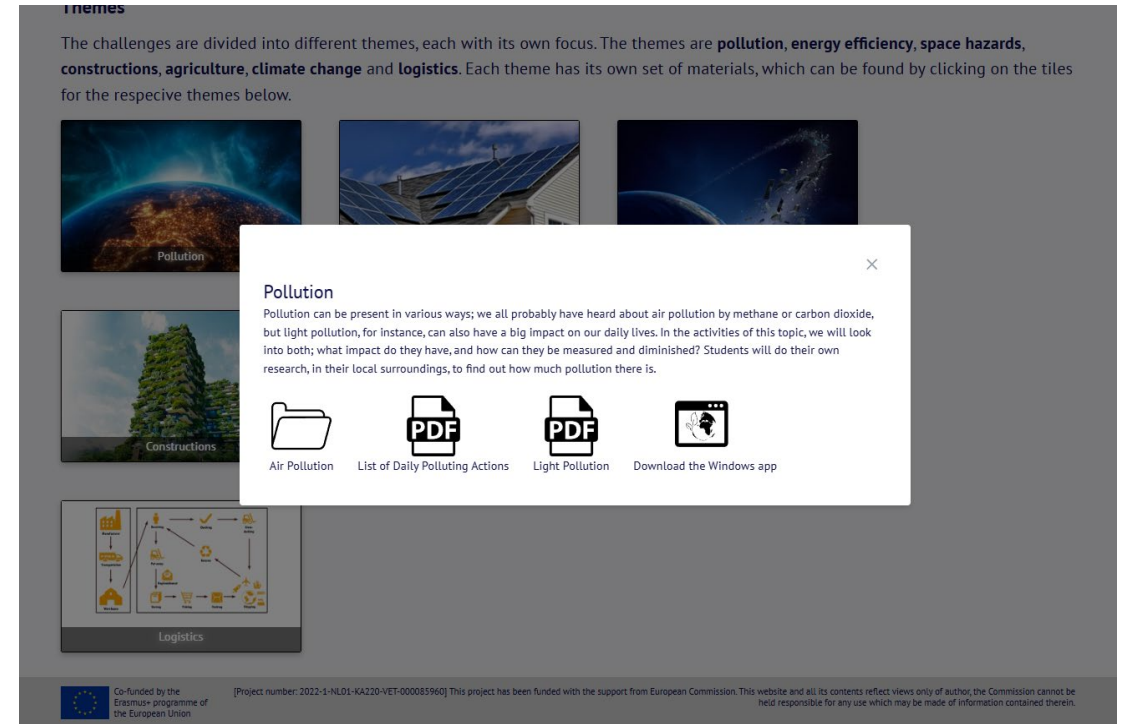
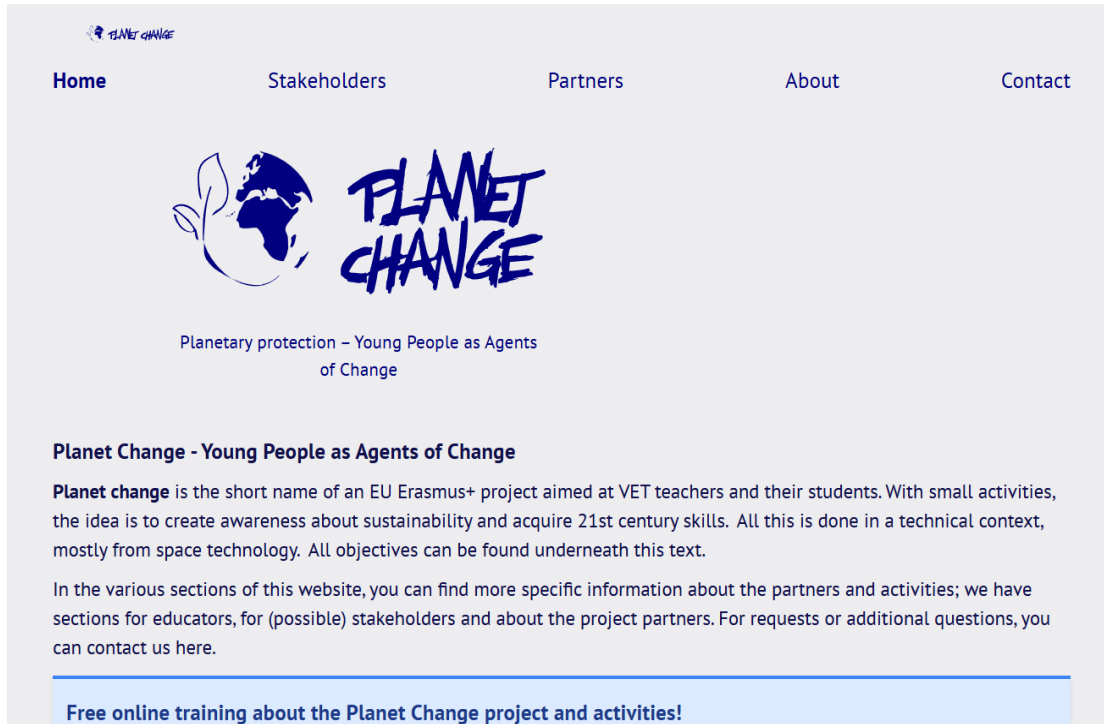
- 18 activities in the context of sustainability and space technology
- The activities use earth observation data
- The students learn how a concept works in space with applications on Earth

## Themes:

- Pollution
- Space hazards
- Agriculture
- Logistics
- Energy efficiency
- Constructions
- Climate change

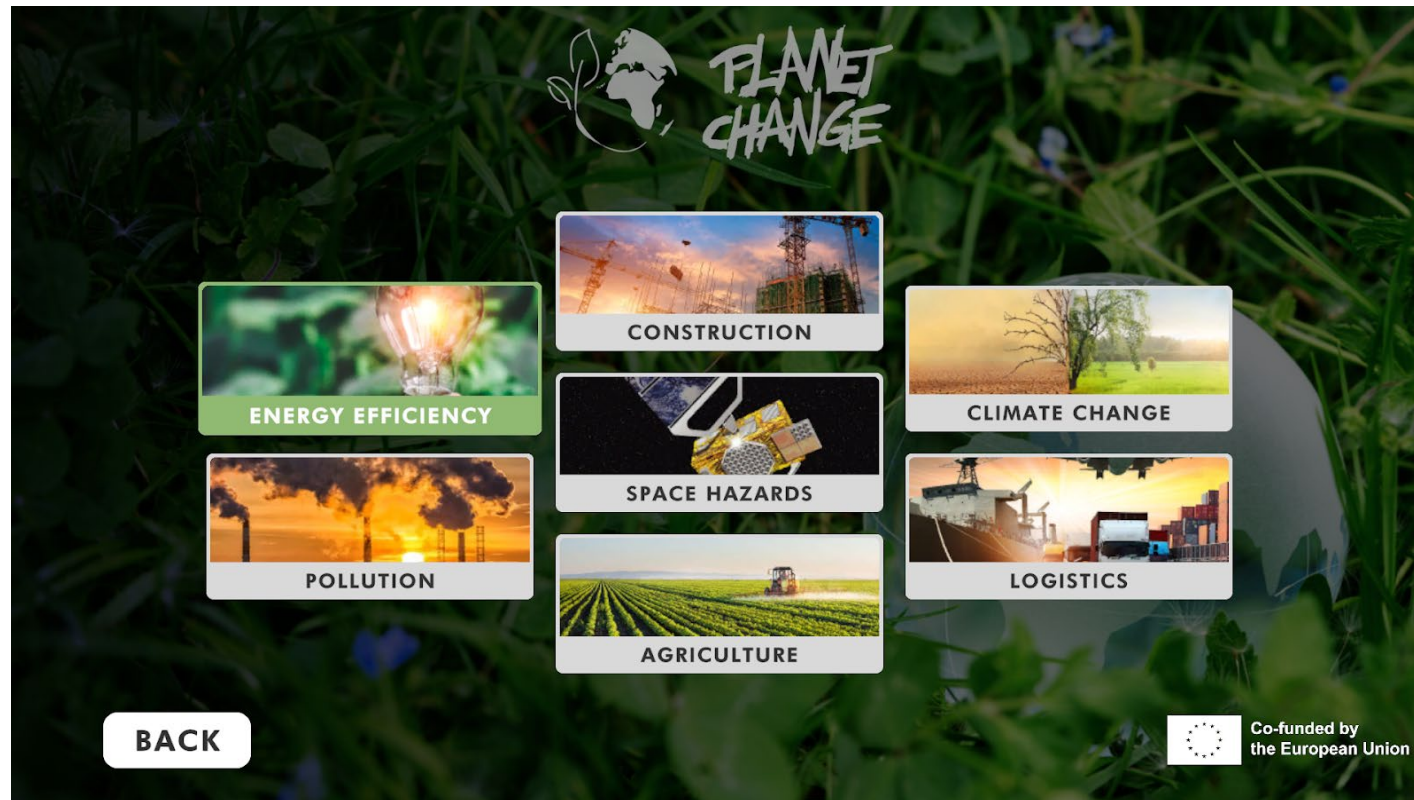


# Website

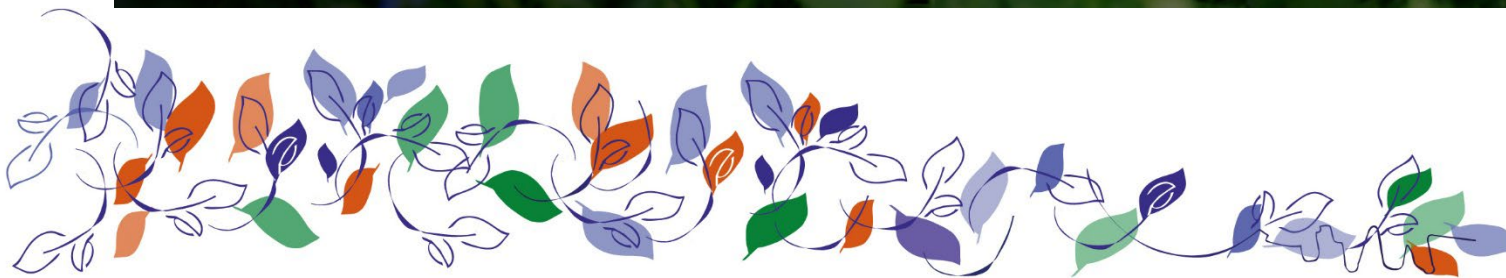
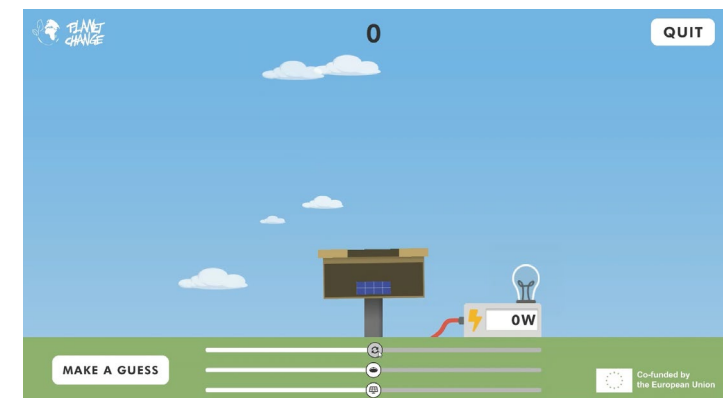
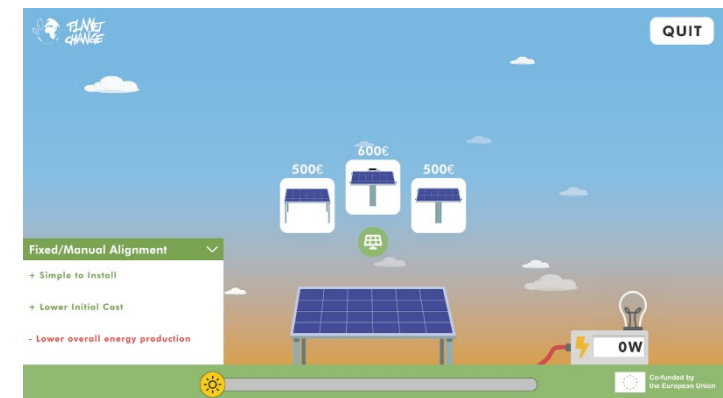
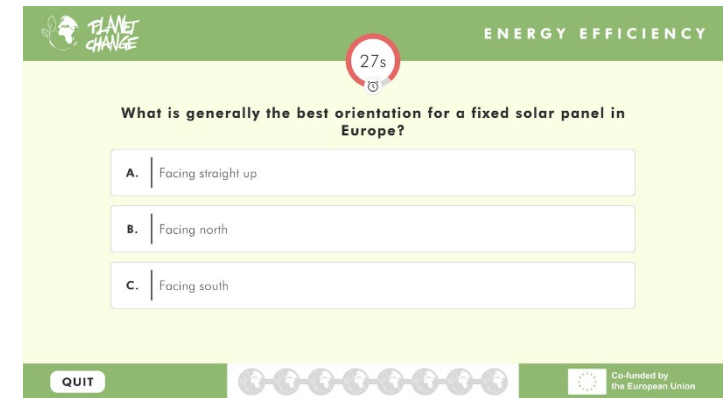
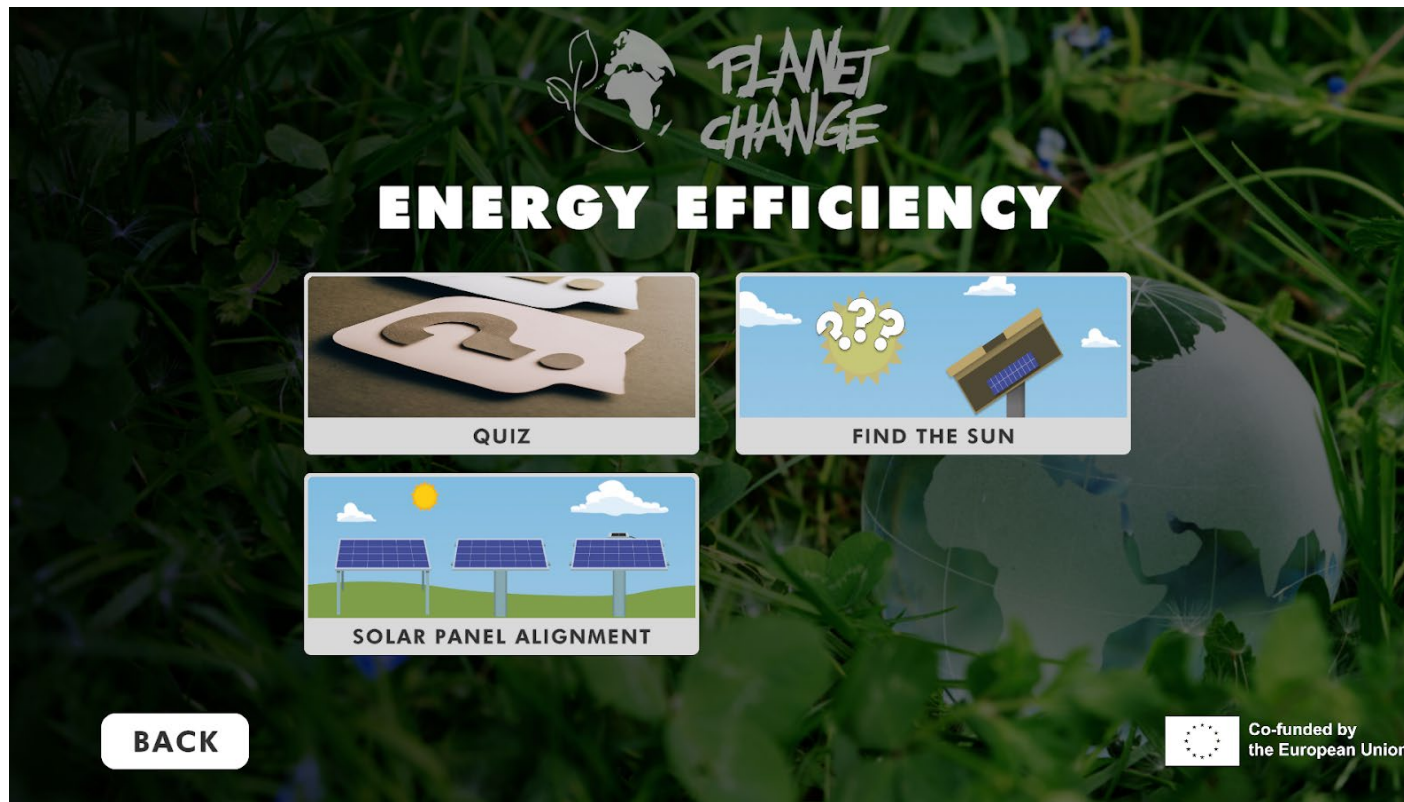




# Multimedia activities



# Multimedia activities



# Today

- Introduction to two activities
  - Air pollution
  - Monitoring the health of the oceans
- Discussion of activities
- Reflection





# Activity Monitor your air pollution



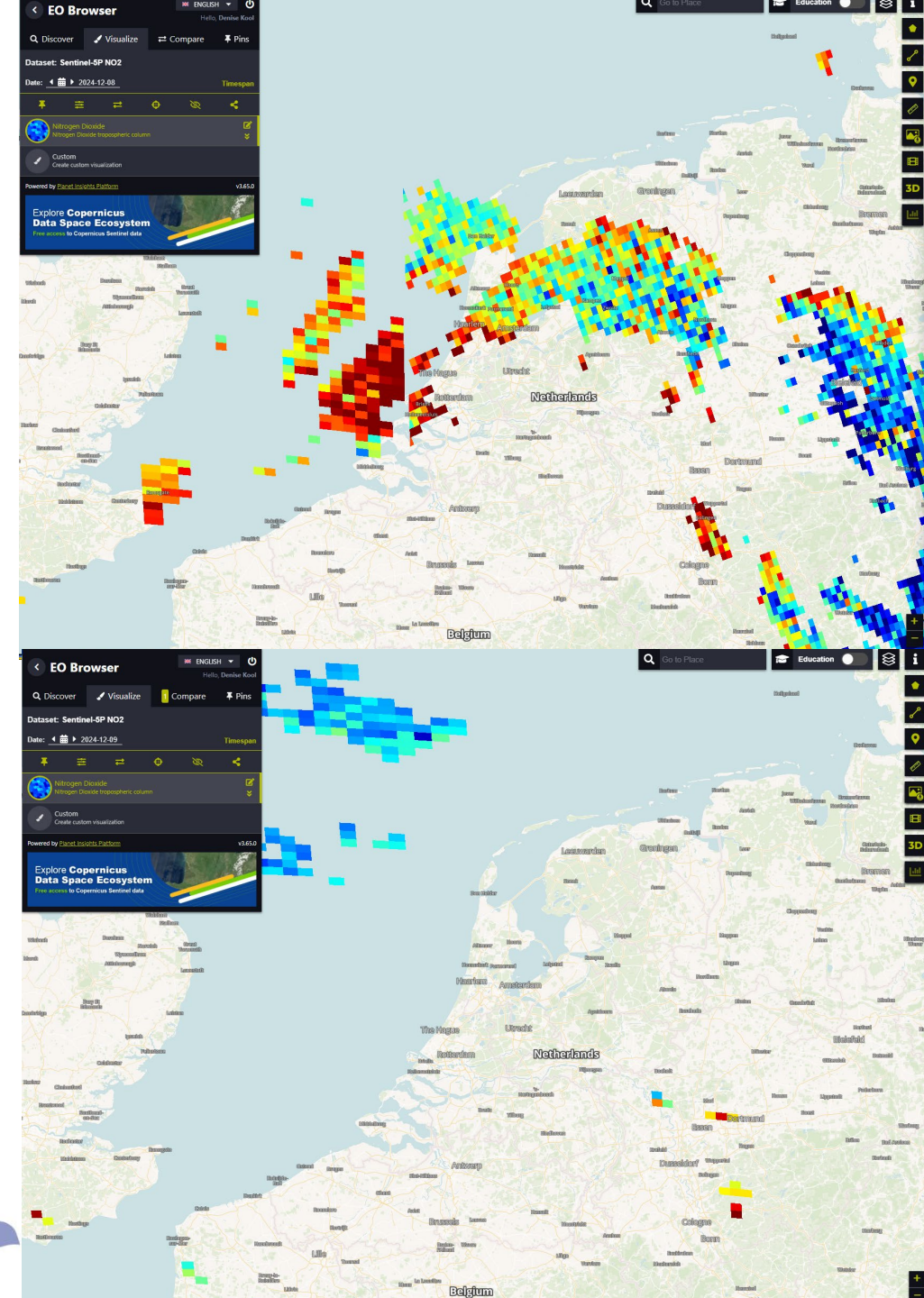
# Monitor your air pollution

1. Introduction
2. Use earth observation data to map and monitor gas emissions
3. Analyse the source of the emissions
4. Map your own contribution to emissions
5. Think of green alternatives
6. Compare with your classmates



# NO<sub>2</sub> in the Netherlands

- 8-12-2024 at 11.00
- 9-12-2024 at 12.30
- What could be the answer to the difference in concentration?



# Categories of pollution sources

1. Gasoline-burning vehicles and engines
2. Electricity from fossil fuels
3. Activities that release particles in the air
4. Products that release particles in the air
5. Consumption and daily habits





# Categories of pollution sources

1. **Gasoline-burning vehicles and engines – NO<sub>2</sub>**
2. Electricity from fossil fuels
3. Activities that release particles in the air
4. Products that release particles in the air
5. Consumption and daily habits



## Table 2. Your life

Now it's your time! Fill in the table (duplicate the table as necessary, depending on the number of days you are going to register)

Date:						
Time	Action	Description of action	Polluting action and source of the pollution	Pollutant points (+3, +2 or +1, depending on the action)	Sustainable alternative points (-3, -2 or -1, depending on the instructions)	Total of points (per line)
Total of points						

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6.00 AM	Taking a short, hot shower	The system used to heat the water is fueled by gas.	Heater: used gas Time: short shower	+3 for the gas	-2 for the time	+1
7.00 AM	Cooked eggs for breakfast	The pan was heated on an electric cooktop. Eggs were transported by car	Cooktop: uses electricity Transport: by car	+3 for the car	-3 for the electric cooktop	+0
8.00 AM	Keep my laptop on without using it	The laptop was kept on without using it, I have also printed a lot of documents	Laptop: uses electricity Printer: uses electricity and paper	+2 for the laptop +2 for the printer		+4
Total of points						+5

# What can I do to reduce my emissions?

- The system used to heat the water is fueled by gas
  - I can look into sustainable alternatives.
  - I can take colder showers
- The pan was heated on an electric cooktop. Eggs were transported by car
  - I can look into other ways to get eggs. Maybe from a local farmer
- The laptop was kept on without using it, I have also printed a lot of documents
  - I can turn off my laptop when I'm not using it
  - I can use digital copies of my documents or print double-sided.





# Activity Monitoring the health of the oceans



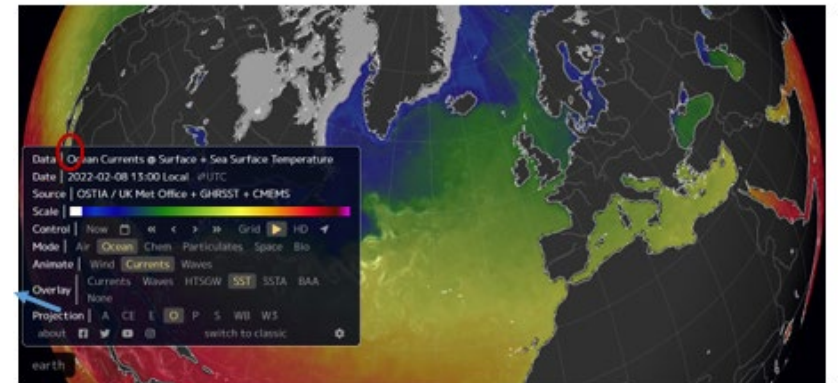
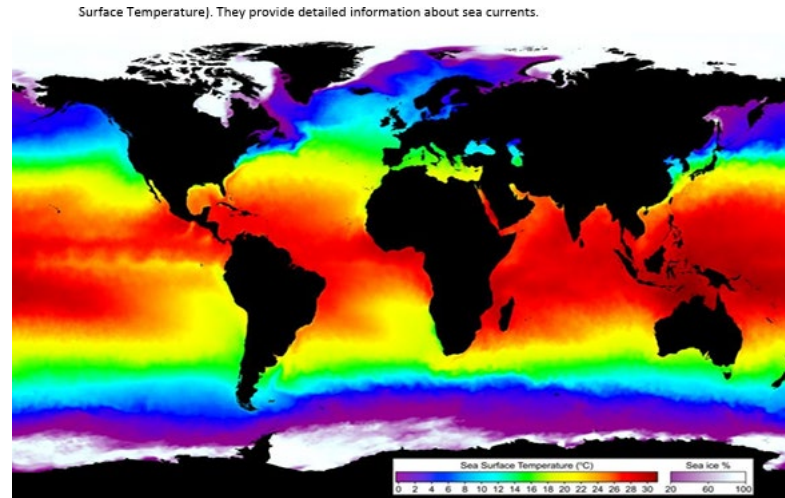
# Activity Monitoring the health of the oceans

- Activity
  - Duration 2 x 45 minutes
  - European qualifications level: 3-4
  - Topic: climate change



# Activity Monitoring the health of the oceans

- Introduction
  - Ocean currents
  - Gulf stream
  - Sea ice
- Part 1 - Preparations
- Part 2 – Feeling the heat
- Part 3 – Sea ice



# Discussing in groups

- What did you like about the activity?
- How can you implement the activity Air pollution/ Monitoring the health of the oceans in school? Discuss positive aspects and challenges
- What is the value of the activity Air pollution/ Monitoring the health of the oceans for (your) students?

