

Climate Change: The Basics

What is climate change and how does it impact us?

Questions I hope to answer...

- 1. What is the difference between the greenhouse effect, climate change and global warming? (Review)
- 1. What is common vocabulary associated with climate change? (Review)
- 1. What proof do we have that climate change is happening? (Intro into Activity 2)
- 1. What are the impacts? (Intro into Activity 3)



The Greenhouse Effect



The Earth is surrounded by a thin layer of gasses we call greenhouse gases. These gases are what make up our atmosphere.

The Greenhouse Effect

Some sunlight that hits the earth is reflected. Some becomes heat.

CO₂ and other gases in the atmosphere trap heat, keeping the earth warm. Mars Thin atmosphere (Almost all CO₂ in ground) Average temperature : - 50°C

Planets and atmospheres

Earth 0,03% of CO₂ in the atmosphere Average temperature : + 15°C

> Venus Thick atmosphere containing 96% of CO₂ Average temperature : + 420°C

The thickness of the atmosphere and the concentration of its gases influence the surface temperature on any planet.

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.

What does "average" mean?

- Climate is the average weather conditions over time.
- Global warming refers to an increase in the Earth's average temperature.



This map shows the five-year average variation of global surface temperatures from 1884 to 2012. Dark blue indicates areas cooler than average. Dark red indicates areas warmer than average.

Source: NASA Climate http://climate.nasa.gov/key_indicators#globalTemp



What proof do we have?

Temperature & CO₂ Data



Source: NASA Goddard Space Flight Center http://data.giss.nasa.gov/gistemp/graphs_v3/

Source: NASA Climate, Data from NOA http://climate.nasa.gov/key_indicators#co2

Glaciers are melting

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





2004

Global Sea Level Rise



Inverse barometer applied and seasonal signals removed.

*estimate for 20th century

Visit: <u>http://climate.nasa.gov/key_indicators</u> for interactive charts on sea level and other key climate change indicators.

Source: NASA Climate http://climate.nasa.gov/key_indicators#seaLevel

Climate Change in the USA

- Temperatures are rising, especially in winter.
- Extreme rainfall and flooding events (24-hr and 7-day) are more frequent.
- Extreme droughts and massive wildfires are more common
- In rural communities, forests and farmland are impacted, making crops and food more scarce and expensive for all.

Source: National Climate Assessment: http://nca2014.globalchange.gov/highlights/regions/rural-communities

Climate change is impacting these plants and animals

We can observe this through phenology, the study of events in nature. (i.e. observing the date of the first snowfall, or arrival of migratory insects and animals. These events are changing.)



What are the impacts?

Agricultural Impacts





https://ag.purdue.edu/indianaclimate/agriculture-report/

Urban Impacts





Credits

Hickey, Laura. (2007). Whats up with global warming? Retrieved, October 10, 2007, from www.climateclassroom.org, www.nwf.org.

The Great Lakes report, as well as other regional reports, can be downloaded from the Union of Concerned Scientist website at: http://www.ucsusa.org/greatlakes/glchallengereport.html