

Summary of Video Series from NASA – a review/ introduction to climate science

NASA Video Series: Climate Change, Lines of Evidence	Climate Science
1. What is Climate 3:37 - General description of climate; good definition - Good introduction to understand climate change, basis of evidence and research. - Discusses basis for this statement: <i>“The overwhelming majority of climate scientists agree that human activity, especially the burning of fossil fuels, are responsible for most of the global warming observed.”</i>	Lesson 1: Weather and Climate
2. Is Earth Warming? 4:37 - Evidence of rising temperature: research from US, UK, Japan, and satellites. - Increase of 1.4 F since 1893, most in the last 40 years. <i>“The picture that emerges from all these data sets is clear and consistent: the Earth is warming.”</i>	
3. Greenhouse Gases 2:02 - Water vapor, carbon dioxide, methane, nitrous oxide. - How the greenhouse effect works. (short)	Lesson 3: Greenhouse Gases
4. Increased Emissions 5:20 - Explanations of carbon cycle (digging up fossil fuels), changes in land uses. - Good description of carbon dioxide exchange between ocean and atmosphere. <i>“The oceans could NOT absorb all the CO₂ in the atmosphere”</i> - Mentions Mauna Loa, and other places that measure atmospheric CO₂ concentrations, increasing since Industrial Revolution, - Other Greenhouse Gases: methane (livestock, landfills); Nitrous Oxide (fertilizer use); Chloro-fluorocarbons – decreasing since being banned. - Measures of how much is being absorbed by ocean – not enough. <i>“...lines of evidence prove conclusively: increase in CO₂ is the result of human activity.”</i>	Lesson 4: Carbon Cycle
5. How much Warming? 5:05 - Forcing Agents: GHG vary in amount of change. - Methane: stays in atmosphere for 10 years. CO₂: stays in atmosphere for centuries - Aerosols have a cooling effect; burning fossil fuels have increased aerosol particles around urban areas. - Agriculture contributes nitrous oxide and methane. - Changes in land use and land cover (deforestation is responsible for 10-20% of increase), and change in reflectivity contribute. <i>“This means each year we add to the climate system more than 50 times the amount of power produced annually by all the power plants in the world combined.”</i> - Water vapor: another positive feedback – reinforcing warming trend. <i>“Even if ... we could hold all human forcing agents at present day values, the earth would continue to warm well beyond the 1.4° observed because of human emissions to date.”</i>	Lesson 5 Climate Forcing and Uncertainty
6. Solar Influences 2:46 How do we know the current warming trend isn't caused by the sun?	
7. Natural Cycles 4:53 - Fluctuations due to El Nino and La Nina - Volcanic Eruptions - Orbital Changes	