

# Unit 08: Atmosphere and Climate Change

Content Area: **Science**  
Course(s): **Generic Course, Environmental Science**  
Time Period: **Marking Period 4**  
Length: **4 weeks**  
Status: **Published**

## Standards

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### [ESS1.B: Earth and the Solar System \(pp. 175-176\)](#)

- [Cyclical changes in the shape of Earth’s orbit around the sun, together with changes in the tilt of the planet’s axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. \(secondary to HS-ESS2-4\)](#)

### [ESS2.A: Earth Materials and Systems \(pp. 179-182\)](#)

- [The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun’s energy output or Earth’s orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden \(e.g., volcanic ash clouds\) to intermediate \(ice ages\) to very long-term tectonic cycles. \(HS-ESS2-4\)](#)

### [ESS2.D: Weather and Climate \(pp. 186-189\)](#)

- [The foundation for Earth’s global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy’s re-radiation into space. \(HS-ESS2-4\) \(SLO 1\)](#)
- [Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. \(HS-ESS2-6\)](#)
- [Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. \(HS-ESS2-6\),\(HS-ESS2-4\)](#)

### [ESS3.D: Global Climate Change \(pp. 196-198\)](#)

[Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. \(HS-ESS3-5\)](#)

SCI.9-12.HS-ESS3-6	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
SCI.9-12.HS-ESS2-2.	Analyze geoscience data to make the claim that one change to Earth’s surface can create feedbacks that cause changes to other Earth systems.
SCI.9-12.HS-ESS3-5	Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated

	future impacts to Earth's systems.
SCI.9-12.HS-ESS3-4	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
SCI.9-12.HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
SCI.9-12.HS-ETS1-1	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
SCI.9-12.HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
SCI.9-12.HS-LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

## Essential Questions

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- Explain how human activities impact the sustainability of the Earth's atmosphere.

## Content / Skills

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Weather and climate are shaped by complex interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions can drive changes that occur over multiple time scales—from days, weeks, and months for weather to years, decades, centuries, and beyond—for climate.