

CSI: South Florida
Scope and Sequencing
Energy – The Driver of Climate

Overview & Concepts

In this module students will learn about energy, the ultimate driver of climate. They will learn about Earth’s unique atmosphere and the role it plays in moderating our climate, along with the balance of incoming energy from the sun and outgoing energy from Earth.

When students complete this module, they will be able to

- Compare the composition of Earth’s early atmosphere to the present composition.
- Compare and contrast the layers of Earth’s atmosphere.
- Explain the relationship between wavelength and frequency of electromagnetic waves.
- Analyze the sun’s electromagnetic spectrum to explain why different percentages of wavelengths reach Earth.
- Use two fundamental laws (Stefan-Boltzmann law and Wien’s law) to explain the correlation between temperature and radiation for the sun and Earth.
- Describe the three ways that heat energy is transferred within Earth’s atmosphere and between its surfaces and the atmosphere.
- Calculate Earth’s global radiation balance by analyzing the amount of incoming solar radiation and outgoing terrestrial radiation.
- Explain why some greenhouse gases are more effective absorbers of infrared radiation.
- Explain the relationship between Earth’s energy budget and the global average temperature of Earth.
- Explain how the greenhouse effect works.

Differentiate between the natural greenhouse effect and an amplified greenhouse effect.

Science Standards (Next Generation Science Standards, Sunshine State Science Standards, and Climate and Energy Literacy Principles)

See website for standards addressed in the module.

Suggested Scope and Sequencing of Module

Module Content	Guided Reading/Note-Taking, and PowerPoint Presentation (through Earth’s Energy Balance)
Investigation Lesson	Earth’s Energy Budget: How Is the Temperature of Earth Controlled?
Module Content	Guided Reading/Note-Taking, and PowerPoint Presentation (The Greenhouse Effect)
Inquiry Lessons	How Strong Is Water Vapor’s Ability to Absorb Heat? How Does the Concentration of Carbon Dioxide Affect The Temperature of a Closed Environment?
Argumentation Practice	Addressing Skeptics’ Claims about Energy: The Driver of Climate
Evaluation	Pre and Post Quiz Questions, Inquiry Lesson, Guided Reading/Note-Taking, and Argumentation Practice