My NASA Data - Interactive Models Explore Earth's Energy Budget Diagram

Grade Band

- 6-8
- 9-12

Time

• 50 minutes

Directions

- 1. Using an internet accessible device, students open the link to the <u>Explore Earth's Energy</u> <u>Budget Diagram Interactive Mode</u>l to begin their exploration of this phenomenon.
- 2. Distribute the Explore Earth's Energy Budget Diagram Interactive Model Student Sheet (optional). Have students navigate on their own through the interactive model to answer the questions and complete the activities on their student sheet.

Earth's Energy Budget

Vocabulary: Earth's Energy Budget

If energy from the Sun is always shining upon the Earth, then how does the Earth manage to balance this energy in a way that allows us to live and survive on Earth?

The answer is that the temperature of Earth is managed by **Earth's Energy Budget**. In the following slides, you will examine the different components of Earth's Energy Budget.

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Take a moment to observe the image of the Earth System and answer the following questions.

1. What are the most notable features of Earth?





Teacher Note

Earth strives to maintain a balance between the overall amount of incoming and outgoing energy at the top of the atmosphere. This is called Earth's energy budget or Earth's radiation budget. Earth receives incoming energy from the Sun. Earth also emits energy back to space. For Earth's temperature to be stable over long periods of time (for the energy budget to be in balance), the amount incoming energy and outgoing energy must be equal. If incoming energy is more than outgoing energy, Earth will warm. If outgoing energy is greater than incoming energy, Earth will cool.

To learn more, visit:

• The Earth's Energy Budget Phenomena page for background information.

Virtual Teachers: Make a copy of the Google Form of your choice so that you may assign it directly from your Google Drive into your Learning Management System (e.g., Google Classroom, Canvas, Schoology, etc.). Do you need help incorporating these Google Forms into your Learning

Management System? If so, read this

Guide to Using Google Forms with My NASA Data.

Teachers who are interested in receiving the answer key, please complete the <u>Teacher Key Request</u> and <u>Verification Form</u>. We verify that requestors are teachers prior to sending access to the answer keys as we've had many students try to pass as teachers to gain access.

NGSS Three Dimensional Learning

NGSS Disciplinary Core Ideas

- ESS2A: Earth Materials and Systems
- ESS3C: Human Impacts on Earth Systems

Crosscutting Concepts

- Systems and System Models
- Stability and Change

Science and Engineering Practices

- Developing and Using Models
- Analyzing and Interpreting Data

Learning Objectives

- Describe the different components and flows of energy of the Earth's Energy Budget diagram.
- Identify imbalances in Earth's Energy Budget.
- Differentiate between reflection and absorption.

Essential Questions

- 1. How does energy flow into and out of the Earth System?
- 2. Why is Earth's Energy Budget out of balance?

Google Docs Interactive Files

Guide to Using Google Forms with My NASA Data

Google Forms Interactive Files

Student Form