GLOBE Earth System Poster "Exploring Connections in Year 2007"

Activity Description

This activity will help you develop an understanding of Earth as a set of closely coupled systems. You will make connections between environmental data to see the interplay among the many processes that take place on varying spatial and chronological scales.

The processes that comprise the global environment are interconnected. Understanding how these processes operate on a global basis is to understand the Earth as a system. Understanding Earth as a system – Earth System Science – requires a qualitative and quantitative exploration of the connections among all parts of the system.

Earth system science focuses on the processes taking place in the atmosphere, oceans, fresh water bodies, ice, soils, and vegetation growing on the land surface. It involves making connections between the soil and atmosphere, plus energy from the Sun, and the gases and particles entering the atmosphere and oceans from space or from the layers of molten and solid rock beneath Earth’s surface. Many of these processes involve life, so Earth system science makes connections between these physical processes and the places on Earth where organisms live.

Activity Goals

This activity will help you to:

* Identify global patterns and connections in environmental data.
* Understand Earth as an integrated system of components and processes.

**Your task**

1. Exploring a Single Map

Study and interpret the card provided to your group. Use the following guiding questions:

* What is the range of values shown on the scale bars on your card?
* Where in the world do you find the highest and lowest values of the data on your map? Where are the extremes? Why are the extremes in these locations and not somewhere else?
* Do you see any patterns? Are they different on different continents? Different over water than over land? How do you explain these patterns?

Be prepared to share with the entire group the information shown on your group card. Use the guiding questions to prepare your report, but also report on other aspects of information not covered by the questions.

1. Exploring Annual Changes in a Measurement

Your group will now be provided with a complete annual set of Earth system cards. Arrange the cards in chronological order, starting with January.

Identify annual cycles for your measurements. Use the following guiding questions:

* What changes do you see through the year? What seasonal changes and annual cycles emerge? What explanations can you suggest for these patterns?
* Pick a location or area. During which months do the extreme highs and lows occur for each measurement? What explanations can you suggest for the timing of those extremes?
* Which regions experience the extreme highs and lows for each measurement? Which regions don’t experience the extremes? Why do you think this is so?
* What differences, if any, do you find between the year’s variations over the ocean versus the year’s variations over the continents?
* Are there regions that remain unchanged over the year? Why do you think this is so?

Be prepared to share with the entire group your discoveries of patterns and interpretations of those patterns.

1. Exploring Relationships Between Two Types of Measurements

Groups should come together in the following pairs:

 Solar Energy and Average Temperature

 Cloud Cover and Precipitation

 Soil Moisture and Vegetation

Put your cards in chronological order for each type of measurement and line the measurement cards next to each other.

Identify the relationships and associations between the measurements. Use the following guiding questions:

* What relationship do you see between solar energy and average temperature? Cloud cover and precipitation? Soil moisture and vegetation?
* Are the relationships proportional or inverse?

Be prepared to share with the entire group the relationships you have identified between the measurements. Share the methods you used to identify these relationships.

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Points for discussion

Relate the following questions to the activity we have just completed.

Which “parts” of the Earth system have to do with Earth’s matter? Which parts have to do with Earth’s energy? Which parts have to do with Earth’s life?

How do the parts work together to create the Earth system as a whole?

Which of the parts can be considered a closed system, which ones can be considered open systems?

What are the parts of each of the smaller systems that you examined in this activity?