

Name _____

Earth Systems

When Earth is photographed from space, we can see that it is made up of parts: land, air, water, and living organisms. All of these parts work together to make **system**. A *system is a set of connected things or parts forming a complex whole*. Earth itself is part of a larger system – the solar system.

Land, air, water, and living organisms form systems as well. We call these systems **spheres**.

- The **geosphere** is the rocky, on-living part of Earth. It is the rocks and soil on the crust and the molten rock below the surface.
- The **atmosphere** is all of the gases or air the surround the plant.
- The **hydrosphere** is the water on Earth – solid (ice), liquid (oceans, rivers, lakes), and gas (water vapor). Frozen water is sometimes referred to as the **cryosphere**.
- All of the living organisms, including humans, on Earth make up the **biosphere**. Things that were built by and for humans are called the **anthrosphere**.

When something occurs that changes a system, it is known as an event. Events may be natural (volcanoes, floods) or caused by humans (pollution.)

Sometimes events have an impact on a system or systems, sometimes system also impact events. This cause and effect between systems and events is called an **interaction**. Systems ca also impact other systems.

In June 2010 flash floods killed at least 20 people near Langley, Arkansas. The floods were caused by heavy rain on the evening of June 10 and the early morning of June 11 in the Ouachita National Forest.

A key factor in the Arkansas flash flood was the geography of the campground. It is surrounded by mountains on either side, so as the rain hit the mountains, it quickly rushed into the valley below, acting as a funnel and pooling the water to one area.

System ← → **Event Interaction: Which system(s) caused this event? Explain your answer.**

Event ← → **System interaction: Which system(s) were affected by this event? Explain your answer.**

The dustbowl was a period of severe dust storms the 1930s. The phenomenon was caused by severe drought combined with poor farming techniques. Grasses in the American prairie were lost, and there was nothing to hold soil in place.

During the drought of the 1930s, without natural anchors to keep the soil in place, it dried, turned to dust, and blew away with the prevailing winds.

System \leftarrow \rightarrow Event Interaction: Which system(s) caused this event? Explain your answer.

Event \leftarrow \rightarrow System interaction: Which system(s) were affected by this event? Explain your answer.

A catastrophic EF5 multiple-vortex tornado struck Joplin, Missouri late in the afternoon of Sunday, May 22, 2011. It was part of a larger late-May tornado outbreak and reached a maximum width of nearly 1.6 km during its path through the southern part of the city.

A tornado is a violently rotating column of air that is in contact with both the surface of the earth and a thunder cloud.

Damage from tornadoes often goes beyond what is readily visible. Liquid fuels and chemicals can leak from ruptured containers and contaminate groundwater. Ruined buildings may contain asbestos. Fires can generate smoke containing soot, dioxins and other pollutants. Household, industrial and medical wastes are strewn about.

Explain how this tornado could have affected all four Earth systems.

Geosphere -

Atmosphere -

Hydrosphere -

Biosphere -