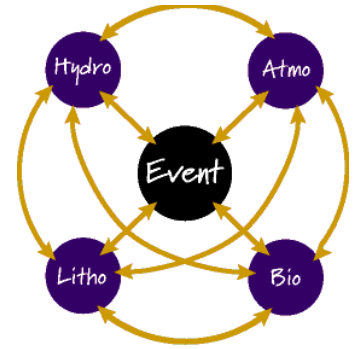


INTERACTIONS OF EARTH'S 4 SPHERES

NAME _____ HR ____ DATE _____

Although the four systems have their unique identities, there is substantial **interaction** between them. Environmental scientists study the effects of events in one sphere on the other spheres. For example, a volcanic eruption in the geosphere may cause profound direct and indirect effects on the hydrosphere, atmosphere and biosphere as follows:



Example 1 (Volcano) On May 18, 1980, Mount Saint Helens, in the state of Washington, erupted. The following are but a few of the many of interactions resulting from a volcanic eruption.

DIRECTIONS—fill in the blank in parenthesis to show which of Earth's spheres was being affected.
GEOSPHERE >> ATMOSPHERE >> HYDROSPHERE >> BIOSPHERE

Volcano effect 1

Volcanoes (an event in the _____) release a large amount of particulate matter (dust) into the atmosphere. These particles serve as nuclei for the formation of water droplets (_____). Rainfall (_____) often increases following an eruption, stimulating plant growth (_____). Particulate matter in the air (_____) falls out, initially smothering plants (_____), but ultimately enriching the soil (_____) and thereby stimulating plant growth (_____).

Volcano effect 2

Volcanoes (events in the _____) may release a substantial amount of hot lava (_____), which causes mountain glaciers (_____) to melt. Mudflows (_____) and flooding may occur downstream from volcanoes and may inundate (totally cover) streamside plant and animal communities (_____).

Volcano effect 3

Volcanoes (events of the _____) release a large amount of carbon dioxide (_____), the raw material for sugar production in plants (_____). This may increase photosynthetic production and eventually increase the amount of biomass, which, after a very long time, forms coal and oil deposits (_____).

Volcano effect 4

Volcanoes (_____) may emit large quantities of sulfur dioxide (_____). When atmospheric sulfur dioxide combines with water (_____), sulfuric and sulfurous acid form. Rain (_____) may bring these acids to the Earth which is called acid rain. The rain acidifies soils (_____), lakes and rivers (_____). Acidic water leaches nutrients from the soil (_____) into the water table (_____), making the soil less fertile for plants (_____), and the subterranean water supply (_____) less potable (drinkable) for humans (_____). Acid rain falling on lakes and streams reduces the pH of the water (_____), which may result in a decrease in phytoplankton and zooplankton growth (_____). If photosynthesis is reduced, atmospheric concentrations of carbon dioxide can build up and stimulate global warming (_____) which may contribute to increased melting of glaciers (_____).