**Student Worksheet: Interactions - Biosphere, Atmosphere, Lithosphere, and Hydrosphere**

**Introduction**

The Earth is made up of four major spheres, which constantly interact with each other to maintain the planet’s systems. Write a brief definition of each of these spheres. This will come from your teacher (as notes), or may be set as research for you to complete.

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| 1. **Biosphere** – |  |
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| 1. **Atmosphere** – |  |
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| 1. **Lithosphere** – |  |
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| 1. **Hydrosphere** - |  |
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The way each sphere functions is very important, but they do not operate in isolation. They are very much interconnected, and their interactions are crucial for life on Earth.

**How the Spheres Interact**

* **Biosphere and Atmosphere:** Plants (biosphere) take in carbon dioxide (atmosphere) for photosynthesis and release oxygen back into the atmosphere. Animals breathe in oxygen from the atmosphere and release carbon dioxide.
* **Biosphere and Lithosphere:** Plants and animals depend on soil (lithosphere) for nutrients. Decomposed organisms return nutrients back into the soil, enhancing its fertility.
* **Biosphere and Hydrosphere:** Living organisms need water (hydrosphere) to survive. Plants absorb water through their roots, and animals drink water from lakes, rivers, and oceans.
* **Atmosphere and Lithosphere:** Weathering of rocks in the lithosphere can be caused by atmospheric conditions such as rain and wind. Volcanic eruptions from the lithosphere can release gases into the atmosphere.
* **Atmosphere and Hydrosphere:** Water from the hydrosphere evaporates and enters the atmosphere as water vapor, which later forms clouds and precipitation, returning water back to the hydrosphere.
* **Lithosphere and Hydrosphere:** The movement of water (hydrosphere) erodes rocks and shapes landscapes in the lithosphere. Rivers carve valleys, and ocean waves shape coastlines.

**Importance of These Interactions**

These interactions drive essential processes, such as the water cycle, carbon cycle, and nutrient cycles, which support life and regulate Earth’s climate. For example, the carbon cycle involves the exchange of carbon among the atmosphere, hydrosphere, biosphere, and lithosphere, which regulates climate by controlling greenhouse gas levels.

**Questions:**

**Multiple Choice Questions**

1. Which of the following best describes the biosphere?

a) The layer of gases around the Earth  
b) All living organisms on Earth  
c) The Earth’s solid outer shell  
d) All the water on Earth

1. How does the hydrosphere interact with the atmosphere?

a) By providing gases for photosynthesis  
b) By eroding rocks and soil  
c) By evaporating water into the air  
d) By decomposing organic matter

1. Which process shows interaction between the biosphere and the atmosphere?

a) Volcanic eruptions  
b) Animals breathing in oxygen  
c) Rain falling on rocks  
d) Ocean waves eroding cliffs

1. What role does the lithosphere play in supporting the biosphere?

a) It provides oxygen for living organisms.  
b) It offers gases like carbon dioxide.  
c) It supplies nutrients and soil for plants.  
d) It stores and cycles water.

1. The carbon cycle involves interactions between which spheres?

a) Atmosphere, biosphere, hydrosphere, and lithosphere  
b) Atmosphere and hydrosphere only  
c) Lithosphere and biosphere only  
d) Hydrosphere and biosphere only

**Short Answer Questions**

1. Describe one way the biosphere interacts with the lithosphere.

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1. How does the hydrosphere contribute to the formation of weather patterns in the atmosphere?

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1. Explain the role of the lithosphere in the water cycle.

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1. How do volcanic eruptions illustrate the interaction between the lithosphere and atmosphere?

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1. What is one example of how humans, as part of the biosphere, impact the atmosphere?

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