Name_____

Modeling Interactions in Earth Systems

Purpose: To investigate the interactions in Earth Systems

Background Information: Earth is a complex system. It can be represented by interacting sub-systems or "spheres." These spheres are the atmosphere, hydrosphere, biosphere and geosphere.

Changes that take place in a system are called **events**. Events can occur naturally, such as an earthquake or a hurricane, or they can be caused by humans, such as oil spill or air pollution. An event can cause changes to occur in one or more of the spheres, and/or an event can be the effect of changes in one or more of Earth's four spheres. This two-way cause and effect relationship between an event and a sphere is called an **interaction**. Interactions also occur among the spheres; for example, a change in the atmosphere can cause a change in the hydrosphere, and vice versa. (http://www.cotf.edu/ete/ess/essmain.html)

Question: What happens when there is an event in one of the Earth's systems?

Prediction: _____

_____

Materials: Jenga game with colored blocks, Die

Procedure:

1. Set up the Jenga game. Make sure to mix up the colors and set the tower on levels of three blocks. This represents your world or planet. This is World 1.
2. Roll the die. Use the information below to determine the impact and interactions events may have on the planet.
    - If you roll:
        - 1 or 6 – no event occurs; do not remove a block
            - Record "no event" in the system & event columns
            - Record an example of what can be done to maintain the planet
        - 2 an event occurs in the **hydrosphere**; remove a **blue** block
        - ***Set the block aside, do not put it back on the tower***
            - Record "hydrosphere" in the *system* column
            - Record an example of an event in the hydrosphere in the *event* column
            - Record the impact the event has on that system in the *impact* column
            - Record an interaction that system may have on the event or on another system in the *interaction* column
        - Repeat the above
            - Rolling a 3 → an event occurs in the **atmosphere**; remove a **red** block
            - Rolling a 4 → an event occurs in the **biosphere**; remove a **green** block
            - Rolling a 5 → an event occurs in the **geosphere**; remove a **brown** block
3. Take turns rolling the die and removing blocks until the tower falls.
4. Rebuild the tower (World 2), and begin again.

Data:

World 1

Earth System Impacts & Interactions				
Trial	**System**	**Event**	**Impact (What did the event do?)**	**Interaction (What other system was impacted by the event)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

World 2

Earth System Impacts & Interactions				
Trial	**System**	**Event**	**Impact (What did the event do?)**	**Interaction (What other system was impacted by the event)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

World 3

Earth System Impacts & Interactions				
Trial	**System**	**Event**	**Impact (What did the event do?)**	**Interaction (What other system was impacted by the event)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

Questions and Conclusions

1. In this model, what does the tower of blocks represent?

_____

2. What does each color represent?

_____

3. What does removing a block represent?

_____

4. What does the tower falling represent?

_____

For World 1 - How many blocks did you have to remove? What can you **infer** about the Earth and how it reacts to change?

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_____

_____

If you had more than one world, were the results the same for both? How does this model changes on Earth?

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Predict what would happen if one of the major systems or spheres was permanently removed?

How would the earth be different?

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_____

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Adapted from - http://www.monroecti.org/cms/lib07/PA03000492/Centricity/Domain/37/Earth%20jenga.pdf