Name:

**Ecological Pyramids Virtual Lab activity**

<http://glencoe.mcgraw-hill.com/sites/dl/free/0078802849/383926/BL_02.html>

At the top is a drop down box. Choose an ecosystem. Read the directions on the left side of the screen. Place the organisms in the correct trophic levels and fill in the information for the Data for Pyramid of Energy chart and the Data for Pyramid of Numbers chart below for the ecosystem you chose. Choose another ecosystem and repeat. **You only have to complete the pyramids for** **2 different ecosystems**. Then complete the rest of the handout and the questions below. I have completed the Freshwater Lake ecosystem for you as an example. DO NOT choose the Freshwater Lake ecosystem as one of yours.

# Data for Pyramid of Energy

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ecosystem | Producers (amount of energy) | 1st Order Heterotrophs (amount of energy) | 2nd Order Heterotrophs (amount of energy) | 3rd Order Heterotrophs (amount of energy) |
| Deciduous Forest |  |  |  |  |
| Hot Desert |  |  |  |  |
| Grassland |  |  |  |  |
| Antarctic Ocean  Shore |  |  |  |  |
| Freshwater Lake | **7,500** | **744** | **81** | **8** |

Now you can ask yourself, “how well does the energy transfer from one trophic level to the next?” What you want to know is how much energy is left over from one trophic level to the next. To do this you divide the energy at the higher trophic level by the energy at the lower trophic level. This gives you a ratio that you can use for comparison, write your answer as a decimal. Complete this for both of your ecosystems.

# EXAMPLE

|  |  |  |
| --- | --- | --- |
| 1st Order Heterotrophs (amount of energy) Producers (amount of energy) | **=** 744 units of energy 7,500 units of energy | **= 0.992** |

|  |  |  |  |
| --- | --- | --- | --- |
| Ecosystem | 1st Order Heterotrophs (amount of energy)  Producers (amount of energy) | 2nd Order Heterotrophs (amount of energy)  1st Order Heterotrophs (amount of energy) | 3rd Order Heterotrophs (amount of energy)  2nd Order Heterotrophs (amount of energy) |
| 1. **Freshwater Lake** | **744/7500=.992** | **81/744=.109** | **8/81=.099** |
| 2. |  |  |  |
| 3. |  |  |  |

If you round-off your numbers above which of the following decimal numbers most closely matches ALL your numbers?

A. 0.23 B. 0.10 C. 0.30 D. 0.01 (to get a percentage, multiply your decimal by 100)  
This exercise shows you that \_\_\_\_\_\_\_% of energy from the lower level is available to the next level up. With this information complete the flow chart below that shows how much energy will be found at each level for the generalized ecosystem. (one has been done for you).

**Herbivores (1st consumers)**

units of energy

**Omnivores (2nd consumers)**

units of energy

**Carnivores (3rd consumers)**

units of energy

**Producers**

units of energy

**1000**

**Top Carnivore (4th Consumers)   
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** units of energy

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Data for Pyramid of Numbers** | | | | |
| Ecosystem | Producers  (# of Individuals) | 1st Order Heterotrophs  (# of Individuals) | 2nd Order Heterotrophs  (# of Individuals) | 3rd Order Heterotrophs  (# of Individuals) |
| Deciduous Forest |  |  |  |  |
| Hot Desert |  |  |  |  |
| Grassland |  |  |  |  |
| Antarctic Ocean Shore |  |  |  |  |
| **Freshwater Lake** | **123,000** | **2,294** | **55** | **2** |

Does the population size increase or decrease at higher trophic levels in the pyramid of numbers for all of your ecosystems? Explain your answer.

What might happen to an ecological pyramid of numbers in a forest ecosystem if most of the deer were killed due to hunting by people and disease?

What would happen to an ecosystem if the decomposers disappeared?

Could there be a food chain without herbivores and carnivores?