Ecological Pyramids Virtual Lab Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Each level of production and consumption in a food web is a trophic level. Autotrophs make up the first trophic level, herbivores make up the second, things that eat the herbivores are in the third level, and things that eat other carnivores are in the fourth level. Place the organisms in the correct trophic levels to complete the pyramids for 2 different ecosystems; make sure to check your answers! After you have correctly placed all the organisms fill in the data in the tables below for the pyramids of energy and numbers.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ecosystem | 1st trophic level | | 2nd trophic level | | 3rd trophic level | | | 4th trophic level | |
| Numbers | Energy | Numbers | Energy | | Numbers | Energy | Numbers | Energy |
|  |  |  |  |  | |  |  |  |  |
|  |  |  |  |  | |  |  |  |  |

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 will complete a **“conversion efficiency”** between each trophic level. To do this you *divide the energy at the higher energy level (smaller number) by the energy at the lower trophic level (bigger number).* This gives you a ratio that you can use for comparison. Write your answer as a decimal. Complete this for both of your ecosystems.

|  |  |  |  |
| --- | --- | --- | --- |
| Ecosystem | Efficiency of 2nd/1st | Efficiency of 3rd/2nd | Efficiency of 4th/3rd |
|  |  |  |  |
|  |  |  |  |

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

This exercise shows you that \_\_\_\_\_% of energy from the lower level is available to the next level up.

With this information complete the pyramid on the next page that shows how many units of energy will be found at each level for a generalized ecosystem (one has been done for you). How many units are lost as heat at each level?

\_\_\_\_\_\_

Units lost as heat energy

\_\_\_\_\_\_

Units lost as heat energy

\_\_\_\_\_\_

Units lost as heat energy

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

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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?

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What would happen to an ecosystem if the decomposers disappeared?

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Could there be a food chain without herbivores and carnivores? How?

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