**Name:**

**Date:**

**School:**

**Facilitator:**

1.04 Energy Pyramid Lab

**Directions: In this activity, you will explore the relationship between energy and matter in an ecosystem.**

# Part 1: Energy

**Calculate the amount of energy available for each trophic level in each ecosystem given the amount of the energy produced by producers. Hint: Remember the 10% rule.**

| **Biome** | **Producers** | **Primary Consumers** | **Secondary Consumers** | **Tertiary Consumers** |
| --- | --- | --- | --- | --- |
| **Deserts** | 200 J |  |  |  |
| **Deciduous temperate forests** | 6000 J |  |  |  |
| **Savanna** | 3000 J |  |  |  |
| **Tropical rainforest** | 9000 J |  |  |  |
| **Tundra** | 600 J |  |  |  |

# Part 2: Biomass

**Calculate the total biomass in each ecosystem.**

| **Biome** | **Producers** | **Primary Consumers** | **Secondary Consumers** | **Tertiary Consumers** | **Total Biomass** |
| --- | --- | --- | --- | --- | --- |
| **Deserts** | 315 | 29 | 5 | 1 |  |
| **Deciduous temperate forests** | 12,016 | 1,175 | 140 | 17 |  |
| **Savanna** | 2,565 | 260 | 23 | 2 |  |
| **Tropical rainforest** | 17,461 | 1722 | 193 | 25 |  |
| **Tundra** | 293 | 7 | 4 | 1 |  |

# ****Part 3: Analysis****

**Use the data in the charts above as well as information from the content of the lessons to answer the following analysis questions. Use complete sentences.**

1. Which ecosystem has the greatest amount of energy overall? The least amount?
2. Which ecosystem has the greatest mass of organisms in it? The least number of organisms? (Hint: All trophic levels added together)
3. Using what you know about the energy—matter relationship, explain why the ecosystems with the greater amount of overall energy tend to have a greater mass of organisms.
4. Deserts have plenty of sunlight for producers to use in photosynthesis. However, their energy levels and biomass are more like the tundra than the rainforest. Explain why.
5. The Plains zebra is one of the primary prey of the lion. There are about 750,000 Plains zebras in the wild. There are only about 20,000 lions in the wild. Explain why zebras will always outnumber lions in the wild.