

Problem #1

How much energy is available for the third trophic level lions in the Serengeti ecosystem?

Let's use figure 3.9 to help illustrate the food chain.

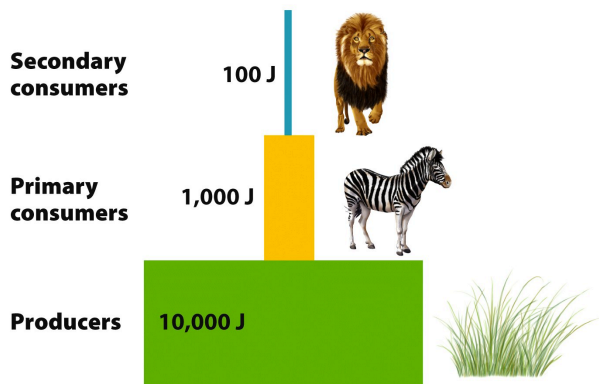


Figure 3.9
Environmental Science
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a). Assume 10% efficiency.

b) Assume 5% efficiency.

c) What factors could increase productivity?

Problem #2

If the net primary productivity of an ecosystem is $2 \text{ kg C/m}^2/\text{year}$, and the energy needed by the producers for their own respiration is $2.5 \text{ kg C/m}^2/\text{year}$. What is the gross primary productivity of this ecosystem?

Problem #3

Start with the first trophic level grass at 100,000 kcals. How much energy moves to the second trophic level, (primary consumer) rabbits? Use the chart below to fill in your answers. Once you calculate the amount of energy transferred to the rabbits, move on and calculate how much energy moves to the foxes and finally to the hawks. See the table below to calculate the amount of energy for each level.

Table showing the transfer of energy through each trophic level

Between trophic levels	Percentage of energy efficiency	Energy in kcals that moves to the next trophic level?	
Grass to Rabbits	12 % energy efficiency		
Rabbits to Foxes	14% energy efficiency		
Foxes to Hawks	8% energy efficiency		

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