

Solutions

2.1 A Use the same energy units and period in numerator and denominator. Distinguish ingestion, assimilation and production: consumed energy is not all assimilated, and assimilated energy is not all stored as new biomass. An energy pyramid records a flow per area per time; a standing biomass snapshot is a different quantity.

2.2 $\text{efficiency} = 800 / 8,000 \times 100 = 10\%$.

2.3 False. Energy is not destroyed when respiration transfers it as heat. Material can cycle through an ecosystem, while usable energy flow depends on continuing input. A count pyramid or biomass snapshot cannot automatically be substituted into an energy-efficiency calculation.

2.4 trophic transfer efficiency. trophic transfer efficiency means Production at one trophic level divided by production at the preceding level over a common interval.

3.1 15% then 10%. Use adjacent levels with the same area/time basis; losses and unconsumed material vary. The dataset gives two different fractions.