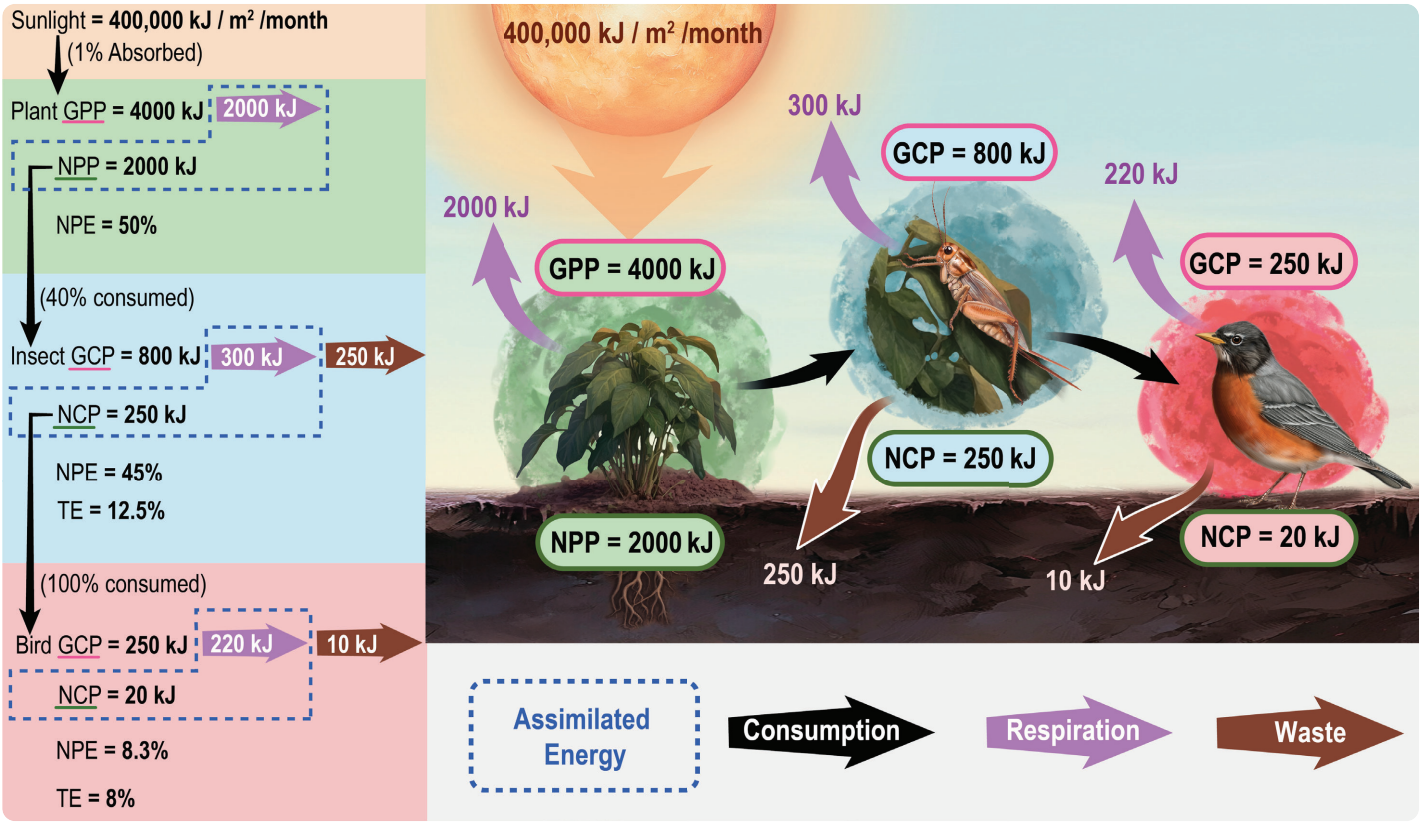
TOPIC: MAKING SENSE OF ECOSYSTEM PRODUCTION & EFFICIENCY

Making Sense of Ecosystem Production & Efficiency

- Every ecosystem has an energy "_____" determined by primary producers.
  - Energy is transferred from one trophic level to the next, but _____ all of the energy can be used.
- Let's look at the following example as we make sense of a handful of relevant terms:



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PRACTICE

Which of the following terms describes NPP?

a) Total energy captured by primary producers in an ecosystem.

b) Energy invested in the production of new biomass by autotrophs.

c) Energy invested in new biomass by primary consumers.

d) None of the above.

PRACTICE

If a capybara has a net production efficiency of 15% and consumes 1800 kJ of grass in a day, 1150 kJ of which is assimilated, roughly how much energy will be converted to new biomass?

a) 120 kJ.

b) 270 kJ.

c) 77 kJ.

d) 173 kJ.

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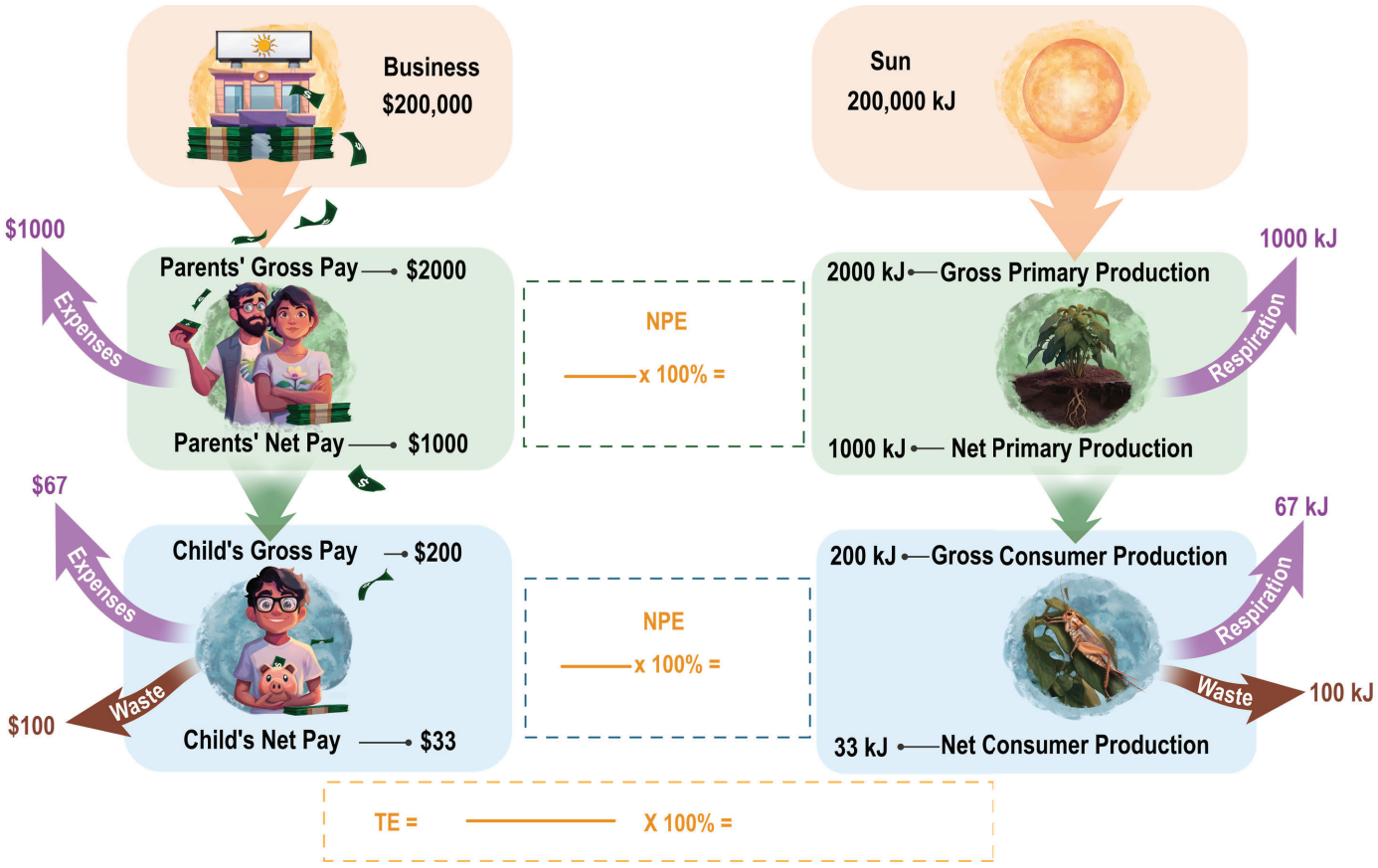
Financial Analogy for Ecosystem Production & Efficiency

◆ Still confused? Let's take a look at this financial analogy where we imagine that "Energy" = _____ ($$$).



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Key Term	Definition	Important Notes
Gross **P**rimary **P**roductivity **GPP**	Total energy captured by primary producers.	**~1%** of solar energy is absorbed.
Assimilated **E**nergy **AE**	Used for respiration & new biomass. **AE** = **GP** – **(Not Assimilated Energy)**	For primary producers, **AE** ≈ **GPP**
Net **P**rimary **P**roductivity **NPP**	Producer's energy for biomass: **NPP** = **GPP** – **R**	Available as food for primary consumers.
Gross **C**onsumer / Secondary **P**roductivity **GCP**	Total energy consumed by consumers in an ecosystem.	Consumers do **NOT** consume all available energy.
Net **C**onsumer / Secondary **P**roductivity **NCP**	Consumer's energy for biomass: **NCP** = **AE** – **R**	Analogous to **NPP**
Net **P**roduction **E**fficiency **NPE**	$\textbf{NPE} = \frac{\textbf{NP}}{\textbf{AE}} \times 100\%$	Reveals how efficiently an organism converts **AE** into biomass
Trophic **E**fficiency **TE**	$\textbf{TE} = \frac{\textbf{Net Productivity of } \textit{\textbf{current}} \textbf{ trophic level}}{\textbf{Net Productivity of } \textit{\textbf{previous}} \textbf{ trophic level}} \times 100\%$	Typically **~10%**