

Energy Flow in Ecosystem

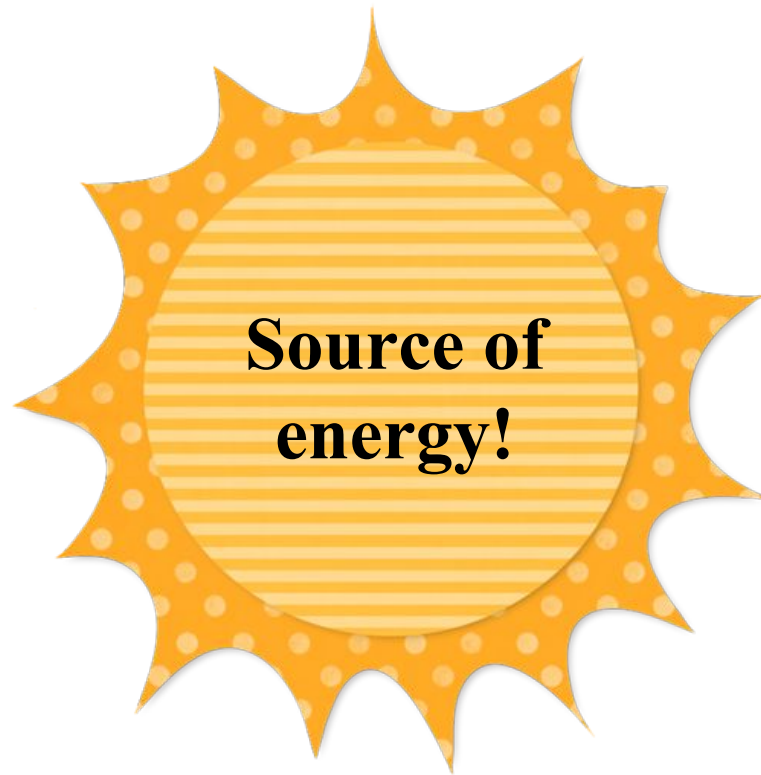
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Energy enters an ecosystem as...

SUNLIGHT!!!



**What is
energy?**

The primary source of energy for an ecosystem is the sun.

Key Ideas

- **How does energy flow through an ecosystem?**
- **What happens to energy as it is transferred between trophic levels in a community?**

Energy in Ecosystem

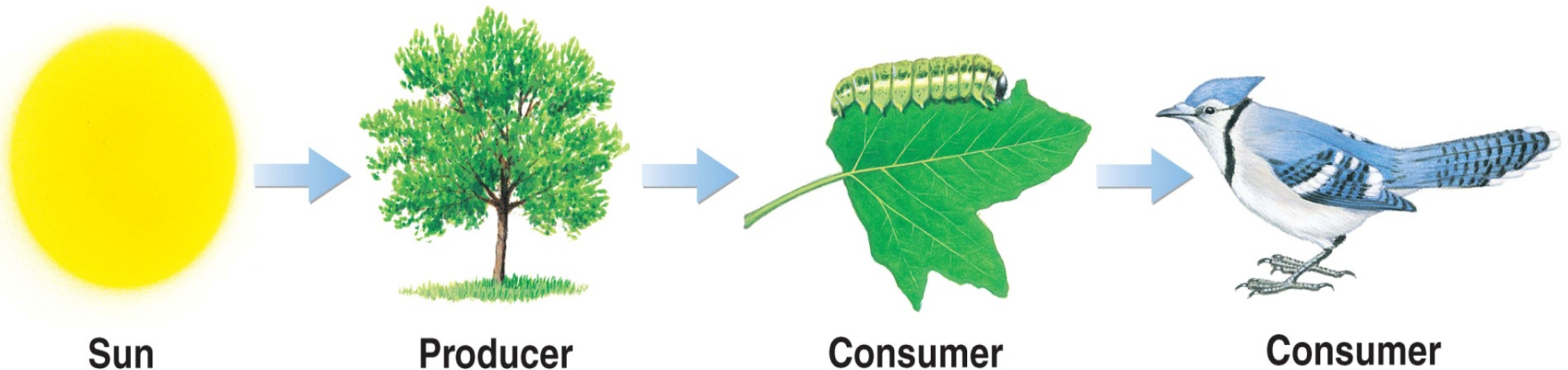
✓ **Producers** - change light energy into food energy in an ecosystem.

✓ **Consumers** - eat other organisms instead of producing their own food.

✓ **Decomposers** (bacteria) - break down the remains of animals and plants.

✓ **Energy flows** - sun to producers to consumers to decomposers in an ecosystem.

✓ **Trophic level** - each step in the transfer of energy through an ecosystem.

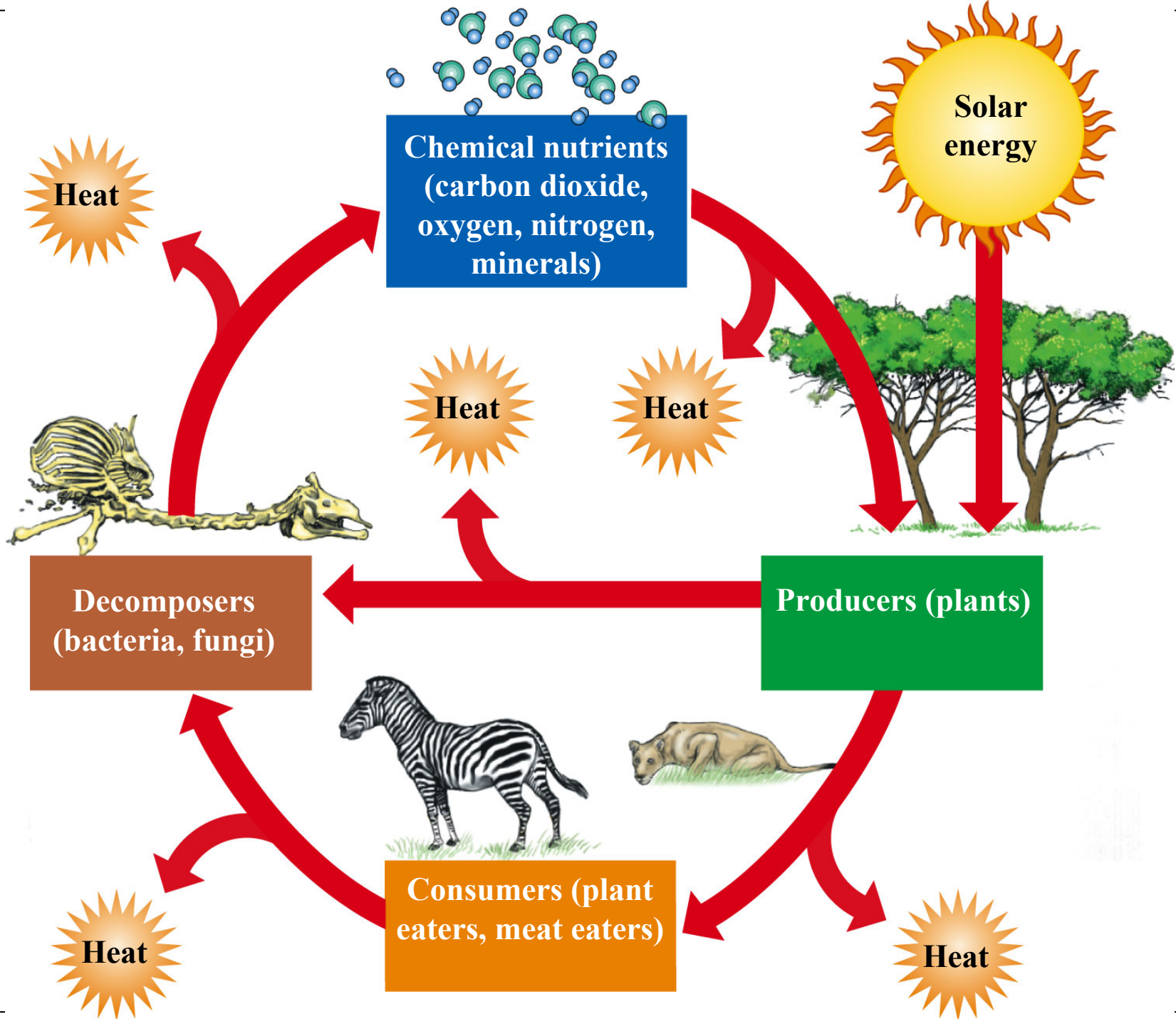


Laws of Thermodynamics

- **Ist Law of Conservation of Energy:** Energy may be transformed from one form to another but is never created or destroyed.
- **IInd Law of Entropy:** There is always a tendency for increase in entropy or degradation from a concentrated to a dispersed (random) form leading to dissipation of heat.

Energy Flow in Ecosystem

- **Producers (Plants)** – fix solar energy by photosynthesis. A part of it is released in respiration and remainder passes as food from plants to herbivores to carnivores to decomposers.
- **Fate of energy at each trophic level:**
 - a) To next trophic level
 - b) Through death to decomposers
 - c) Lost as heat by respiration
- **10% Rule:** Only about 10% energy is stored (fat/tissue) in successive higher trophic levels. Major part of energy (**90%**) is lost as heat or other metabolic activity of organism.
- Shorter the food chain, greater would be the available food energy. Hence, maximum possible links in a food chain are limited to **4/5**.



1 unit of energy



top level consumer

10 units of energy

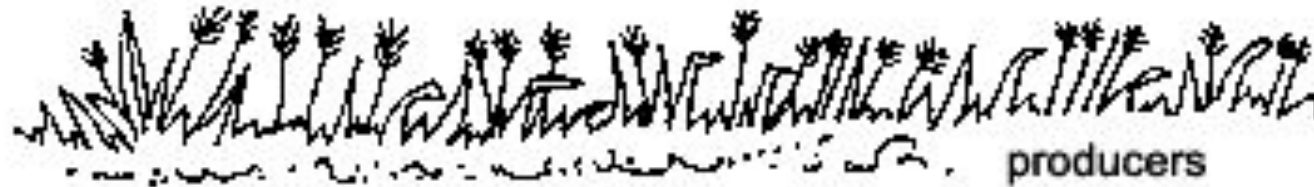


second level consumers

100 units of energy



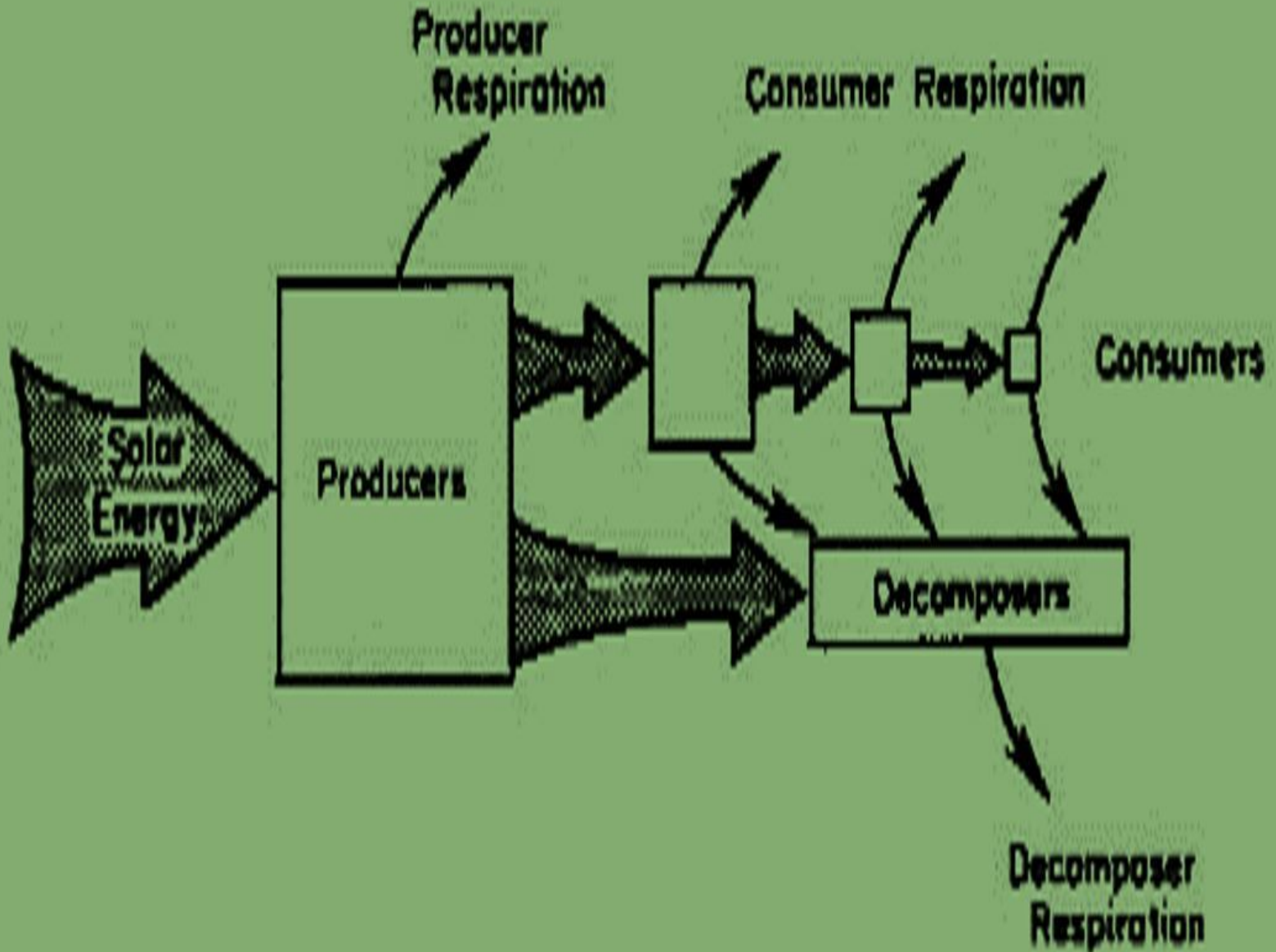
first
level
consumers



producers

1000 units of energy

Single Channel Model of Energy Flow



Y-Shaped/ 2 Channel Model of Energy Flow

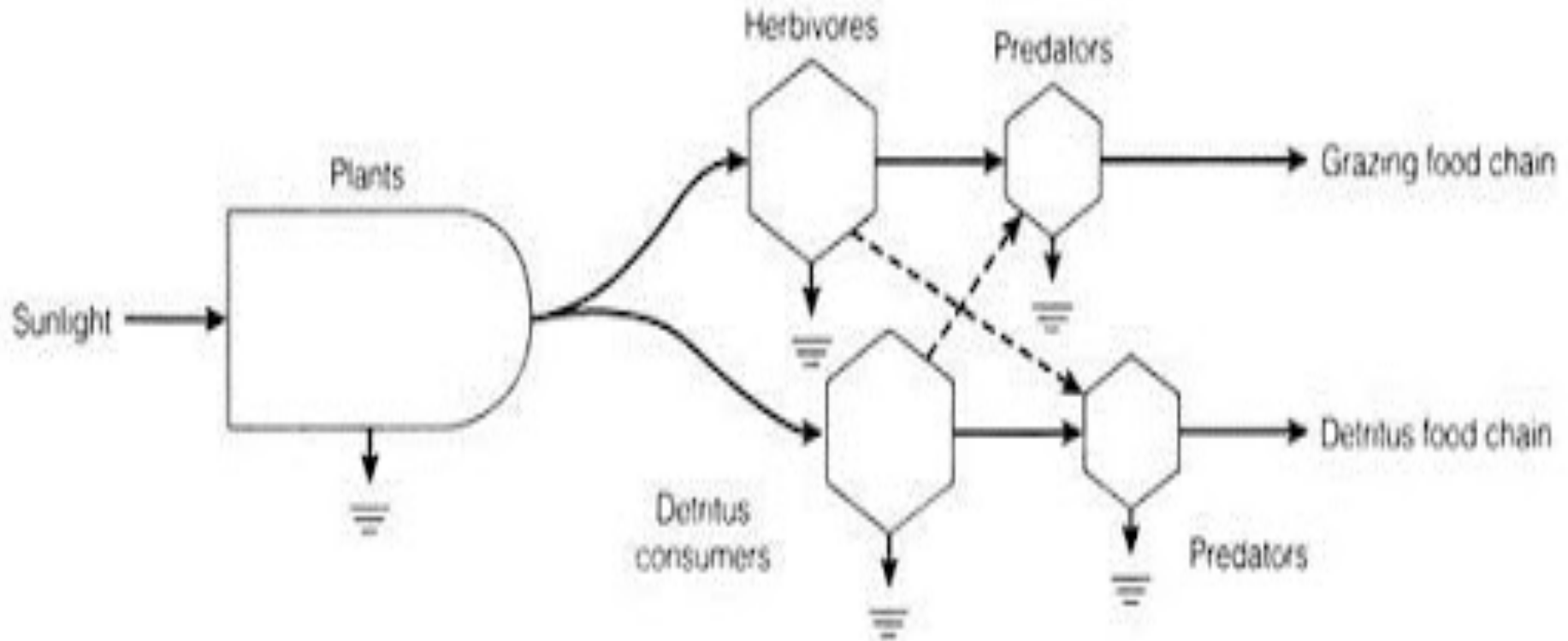


Figure 3-18. Y-shaped energy flow model showing linkages between grazing and detritus food chains.



Thank
You