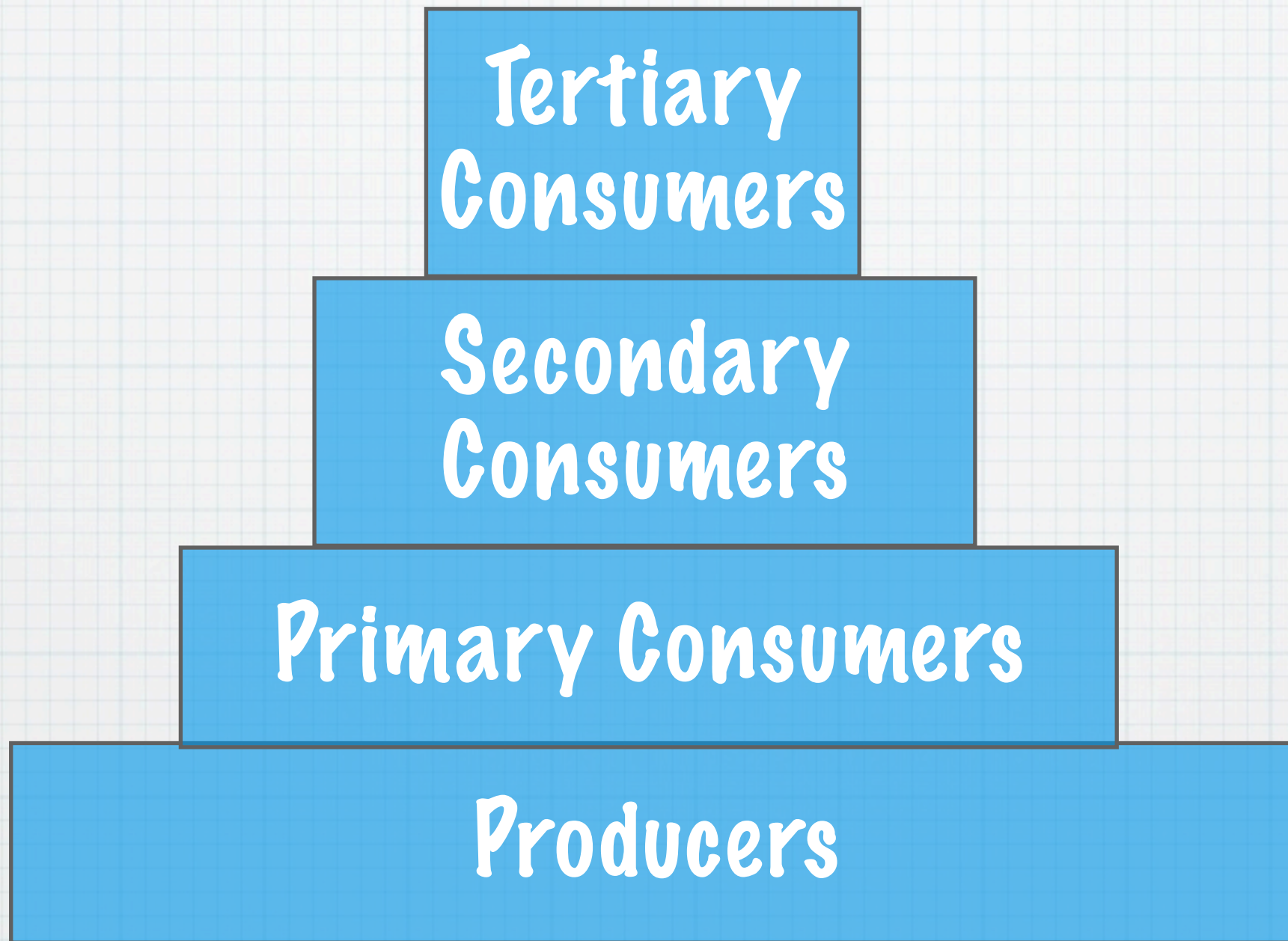


# Energy Flow in an Ecosystem

---







# First Law of Thermodynamics

- \* Take your hands and rub them together. Now press them to your face. What happens?



# First Law of Thermodynamics

- \* The first law of thermodynamics states that energy cannot be created or destroyed, it just changes forms.





# First Law of Thermodynamics in Ecology

- \* This means that all living things must have a source of energy.
- \* The ultimate source of energy for most living things is the sun.





# Second Law of Thermodynamics in Ecology

- \* The second law of thermodynamics states that at every energy transfer, some of that energy is lost to heat moving to cooler objects.





# Energy Transfer in Food Pyramids

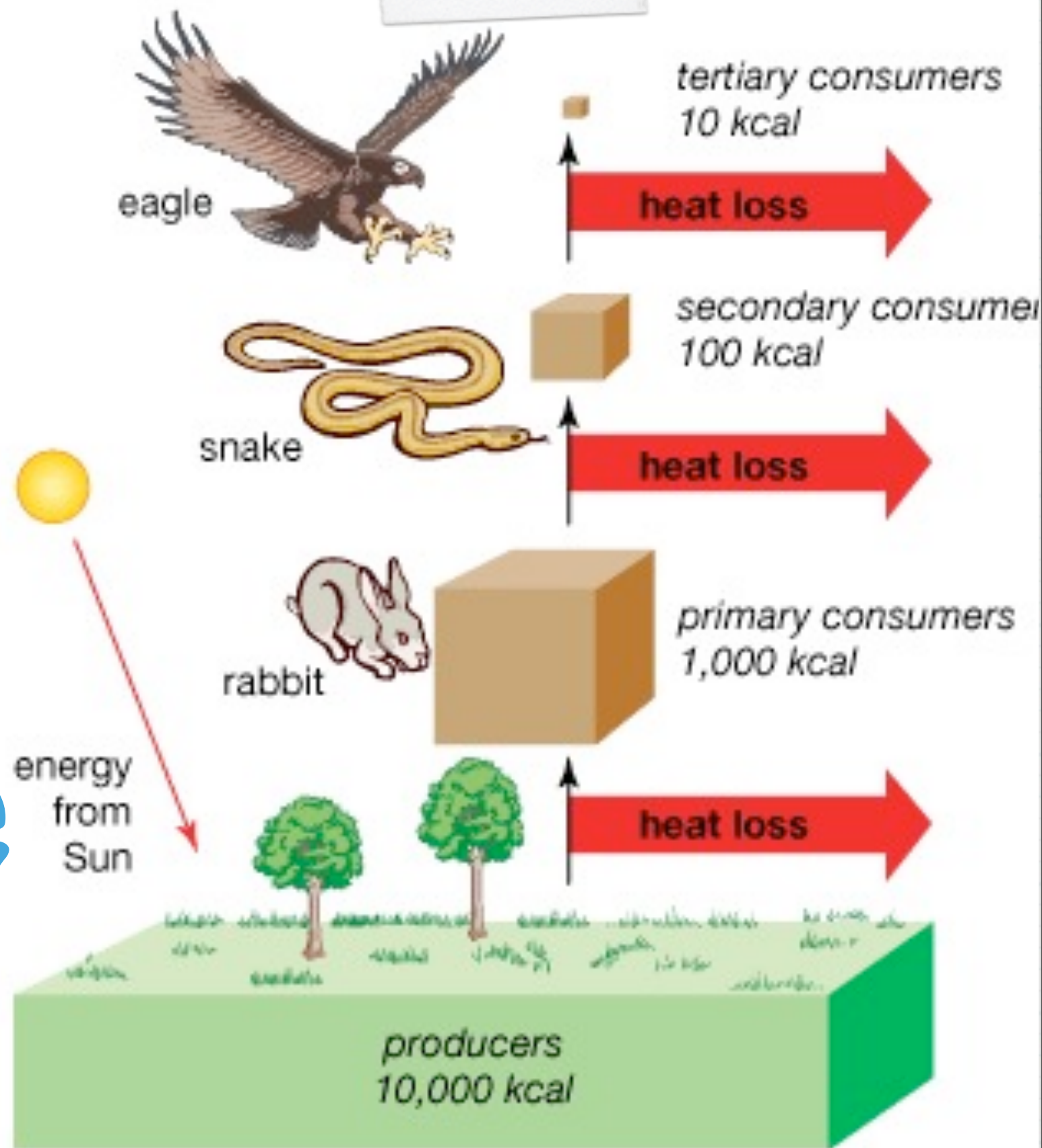


Record this in  
your notes

- \* Energy is lost each time an organism eats another.
- \* Each level gets 10% of the energy from the trophic level below.
- \* 90% of energy is used by the organism to stay alive.



# Energy Flow Through the Trophic Levels



2011 Encyclopædia Britannica, Inc.





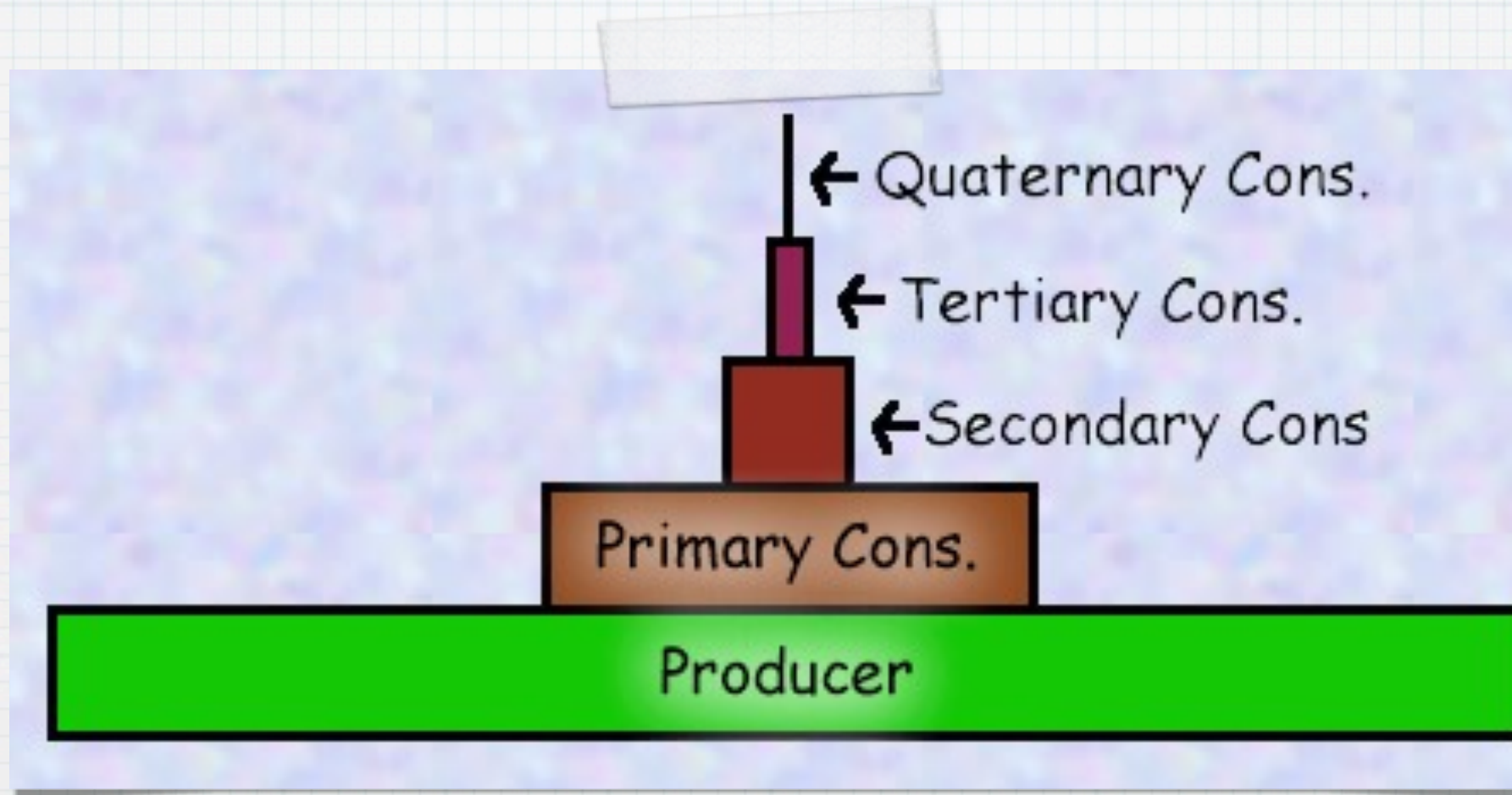
# Energy Pyramids

- \* The movement of energy through an ecosystem can be summarized by an energy pyramid.
- \* Since we lose energy at each trophic level, each step up on the pyramid gets smaller.
- \* Energy is measured in Joules (J) or Kilojoules (KJ)



Record this in  
your notes

# Trends in Energy Flow

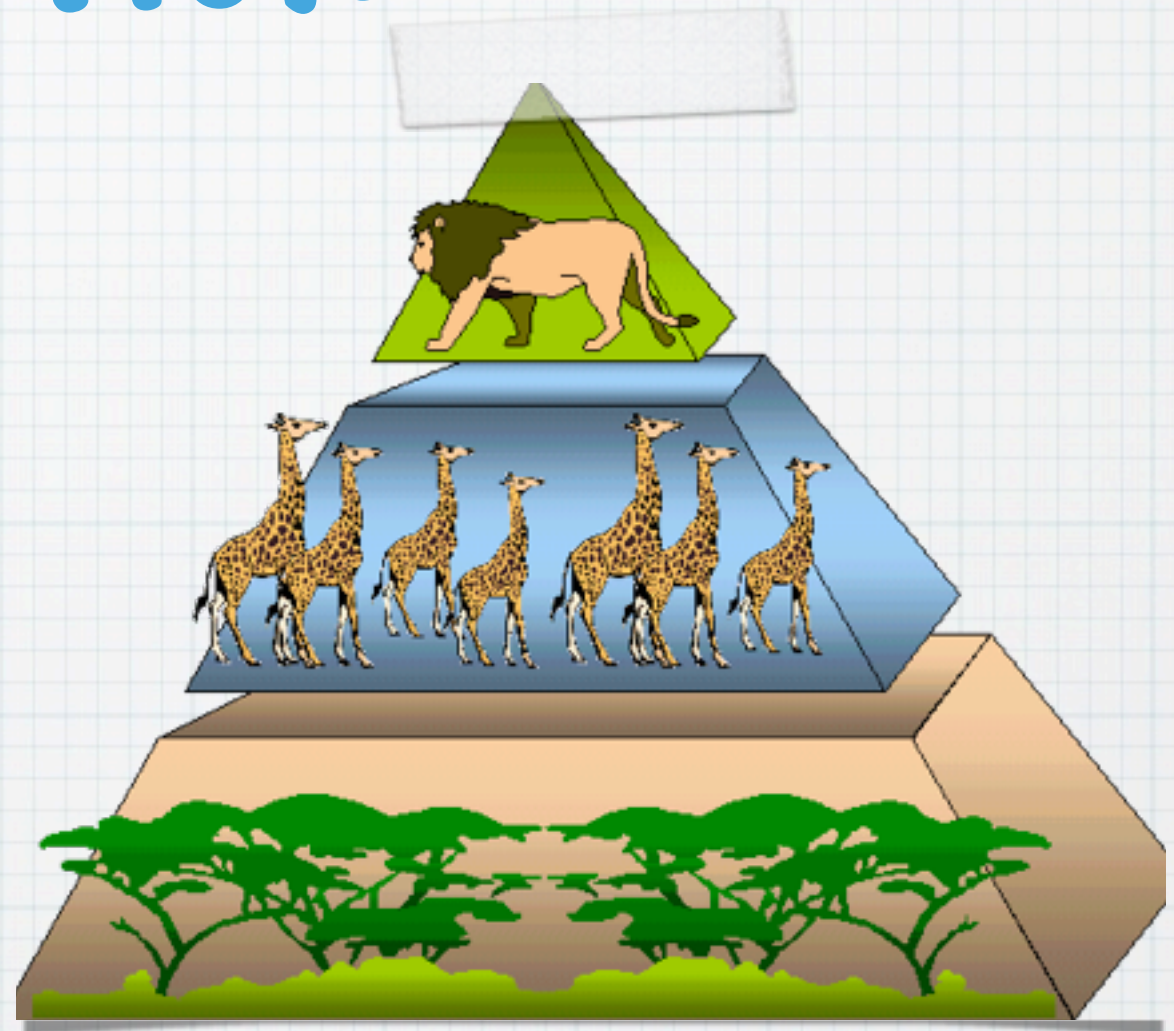


- \* Because energy is lost at each step, this sets a limit on the number of trophic levels to about five.



# Control on Ecosystem Function

- \* Bottom up control: Hypothesis that states that primary producers ultimately control ecosystem function.

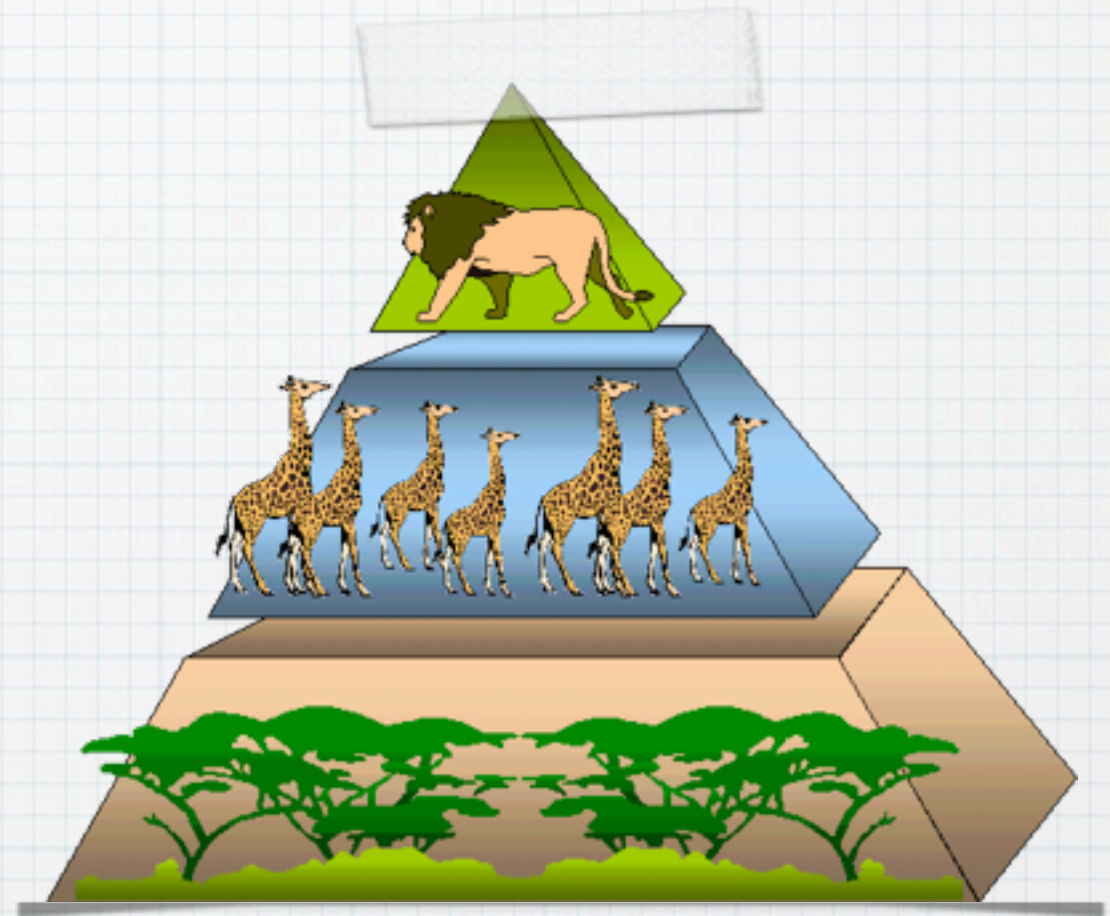


Record this in  
your notes



# Control on Ecosystem Function

- \* Top-down control: Predation by higher trophic level ultimately control ecosystem function.



Record this in  
your notes