

Learning Target: I can explain how carrying capacity and limiting factors impact populations of organisms in ecosystems.



### 1<sup>st</sup> & 2<sup>nd</sup> Laws of Thermodynamics Interactive Activity

**Part 1 Cloze Read Reading for Meaning:** Read the following information on carrying capacity and limiting factors. Use your knowledge and context clues to drag and drop/fill in the blanks.

The first law of \_\_\_\_\_ deals with the total amount of \_\_\_\_\_ in the universe, and in particular, it states that this total amount does not change. Basically, the First Law of Thermodynamics states that energy cannot be \_\_\_\_\_ or \_\_\_\_\_. It can only change form or be \_\_\_\_\_ from one object to another. Light bulbs transform \_\_\_\_\_ energy into \_\_\_\_\_ energy or radiant energy. One pool ball hits another, transferring \_\_\_\_\_ energy and making the second ball move. Plants convert the \_\_\_\_\_ energy into \_\_\_\_\_ energy stored in organic molecules. You are transforming \_\_\_\_\_ energy from the lunch you ate into kinetic energy as you walk, breathe, and complete a workout after a busy day.

transferred	energy	chemical	destroyed
created	electrical	thermodynamics	light
sunlight	chemical	kinetic	

The Second Law of Thermodynamics states that the \_\_\_\_\_ or \_\_\_\_\_ of an isolated system will always \_\_\_\_\_ until it reaches a maximum value. Energy cannot be created or destroyed, but it can change from more-useful forms into \_\_\_\_\_ forms of energy. As it turns out, in every real-world energy transfer or transformation, some amount of energy is \_\_\_\_\_ to a form that's unusable which basically means it's unavailable to do \_\_\_\_\_. In most cases, this unusable energy is in the form of \_\_\_\_\_.

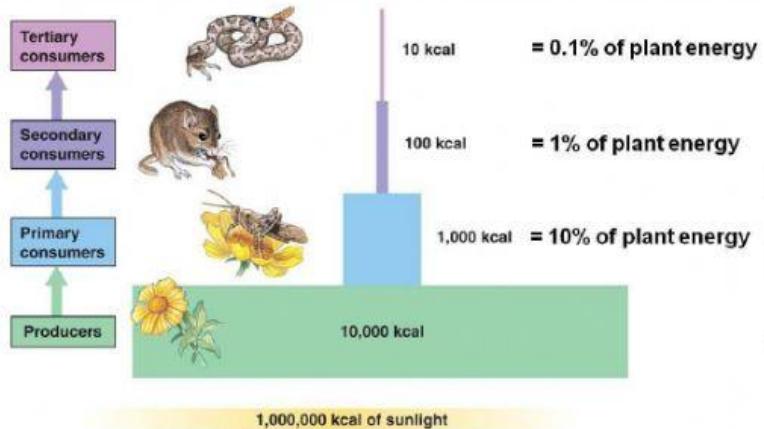
Although heat can in fact do work under the right circumstances, it can \_\_\_\_\_ be turned into other work-performing types of energy with 100% \_\_\_\_\_. So, every time an energy transfer happens, some amount of useful energy will move from the useful to the useless category in the form of heat.

heat	increase	efficiency	Less-useful
disorder	converted	entropy	never

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Part 2 Graphical Analysis: Analyze the following diagram and answer the questions that follow.

**"Rule of 10"** Only ~10% passes to next level.  
Therefore, ~90% LOSS at each trophic level



1. What trends do you notice as you go up each trophic level? \_\_\_\_\_

2. What happens to most of the energy as you go up each trophic level? Explain why. \_\_\_\_\_

3. How is the 1<sup>st</sup> law of thermodynamics being demonstrated in the following diagram? \_\_\_\_\_

4. How is the 2<sup>nd</sup> law of thermodynamics being demonstrated in the following diagram? \_\_\_\_\_

5. Does entropy/disorder increase or decrease as you go up each trophic level? Explain your answer in detail. \_\_\_\_\_

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