

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



1st & 2nd 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 _____.

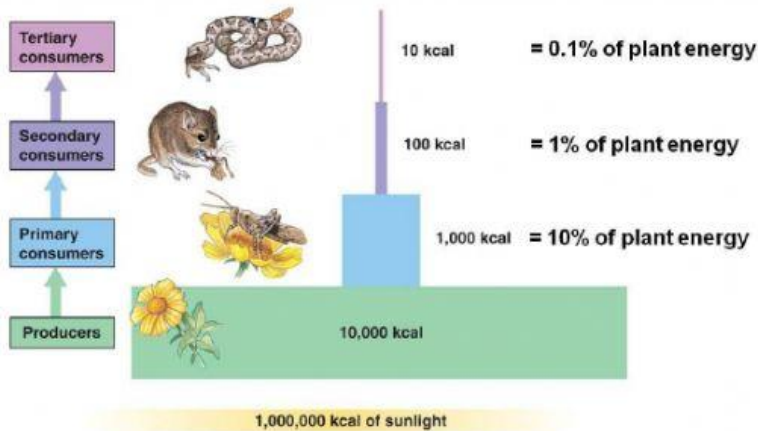
Although heat can in fact do work under the right circumstances, it can _____ be turned into other work-performing types of energy with 100% _____. So, every time an energy transfer happens, some amount of useful energy will move from the useful to the useless category in the form of heat.

| | | | |
|----------|-----------|------------|-------------|
| 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 1st law of thermodynamics being demonstrated in the following diagram? _____
4. How is the 2nd 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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