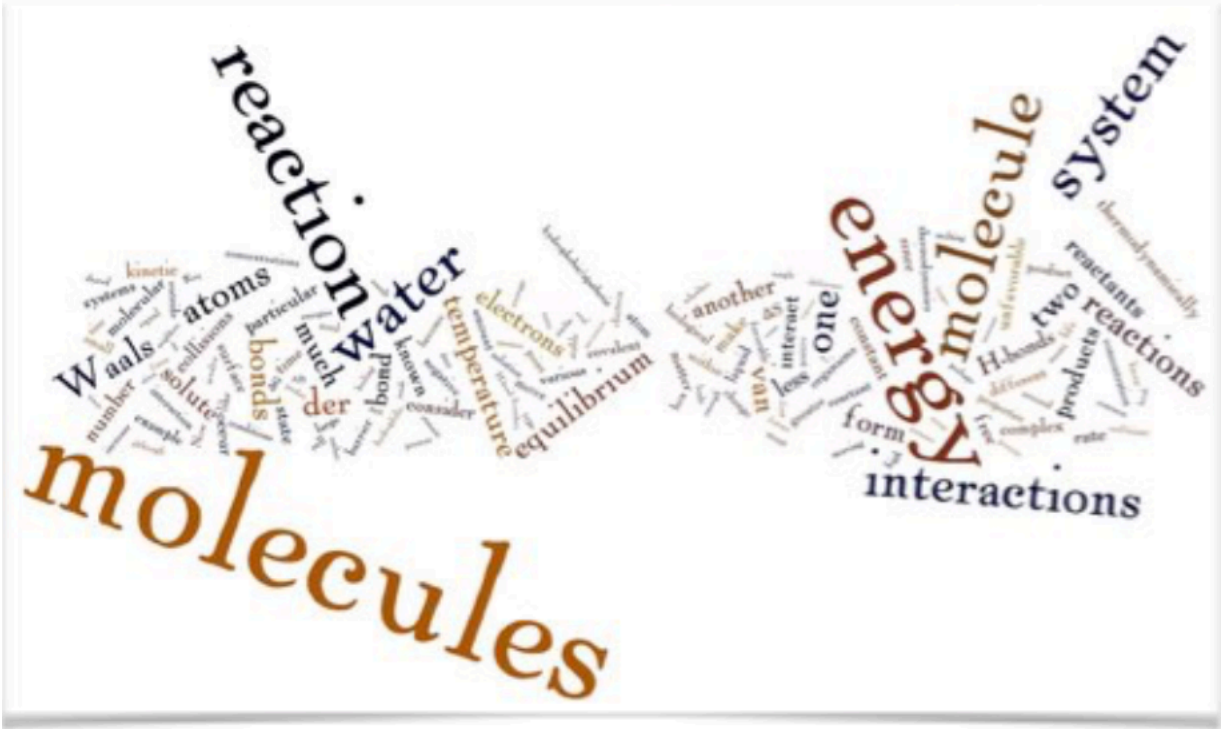


Molecular interactions, thermodynamics & reaction coupling

exam 1 issues

Test was clearly too long for many….
future midexams will be 10 questions

We will have graded version back to you on Friday ….

We are marking questions not answered …. You can completed those questions over the weekend and hand the exam back to us on Monday

To be fair … even if you completed the exam, you can add clarifying comments to answers 11-18, which we will consider in calculating your final score.

big (recurrent) themes (chapters 1-4)

variation (population)

selection (natural, social, sexual)

founder/bottleneck effect + drift

continuity

homology + analogy (convergence)

big (recurrent) themes (chapters 4+5 and on)

laws of thermodynamics

1. energy is conserved
2. entropy increases (until equilibrium is reached)

3. entropy at absolute zero (°K) (not relevant)

molecular level interactions (release or deliver energy)

thermodynamics deals with systems

what type of a system is a cell / an organism?

open versus closed

equilibrium versus non-equilibrium
(steady state or growing / expanding)

reactions and reaction systems

thermodynamically favorable versus unfavorable

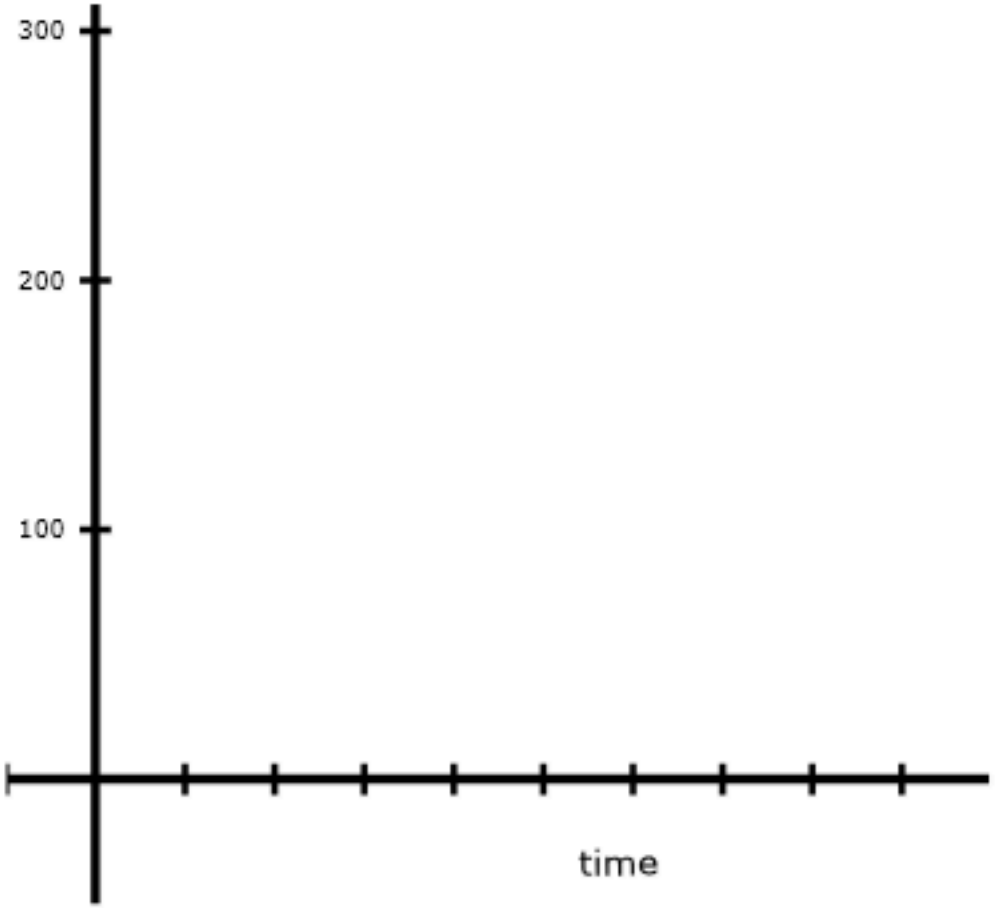
reaction rates : spontaneous versus regulated

coupled reaction systems

What does an "increase in entropy" mean to you?

page 1 of 5

A bar of gold at 240°C sits on the floor of a closed room. The room is originally at 10°C. What is the difference between macroscopically static and molecularly static. Draw a graph of the temperature of the gold bar as a function of time.

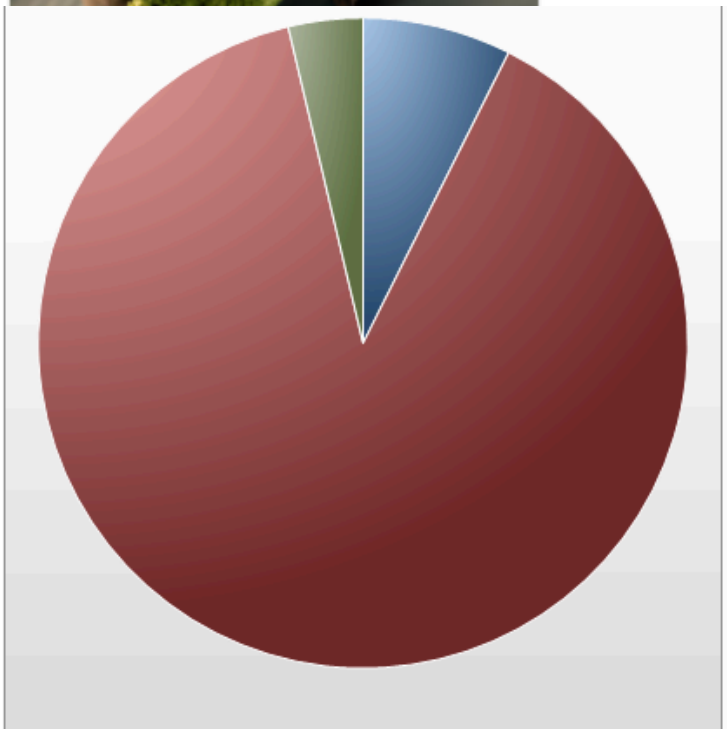


Draw | Adjust | Erase | Check | Reset

explain you thinking, and explain how energy moves (if it does) between the gold bar and the room.

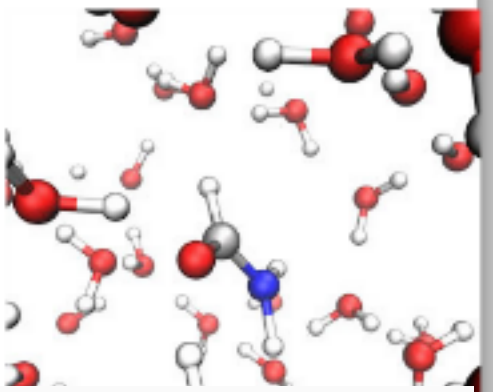
Living systems are non-equilibrium systems. To maintain state non-equilibrium state they need to import energy and matter. SO, how can freeze-dried tardigrads (water bears), dormant seeds, and such be considered alive?

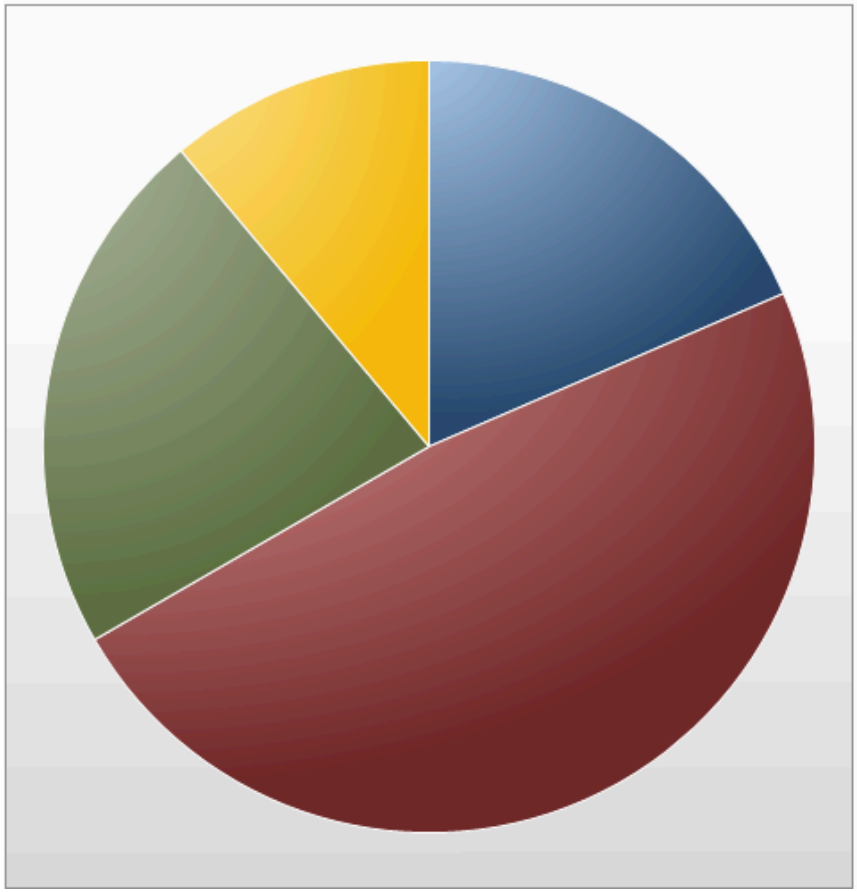
- A: Actually they are dead and can come back to life
- B: Water supplies the missing energy required for life
- C: While reactions have stopped, the system is still far from equilibrium.
- not sure how this is even possible



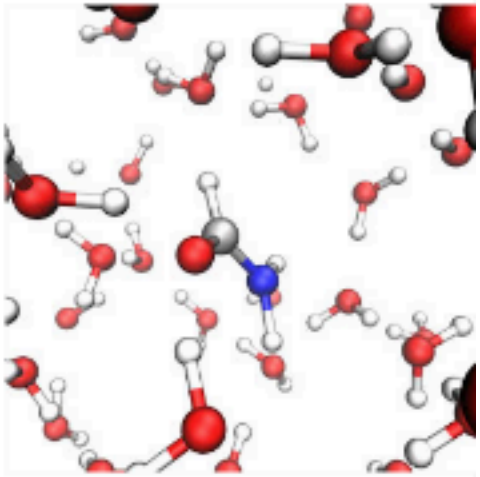
In a thermodynamically favorable reaction, which is true...

- A: at equilibrium, there are more reactants than products
- B: at equilibrium, there are more products than reactants
- C: the reaction occurs rapidly, even in the absence of a catalyst





at equilibrium, a reverse (thermodynamically) unfavorable reaction can occur. In a diegram or cartoon, indicate schematically where that energy comes from.



explain the logic of your diagram

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Friday 6 Oct	Chapter 5.2 Biological Thermodynamics	110-119	beSocratic #14