Berean Baptist Church—6/10/2018
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Entropy and the Second Law of Thermodynamics

This week: Learn concepts of thermodynamics and entropy that point to a single creation event and information-rich creator

1. Laws of thermodynamics
    a. **Zeroth law of thermodynamics:** If two systems are in thermal equilibrium with a third system, they are in thermal equilibrium with each other.
    b. **First law of thermodynamics:** When energy passes into or out from a system, the system's internal energy changes in accord with the law of conservation of energy.
    c. **Second law of thermodynamics:** In a natural thermodynamic process, the sum of the entropies of the interacting thermodynamic systems increases.
    d. **Third law of thermodynamics:** The entropy of a system approaches a constant (usually zero) value as the temperature approaches absolute zero.
2. Energy and Entropy
    a. Energy of motion of atoms and molecules is high
    b. Not useful for doing "work" as it is disordered motion
    c. Example of a penny
        i. Contains atoms moving at 700+ mph
        ii. If "coherent" motion, penny could leap into the air without violating energy conservation
        iii. Need a different concept to explain why this doesn't happen
3. Discussion of Entropy and the Second Law of Thermodynamics
    a. Heads/tails counting
    b. Molecules in a box can be counted like coin flips
    c. For even moderate numbers of particles, probabilities dictate **all behavior**
    d. Entropy is a measure of **likelihood**
    e. Extracting "work" or useful energy requires increasing entropy of a system
4. Take-aways from the Second Law of Thermodynamics
    a. Laws of probability ensure entropy of a closed system always increases
    b. The universe is the quintessential "closed system"
    c. Entropy of the universe is **always increasing**
    d. Quantity of useful work in the universe is **always decreasing**
5. Conclusion
    a. God created a **useful, energetic, low-entropy** universe
    b. Increasing entropy is **ensured** by laws of mathematics
    c. Increase of entropy is irreversible. One creation, one death
    d. Entropy informs our discussion of information and biological evolution…