

1) Plot temperature versus time since the big bang. What shape does your graph take? Why?

2) US power consumption is on the order of magnitude of 5×10^{20} Joules per year. If we could turn pure mass into energy, how much mass would we need to power US for a year?

3a) At the Planck Era we believe photons had a peak wavelength of 2.9×10^{-32} meters. What was the temperature of the universe then?

b) At the end of the era of Nucleosynthesis, when the universe had temperature of 2×10^9 K, what was peak wavelength for photons produced then?

c) According to your answer in part b) how much have the wavelengths of photons in the universe been stretched since that time?

4a) Estimate the size of a skittle (definitely the best fruit candy). Explain all steps and work.

b) How many skittles are consumed in a year in America? Show and explain all steps and assumptions in your calculations.

5) So I'm having issues getting the full grasp on this whole Inflation thing. What we seem to be saying is that one instant a skittle (or universe) is a skittle and the next second it's the size of a galaxy?

a) Explain how Inflation occurs, step by step.

b) Calculate how much larger the skittle would get if it expanded from its normal size to the size of the Milky Way Galaxy.

c) What size would an atom be if it was expanded by this factor (that you found in part b)?

d) How big would our Milky Way Galaxy (current size) be if went through this much expansion?