

PS#6, Due Tuesday, February 19

1. I've heard that each person is about a 100 W lightbulb... that we put out heat at the rate of about 100 W, on average throughout our lives.
 - a) Does it seem to you that this is about right if you think about the heat you give off... does it compare to be about the same as a 100 W lightbulb?
 - b) Consider if you just lived and didn't exercise too much, how many calories would you consume in a day. Energy in = Energy out. So, if you metabolize all the nutrients in your food into heat (a reasonable estimate), calculate the rate at which you dissipate heat into the world. Is this close to 100 W? Remember that a Calorie is actually 1000 thermal calories.
 - c) There was one more question we could ask: Estimate your CO₂ emissions for a day knowing the carbon intensity of your fuel. We know that sugar is like wood (30 g(C)/MJ) and fat is oil (20 g(C)/MJ)
2. Fission – Fusion what is the difference between these two processes?
 - a) How are these two processes different? Please give an example of each process.
 - b) What is necessary to make each process happen? What do we have to do to make it happen?
 - c) What are the major challenges to making each a wide-spread source of clean energy?
3. Everybody's running on the democratic ticket to be the next US president... how about you too? In your next campaign speech, consider how the USA is going to comply with the Green New Deal and cut carbon emissions 100% in the next 10 years. Make some arguments based on the real numbers of what causes GHG emissions – we have a GHG sources slide in our lectures. Make a strong argument as to what we can cut and not cut and how close we can come to this aspirational state of carbon neutrality in the next 10 years. Who are your supporters, adversaries? What might you do to mitigate blowback? To get an idea of what's working for other countries, please see this NYTimes article:
<https://nyti.ms/2E7yKLk>
4. Thinking about MT#2 next Friday Feb. 22? Maybe you could take last year's MT#2 being this problem set is so light. Keep in mind that this year we covered solar energy before MT#2, so solar energy will also be covered.
5. Petroleum:
 - A) Please explain how increased demand for petroleum is *increasing* the amount of (available) petroleum reserves in the ground. Explain the ensuing risk to humans and the environment that result from increasing accessible petroleum.
 - B) Please see this short US EIA report (https://www.eia.gov/energyexplained/index.php?page=oil_imports) to note recent changes since I made the petroleum video. Comment on recent changes that are interesting? What changes does this have with life in the USA (about driving and the kind of cars we drive.)
 - C) A petroleum expert began a talk I attended in Berkeley with, "We used to be worried that we're running out of oil. Now we're worried we're *not* running out of oil." What did he mean by that? Why might some experts feel we *need* to run out of oil?
6. Remember to send me an Email with your empathy self-intervention epiphany.