

War & Peace Cluster, Summit Program
Fall 2018 – Engl 3550 - Physics section
Physics Assignment 2

Below are some questions which relate to the background information for this cluster. We shall fill in the details later in the fall and winter. For now, concentrate on getting factual information without worrying about explanation.

1. *Health effects and cancer.* How many people in the US will die from cancer per year? What fraction of the total number of deaths per year does this represent?
2. *Health effects and nuclear power.* Try to find out how many people die per year as a result of the nuclear power industry
 1. There is no definitive answer, only 'best guesses' which are inevitably influenced by politics, so find the range (low to high) of the estimates.
 2. How would you try to decide who (if anyone) has the 'best' estimate?
 3. Can you find any reason (apart from politics) why any one method of determining the number of deaths might either underestimate the correct result, or might overestimate it?
 4. (Harder) If we consider the chances of any one person contracting cancer as a result of radiation exposure as being essentially random, then if there are N cases of cancer the fluctuation should be approximately \sqrt{N} . From your answer to question 1, how much of a change in the number of deaths in the US per year from cancer would it take for the change to be statistically significant?
3. *Nuclear power generation.* How many nuclear power plants operate within California? How many within the United States? What percentage of the US electricity is generated by nuclear power plants? (Note: a plant is a site with one or more reactors. The question asks for the number of sites, not the number of reactors.)
4. *Accidents related to nuclear power generation.* What was the most serious accident involving nuclear power plants worldwide? Where was it and when? How many people were killed? How many were affected? What was the most serious accident involving nuclear power plants in the US? Where was it and when? How many people were killed? How many were affected?
5. *Nuclear weapons*
 1. What was the date, time, and location of the world's first detonation of a nuclear device?
 2. What was the date, time, and location of the world's first detonation of a nuclear bomb as a weapon?
 3. What was the date, time, and location of the world's first detonation of a thermonuclear device (H bomb)?

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6. *Accidents related to nuclear weapons.* The following are all incidents involving the US arsenal of weapons. In each case find out when it happened, where, and what the consequences were.
 1. Palomares
 2. Tybee Island
 3. Thule