Fermi Questions

A Fermi question requires estimation of physical quantities to arrive at an answer.

Throughout his work, Fermi was legendary for being able to figure out things in his head, using information that initially seems too meager for a quantitative result. He used a process of "zeroing in" on problems by saying that the value in question was certainly larger than one number and less than some other amount. He would proceed through a problem in that fashion and, in the end, have a quantified answer within identified limits.

In a Fermi question, the goal is to get an answer to an order of magnitude (typically a power of ten) by making reasonable assumptions about the situation, not necessarily relying upon definite knowledge for an "exact" answer.

- A Fermi question is posed with limited information given.
    - How many water balloons would it take to fill the school gymnasium?
    - How many piano tuners are there in New York City?
    - What is the mass in kilograms of the student body in your school?
- A Fermi question requires that students ask many more questions.
    - How big is a water balloon?
    - What are the approximate dimensions of the gym?
    - What measurement must be estimated using the dimensions of the gym?
    - ... and the list goes on.
- A Fermi question demands communication.
- A Fermi question utilizes estimation.
- A Fermi question emphasizes process rather than "the" answer.