

EVENT 1: FERMI QUESTIONS

OBJECTIVE: To estimate the order of magnitude of a quantity that is difficult or impossible to measure.

RULES:

- Each team will be provided with a list of ten Fermi Questions.
- Each team will have 30 minutes in which to answer these questions.
- Each team will submit a single set of answers.
- All answers must be recorded in order of magnitude format (i.e., 10^4 not 3×10^4 , 10^6 not 7×10^5).
- No calculators or reference materials may be used.

COMPETITION AND SCORING:

Ten points will be awarded for each correct answer (correct order of magnitude). There will be 1 point off for each order of magnitude difference from the accepted order of magnitude. No answer will score less than zero.

Sample Fermi Questions:

- How much land area (in square meters) is found on earth?** (Answer is 10^{14})
- How many revolutions will a 14-inch tire have to make during a crossing of the continental United States?** (Answer is 10^6)
- How many liters of air does an adult inhale in a 24-hour day?** (Answer is 10^4)
- How many square meters of turf (real or artificial) are there in a National Football League Stadium?** (Answer is 10^4)
- A water balloon is holding $2,000 \text{ cm}^3$ of water. More water is added until the diameter doubles. How many cm^3 of water does it now hold?** (Answer is 10^4)
- An automobile travels 100,000 km before the tire tread wears out. What thickness of rubber wears off the tire each revolution of the wheel? Express your answer in centimeters.** (Answer is 10^{-8})