

Yale Physics Olympics

Team Name _____

Fermi Quiz

Aim: To estimate the values of various quantities.

Materials: None - except an imaginative, innovative mind. **Use of electronic devices is seriously frowned upon for this event.**

Method: Except for question 15, provide only the power of 10 that best answers the question by combining quantities you already know. Question #15 will be a tiebreaker for all events and will not be scored unless there is a tie.

Conditions: The answers must be entered using the units specified. **WRITE CLEARLY!**

Ranking: Each question's score will be the difference between the correct answer and your answer. A penalty applies for leaving answers blank, so take your best guess if you can't calculate an answer or don't have time.

1) In cm^2 , what was the total US land area covered by the 2017 total solar eclipse?

Answer: 10 cm^2

2) How many eclipse glasses were used to view the 2017 eclipse?

Answer: 10

3) What is the probability (10^0 = certainty) that a LIGO-detectable gravitational wave will pass through your body in the next 5 seconds?

Answer: 10

4) How many Kilowatts of power are required to charge cell phones at JFK airport on a typical day?

Answer: 10 KW

(TURN OVER)

- 5) In astronomical units (earth-sun distance), what is the collective total distance run by all finishing marathon runners in all official races in the USA in a single year?
Answer: 10 a.u.
- 6) While riding, how many words do all NYC subway riders say in a single year?
Answer: 10 words
- 7) How many characters are printed in physical books published in a single year in the USA?
Answer: 10 letters
- 8) In square miles, what is the total area of leaves that fall from trees in CT during Autumn?
Answer: 10 Sq. miles
- 9) How many pixels worth of photos are uploaded per day on Instagram?
Answer: 10 pixels
- 10) How long in decades does it take a sea turtle to swim across the Atlantic?
Answer: 10 decades
- 11) How many metric tons worth of pennies have we spent on the YPO over the last 20 years?
Answer: 10 metric tons
- 12) What is the ratio of the weight of a single gut bacterium to the total weight of all bacteria found in and on a person's body (the microbiome)?
Answer: 10
- 13) How much surface area **as a percentage** of the United States' total land area do all the single-family homes in the US occupy?
Answer: 10 Percent
- 14) In the US, what is the ratio of total solar power output to total nuclear power output?
Answer: 10
- 15) **TIEBREAKER: How many atoms thick is the layer of rubber that is laid down by an average automobile tire as it travels down a paved road? Give an integer number.**

Answer: Atoms thick