



Minnesota
Science
Olympiad

FERMI QUESTIONS
WAYZATA INVITATIONAL
by Michael D. Huberty
Minnesota Science Olympiad President

Team Number _____


School Name _____

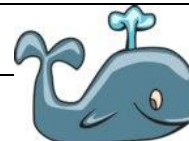
Total Points _____









For each item, answer the quantity as the nearest integral power of ten. For example, if the number is 1.4×10^6 , you record 6 as your answer. If it is 8.6×10^3 , you record 4.

No calculators or resources allowed.

SCORING: If the response is = to the accepted value, then it receives 5 points. If the response is ± 1 of the accepted value, then it receives 3 points. If the response is ± 2 of the accepted value, then it receives 1 points. Ties are broken by counting the highest number of answers which received 5 points (then 3 points if still a tie).

	Answer	Points
1. What is the value of 10^{-10} ?		5 3 1 0
2. What is the value of $10^{0^{-10}}$?		5 3 1 0
3. What is the value of $10^{0^{0^{-10}}}$?		5 3 1 0
4. What is the value of $10^{0^{0^{0^{-10}}}}$?		5 3 1 0
5. What is the value of $\frac{1}{10 + \frac{1}{10 + \frac{1}{10 + \frac{1}{10 + \frac{1}{10 + \dots}}}}}$?		5 3 1 0
6. What is the value of $\sqrt{10 + \sqrt{10 + \sqrt{10 + \sqrt{10 + \sqrt{10 + \sqrt{10 + \sqrt{10 + \dots}}}}}}}$?		5 3 1 0
7. How many bones are in the human body?		5 3 1 0
 8. If a human could jump the same proportional height as a flea, how many feet could you jump?		5 3 1 0
9. How long, in μm , are the longest cells in the human body – motor neurons?		5 3 1 0
10. At what decibel level does the blue whale “sing”?		5 3 1 0
11. What is the mass of a blue whale at birth, in kg?		5 3 1 0



	Answer	Points
12. If you stretch a standard Slinky out flat, how many inches long would it be?		5 3 1 0
13. What is the average velocity of the Earth traveling around the sun, in km/hour?		5 3 1 0
14. How many times does the average human blink in a year? 		5 3 1 0
 15. What is the Fahrenheit temperature of a bolt of lightning?		5 3 1 0
16. What is the Fahrenheit temperature of the center of the sun? 		5 3 1 0
17. The average human produces how many liters of saliva in a lifetime?		5 3 1 0
18. How many blood cells are produced and destroyed in the human body every day?		5 3 1 0
19. How many kilometers of blood vessels are in the average human?		5 3 1 0
20. What proportion of the atmosphere is ozone?		5 3 1 0
 21. What is the mass, in grams, of oxygen in a soccer ball filled with air?		5 3 1 0
22. How many soccer balls would fit on a soccer field (no stacking)?		5 3 1 0
23. How many trucks are needed to transport the soccer balls in problem 22?		5 3 1 0
24. If you made a piece of toast for each of Earth's humans today, how many feet tall would the "tower-o'-toast" be? 		5 3 1 0
25. What is the probability that two randomly selected people have the same birthday? 		5 3 1 0
26. What is the probability that among 10 randomly selected people, at least two people have the same birthday?		5 3 1 0
27. The Mariana Trench in the Pacific Ocean is the deepest part of the ocean. How many feet deep is it?		5 3 1 0
28. What is the water pressure at the deepest part of the ocean, in psi (pounds/inch ²)?		5 3 1 0
29. What proportion of sterling silver is copper?		5 3 1 0
 30. How many kilograms is the mass of Earth?		5 3 1 0
31. An inch of dry, powdery snow is equivalent to how many inches of rain water?		5 3 1 0
32. How many gallons of fuel does a Boeing 707 jet use in its take-off climb? 		5 3 1 0
33. How many teams are competing in today's Wayzata Invitational Science Olympiad?		5 3 1 0