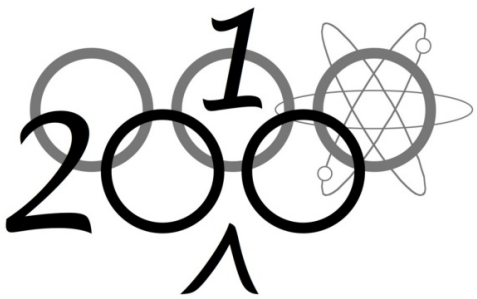
Team _____

Rank _____

LIVERPOOL PHYSICS OLYMPICS



Fermi Questions

1.	What is the average density of the earth?	4	kg/m^3
2.	If the super volcano in Yellowstone national park erupted leaving a thin layer of lava over the entire U.S.A, what is the surface area?	7	km^2
3.	Now many protons are there in a brick?	27	
4.	What is the total mass (in grams) of all the competitors in today's Physics Olympics?	7	g
5.	How far away is the most distant object visible with the naked eye?	22	m
6.	If a laser is pointed at the Moon, how big would the spot be?	3	m
7.	If the Earth's human population continues to double every ten years, how long will it be before the mass of people exceeds that of the Earth itself?	3	years
8.	A fly lands on a 35,000 tonne ocean liner. How much lower in the water will the ship settle?	-11	m
9.	If the Earth has 4x the diameter of the Moon and 6x the surface gravity, what is the ratio of the Earth's mass to the Moon's mass?	2	
10.	What is the gravitational potential energy of a hammer on the International space station (ignoring all other factors)?	7	J
11.	How much energy is released in an earthquake measured at 4.5 on the Richter scale?	12	J
12.	How many Hydrogen atoms fit on the head of a pin?	12	
13.	How many nucleons (protons and neutrons) are there in a typical nucleus?	2	
14.	How many seconds would it take to drive once around the sun following the path of the earth's orbit (no pit stops allowed!).	10	s