

TABLE 1.1
Large Numbers

Physical Analogue	Number
Odds of being killed by lightning (per day)	1 in 9 billion (2^{33})
Odds of winning the top prize in a U.S. state lottery	1 in 4,000,000 (2^{22})
Odds of winning the top prize in a U.S. state lottery and being killed by lightning in the same day	1 in 2^{55}
Odds of drowning (in the U.S. per year)	1 in 59,000 (2^{16})
Odds of being killed in an automobile accident (in the U.S. in 1993)	1 in 6100 (2^{13})
Odds of being killed in an automobile accident (in the U.S. per lifetime)	1 in 88 (2^7)
Time until the next ice age	14,000 (2^{14}) years
Time until the sun goes nova	10^9 (2^{30}) years
Age of the planet	10^9 (2^{30}) years
Age of the Universe	10^{10} (2^{34}) years
Number of atoms in the planet	10^{51} (2^{170})
Number of atoms in the sun	10^{57} (2^{190})
Number of atoms in the galaxy	10^{67} (2^{223})
Number of atoms in the Universe (dark matter excluded)	10^{77} (2^{265})
Volume of the Universe	10^{84} (2^{280}) cm^3
If the Universe is Closed:	
Total lifetime of the Universe	10^{11} (2^{37}) years 10^{18} (2^{61}) seconds
If the Universe is Open:	
Time until low-mass stars cool off	10^{14} (2^{47}) years
Time until planets detach from stars	10^{15} (2^{50}) years
Time until stars detach from galaxies	10^{19} (2^{64}) years
Time until orbits decay by gravitational radiation	10^{20} (2^{67}) years
Time until black holes decay by the Hawking process	10^{64} (2^{213}) years
Time until all matter is liquid at zero temperature	10^{65} (2^{216}) years
Time until all matter decays to iron	$10^{10^{26}}$ years
Time until all matter collapses to black holes	$10^{10^{76}}$ years

Dyson's paper, "Time Without End: Physics and Biology in an Open Universe," in *Reviews of Modern Physics*, v. 52, n. 3, July 1979, pp. 447–460. Automobile accident deaths are calculated from the Department of Transportation's statistic of 163 deaths per million people in 1993 and an average lifespan of 69.7 years.