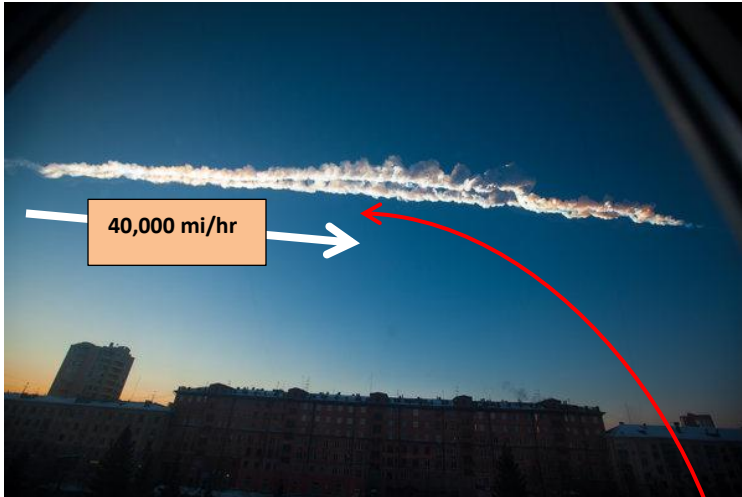


ENERGY

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Size of Blast and Number of Injuries Are Seen as Rare for a Rock From Space



A photo provided by Chelyabinsk.ru shows the meteor's trail over Chelyabinsk on Friday. Its passage unleashed sonic booms. [More Photos »](#)

INTRODUCTION & HINTS: This meteor's 7000 tons is given in Metric tons which is 1000 kg/Ton. $0.447 \text{ m/s} = 1 \text{ mph}$. 1 kilo Ton TNT = $4.185 \times 10^{12} \text{ J}$
Translational Kinetic energy (K) = $\frac{1}{2} mv^2$

QUESTIONS: (a) Convert 7000 tons into kg.?
(b) Convert 40,000 mi/hr. to m/s ?
(c) Convert 300,000 Tons TNT to Joules(J) of energy?
(d) Find Kinetic energy(K) of this meteor ?
(e) How does K of meteor in (d) compare to Stated equivalent TNT energy in ?

ANSWERS: (a) $7.0 \times 10^6 \text{ kg}$. , (b) $1.788 \times 10^4 \text{ m/s}$
(c) $12.56 \times 10^{14} \text{ Joules(J)}$, (d) $\sim 11.2 \times 10^{14} \text{ Joules(J)}$
(e) _____.

The meteor that exploded over [Russia](#) on Friday set off the largest explosion of its kind in more than a century, at least according to Western scientists. And even more unusual for a meteor, it caused numerous injuries, mostly from flying glass, as the shock wave violently jolted the city of Chelyabinsk below.

- [VIDEO: Fire in the Russian Sky](#)
- [SLIDE SHOW: A Strange Show in the Sky Over Siberia](#)

Based on preliminary calculations, the solar system interloper that shook Chelyabinsk weighed about

(((7,000 tons))) and was about 50 feet in diameter when it entered the atmosphere **at (((40,000 miles per hour)))** at about 9:20 a.m. local time, said Peter G. Brown, a professor of physics at the University of Western Ontario. Dr. Brown based his calculations on low-frequency sound waves that traveled as far as Alaska. A worldwide network of such sensors listens for these vibrations, too low to be heard by humans, to verify the ban on nuclear tests. The asteroid streaked across the sky for about half a minute, unleashing thunderous sonic booms. (Asteroids are orbiting rocks usually between Mars and Jupiter; they are called meteors when they enter the Earth's atmosphere and begin burning up.) The meteor was likely made of stony materials and not solid metal, so as pressure from the atmosphere increased, it exploded at an altitude of 12 to 15 miles above the surface **(((. It released the equivalent energy of 300,000 tons TNT)))**, Dr. Brown said, although he said that estimate could be revised higher, perhaps to 500,000 tons of TNT. The atomic bomb that destroyed Hiroshima during World War II was the equivalent of 15,000 tons of TNT.