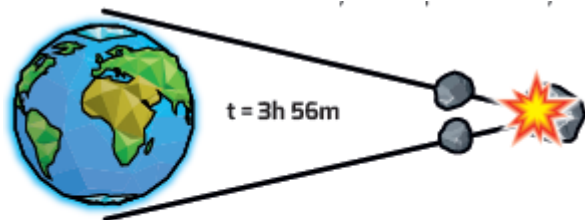


ACTIVITY 18.1 ARMAGEDDON TIME?



Density of an iron asteroid: 8000 kg m^{-3}
Radius of the Earth: 6400 km
Diameter of asteroid: 1100 km

Example Calculation (energy required = total KE)

Each half has to move a 'vertical' distance of $6400 \times 10^3 \text{ m}$ in a time of 3h56m.

Speed of each half = distance/time

Time (s) = 14160s

So speed = $6400 \times 10^3 / 14160 = 452 \text{ ms}^{-1}$

$\text{KE} = \frac{1}{2}mv^2$ since EACH half has speed = 452 ms^{-1} model as whole asteroid having that speed.

Volume of asteroid = $\frac{4}{3} \pi r^3$ (assume it is spherical) = $\frac{4}{3} \pi \times (550 \times 10^3)^3 = 7 \times 10^{17} \text{ m}^3$

Mass of asteroid = $7 \times 10^{17} \times 8000 = 5.6 \times 10^{21} \text{ kg}$

$\text{KE} = \frac{1}{2} \times 5.6 \times 10^{21} \times 452^2 = 5.7 \times 10^{26} \text{ J}$ (A billion times more than the largest ever nuclear test detonation!)