

# 18.1 ARMAGEDDON TIME?

## ACTIVITY 2: ARMAGEDDON?

In the movie Armageddon, an asteroid the size of Texas is headed straight for the Earth. The plan is for a team of oil drillers to drill 270m into the asteroid, plant a bomb, and detonate it, harmlessly splitting the asteroid into two even fragments that separate from each other and miss the Earth. You are going to analyse whether you think this would be successful, and calculate how much energy the bomb would require.

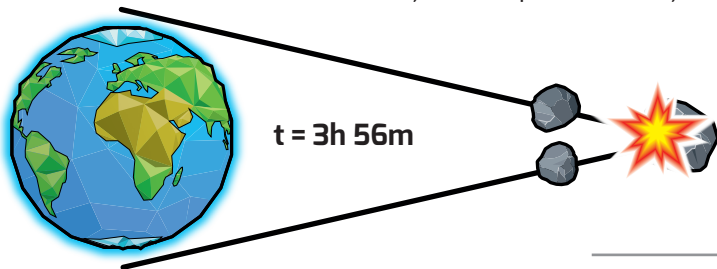
- 1.** Texas has a diameter of about 1100km. Explain in terms of the size of the asteroid whether we can truly say that the bomb would be INSIDE the asteroid.

---



---

- 2.** The movie states that once the asteroid is less than 3 hours and 56 minutes away from the Earth, it is too late to divert it. Use this information along with the information given below to calculate how much energy would be required to safely split the asteroid in two, and have both pieces miss the Earth, just before this deadline. State any assumptions that you have made.



Minimum energy required:

Density of an iron asteroid: **8000kg m<sup>-3</sup>**

Radius of the Earth: **6400 km**

Diameter of asteroid: **1100km**

- 3.** Why is this a minimum energy value?

---



---

- 4.** Here are some figures for various energy sources. Compare these to your answer and make a statement about the energy that would be required and the likelihood of this being possible.

Hiroshima nuclear bomb: **6.3 x 10<sup>13</sup> J**

Biggest ever nuclear weapon test: **2.092 x 10<sup>17</sup> J**

Energy output of the Sun: **3.846 x 10<sup>26</sup> Js<sup>-1</sup>**

### So what could we do?

Think about, and discuss with your table, what other options there might be open to scientists and engineers when it comes to destroying, or deflecting an asteroid that might hit the Earth.

- How could we use gravity?
- How could we use lasers?
- How could we use kinetic energy and momentum?

Use your understanding of physics to explain how your options would work and how feasible you think they are.