

# SCIENCE NEWS FOR STUDENTS

## Gravity Tractor as Asteroid Mover: A huge spacecraft could use its gravity to keep an asteroid from hitting Earth.

by [Emily Sohn](#) [1]

12:00am, November 10, 2005

Movie producers love the idea, partly because it's so scary and partly because it could actually happen. The setup is this: An asteroid is screaming toward Earth. A collision is inevitable. When the rocky object hits the planet, lots of people will die.

In the movies, a daring hero comes up with a crazy plan to destroy or divert the asteroid and save the day. In real life, scientists have come up with more reasonable plans that might actually work if this rare situation ever comes up.

One solution, say two NASA scientists and astronauts, is a 20-ton spacecraft called a gravitational tractor. First, the tractor would zoom up to the threatening asteroid and stop a short distance away. It would hover there, firing its thrusters just enough to overcome the force of gravity between the spacecraft and the asteroid.

The tractor could then use its own gravity to tug the asteroid off course. It would take about a year for the spacecraft to drag a medium-sized asteroid that measures 200 meters (660 feet) across and weighs 60 million tons away from Earth's path.

An asteroid this large could cause major damage to our planet. Some asteroids are even larger than this, and it would require bigger tractors to pull them enough to remove the threat.

The tricky part is that the spacecraft would have to arrive at the Earth-bound asteroid about 20 years before the asteroid was due to hit Earth. It would take a much smaller nudge then to move the asteroid out of the way than it would take if the asteroid were closer to its impact time.

Still, the tractor idea is better than many previously proposed strategies for asteroid avoidance. Blowing up asteroids, for example, wouldn't work because the rocky bodies are too full of air holes to burst apart.

Nor is it reasonable to have a spacecraft attach itself to an asteroid and use its engines to steer the object away. That's because asteroids spin. Unless the craft stopped the asteroid from spinning, each thrust would push the asteroid in a different direction. A gravitational tractor could get around these problems.

Don't spend too much time worrying about asteroids falling on your house, however. The chances of a collision occurring in your lifetime are very slim. If it does happen, though, scientists will do everything they can to keep you from getting hurt. Sounds pretty heroic to me!—*E. Sohn*

### Going Deeper:

Cowen, Ron. 2005. [Protecting Earth: Gravitational tractor could lure asteroids off course](#) [2]. *Science News* 168(Nov. 12):310. Available at <http://www.sciencenews.org/articles/20051112/fob8.asp> [2] .

Sohn, Emily. 2005. [Killers from outer space](#) [3]. *Science News for Kids* (May 18). Available at <http://www.sciencenewsforkids.org/articles/20050518/Feature1.asp> [4] .

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## **GRAVITY TRACTOR**

1. What is a gravity tractor?

2. How does the gravity tractor change the course of an asteroid without touching it?

3. Why would the gravity tractor need to be at the asteroid 20 years before the asteroid hit Earth?

4. If you could talk to the scientists working on this project, what are 2 questions you would ask? (Do not use the words *they*, *it*, *them*).