(Robert Lea (created with Canva))

Earth safe from 'city-killer' asteroid 2024 YR4!

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It has happened Before

According to abundant geological evidence, an asteroid roughly 10 km (6 miles) across hit Earth about 65 million years ago. This impact made a huge explosion and a crater about 180 km (roughly 110 miles) across and up to 12 miles deep. Debris from the explosion was thrown into the atmosphere, severely altering the climate, and leading to the extinction of roughly 3/4 of species that existed at that time, including the dinosaurs.

After a decade of searching, scientists in 1990 identified the crater (Chicxulub crater) **associated with this material. It is no longer visible on the surface of the Earth, but is buried under sediments. It straddles the coast of Yucatan. It is revealed by mapping the strength of the gravity field over that area, and by drilling;**

Did it happen “recently?

An asteroid hit Vredefort South Africa 2B years ago, ~10–15 km (6.2–9.3 mi) in diameter causing a crater 100-160 miles wide. 3-hour simulation and video https://www.youtube.com/watch?v=2eulqemWeiA

On June 30, 1908 the largest asteroid “impact” in recorded history struck in Siberia, over sparsely populated northern forestland.
The blast released enough energy to flatten ~80 million trees over an area of 830 square miles (A circle with a diameter of ~33 miles). Exploded at 28,000’, thus no crater.

Witnesses reported seeing a fireball – a bluish light, nearly as bright as the sun – moving across the sky. A flash and a sound similar to artillery fire was said to follow it. A powerful shockwave broke windows hundreds of miles away and knocked people off their feet. See https://earthsky.org/space/what-is-the-tunguska-explosion/

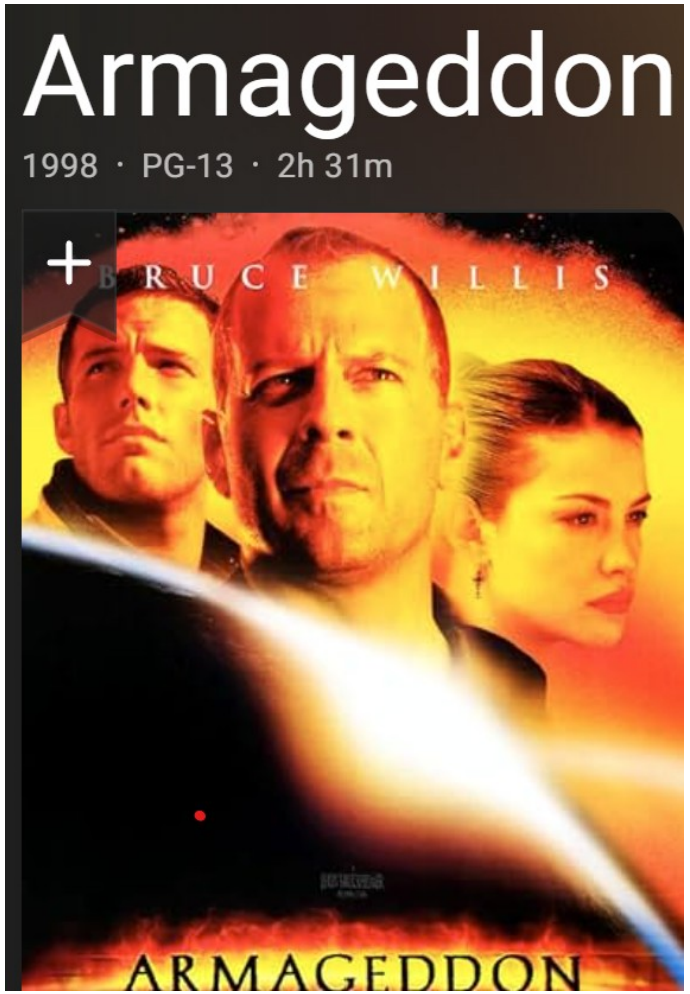
Tunguska event

Likely a stony asteroid approximately the size of a 25-story building traveling at about 33,500 miles per hour and exploded 3 to 6 miles above Earth’s surface.

Per current understanding of the asteroid population, an object like the Chelyabinsk meteor can impact the Earth every 10 to 100 years on average.

An estimated 25 million **meteoroids**, micrometeoroids and other space debris enter **Earth's** atmosphere each **day**, which results in an estimated 15,000 tons of that material entering the atmosphere each year.

Do we need Bruce Willis?



After discovering that an asteroid the size of Texas will impact Earth in less than a month, NASA recruits a misfit team of deep-core drillers to save the planet.

Plant a nuclear bomb deep within the asteroid. Ultimately, Harry sacrifices himself to ensure the bomb detonates, splitting the asteroid and saving Earth.

We have been slightly successful

In 2022, NASA slammed an uncrewed spacecraft into the asteroid Dimorphos—160 metres wide and not a threat to Earth—to slightly shift its path. This DART mission's success hints we might actually deflect an asteroid in a real emergency, though other methods remain untested.

5.5 million tons, or about the same mass and size as the Great Pyramid of Giza

The Recent Scare

For a few weeks, a few months ago, there have been stories of an asteroid coming close to the earth

A few days later "The NASA JPL Center for Near-Earth Object Studies (CNEOS) now lists the 2024 YR4 impact probability as 0.00005 (0.005%) or 1-in-20,000 for its passage by Earth in 2032,"

"Asteroid 2024 YR4 has now been reassigned to **Torino Scale** Level Zero, the level for 'No Hazard' as additional tracking of its orbital path has reduced its possibility of intersecting the Earth to below the 1-in-1000 threshold."

Torino Scale

https://www.space.com/954-asteroid-threat-scale-revised.html

No Hazard (White Zone)	**0**	The likelihood of a collision is zero, or is so low as to be effectively zero. Also applies to small objects such as meteors and bodies that burn up in the atmosphere as well as infrequent meteorite falls that rarely cause damage.
Normal (Green Zone)	**1**	A routine discovery in which a pass near the Earth is predicted that poses no unusual level of danger. Current calculations show the chance of collision is extremely unlikely with no cause for public attention or public concern. New telescopic observations very likely will lead to re-assignment to Level 0.
Meriting Attention by Astronomers (Yellow Zone)	**2**	A discovery, which may become routine with expanded searches, of an object making a somewhat close but not highly unusual pass near the Earth. While meriting attention by astronomers, there is no cause for public attention or public concern as an actual collision is very unlikely. New telescopic observations very likely will lead to re-assignment to Level 0.
	3	A close encounter, meriting attention by astronomers. Current calculations give a 1% or greater chance of collision capable of localized destruction. Most likely, new telescopic observations will lead to re-assignment to Level 0. Attention by public and by public officials is merited if the encounter is less than a decade away.
	4	A close encounter, meriting attention by astronomers. Current calculations give a 1% or greater chance of collision capable of regional devastation. Most likely, new telescopic observations will lead to re-assignment to Level 0. Attention by public and by public officials is merited if the encounter is less than a decade away.
Threatening (Orange Zone)	**5**	A close encounter posing a serious, but still uncertain threat of regional devastation. Critical attention by astronomers is needed to determine conclusively whether or not a collision will occur. If the encounter is less than a decade away, governmental contingency planning may be warranted.
	6	A close encounter by a large object posing a serious but still uncertain threat of a global catastrophe. Critical attention by astronomers is needed to determine conclusively whether or not a collision will occur. If the encounter is less than three decades away, governmental contingency planning may be warranted.
	7	A very close encounter by a large object, which if occurring this century, poses an unprecedented but still uncertain threat of a global catastrophe. For such a threat in this century, international contingency planning is warranted, especially to determine urgently and conclusively whether or not a collision will occur.
Certain Collisions (Red Zone)	**8**	A collision is certain, capable of causing localized destruction for an impact over land or possibly a tsunami if close offshore. Such events occur on average between once per 50 years and once per several 1000 years.
	9	A collision is certain, capable of causing unprecedented regional devastation for a land impact or the threat of a major tsunami for an ocean impact. Such events occur on average between once per 10,000 years and once per 100,000 years.
	10	A collision is certain, capable of causing global climatic catastrophe that may threaten the future of civilization as we know it, whether impacting land or ocean. Such events occur on average once per 100,000 years, or less often.

Discovered in Dec. 2024, 2024 YR4 quickly climbed to the top of NASA's Sentry Risk table, at one point having a 1 in 32 chance of hitting Earth. This elevated it to Level 3 on the Torino scale, a system used since 1999 to categorize potential Earth impact events.

Level 3, which falls within the yellow band of the Torino Scale, is described as: "A close encounter, meriting attention by astronomers. Current calculations give a 1% or greater chance of collision capable of localized destruction."

What will a small nudge do?

" hold a stick that is a few feet long. If you move the stick in your hand a fraction of an inch, you hardly notice any movement on the other end. Now imagine that stick is many millions of miles long. Moving your hand a fraction of an inch will cause dramatic changes on the other end.“

"An object the size of YR4 passes harmlessly through the Earth-moon neighborhood as frequently as a few times per year.