Eye Spy – Asteroids and Near Earth Objects

Get the Data

Visit EOSS **http://1.usa.gov/GLkLWp** to recreate this exact scene. Recommended operating system: MS Vista or later; Browser: MS Internet Explorer 8 or later.

Step 1 – Activate the Distance Measuring tool and measure the distance from Earth to the asteroid Midas. Note the orbit of the moon to scale. In this projection, asteroids may be very far away but appear close to Earth.

Step 2 – Advance the time by using the Speed and Rate slider until the next asteroid, 2012DA14 passes closest to Earth and measure its distance.

Answering Questions

Step 3 – Repeat these steps until you reach 2025, noting the names and distances of the asteroids making their closest approaches to Earth within 10 million kilometers.

Astronomers have cataloged over 8,000 'Near Earth Objects'. The total number of known asteroids within the orbit of Jupiter and the asteroid belt is about 100,000.

Problem 1 – What percentage of asteroids are Near Earth Objects?

Problem 2 – Of the known Near Earth Objects, what percentage will come within ten million kilometers of Earth during the 12-year period from 2013 to 2025 ?

Math Challenge

Astronomers discover asteroids by comparing photographs several days apart and looking for objects that move. They cataloged 600 new objects. How many of these might be Near Earth Objects?

Answer Key

Asteroid	Date	Distance (km)
2012 DA14	February 15, 2013	0 km!
2008 HU4	April 26, 2016	1.4 million
2003 UV11	November 1, 2017	4.4 million
1999 KW4A	May 30, 2018	8.1 million
2001 BB16	March 12, 2020	8.6 million
2009 OS5	July 9, 2020	4.3 million
2001 GP2	October 2, 2020	764,000
QJ142	March 21, 2024	8.9 million
1998 KY28	May 24, 2024	4.6 million

Problem 1 – What percentage of discovered asteroids are known to be Near Earth Objects? Answer: There are an estimated 100,000 discovered asteroids detected so far, of which 8,000 are NEOs so the percentage is P = 100% x (8,000/100,000) = **8%**. Another way to look at this is that 8 out of 100 or about 1 out of 12 asteroids inside the orbit of Jupiter are currently known to be NEOs.

Problem 2 – Of the known Near Earth Objects, what percentage will come within ten million kilometers of Earth during the period from 2013 to 2025 ? Answer: There are 8,000 known NEOs and our simulation of the known orbits shows that in the table above there are 9 that came within 10 million kilometers of Earth, so P = 100% x (9/8,000) = **0.1%** . This is equal to saying that about 1 in 1000 NEOs come this close to Earth during this period of time.

Challenge Question: Astronomers discover asteroids by comparing photographs several days apart and looking for objects that move. They catalogued 600 new objects. How many of these might be Near Earth Objects?

Answer: Because NEOs are only 8% of all asteroids, the number of NEOs in his sample is probably about 600 x 8/100 = **48 asteroids**.