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Tool Kit: Asteroids and Comets

In this document, we introduce a comprehensive suite of interactive, educator-friendly tools—ranging from NASA's real-time asteroid visualizer to ESA's planetary defense interfaces—that enable students to explore, simulate, and assess the properties and orbital dynamics of asteroids and comets throughout our Solar System.

*WP 2: STAND TOOLKITS

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1. Introduction to Asteroids and Comets- Basic tools

The proposed tools are to be used in tandem with the teacher manual: "Asteroids and comets".

NASA's Eyes on Asteroids:
https://eyes.nasa.gov/apps/asteroids/#/home
An interface that allows you to learn about asteroids, and visualize their position over time in the solar system.

ESA's planetary defense page
https://www.esa.int/Space_Safety/Planetary_Defence/ESA_asteroid_toolkit_how_to_guide
ESA has developed four freely available tools to better understand the small bodies scattered through our Solar System, and the risk they pose Earth.

Torino's impact hazard scale:
https://cneos.jpl.nasa.gov/sentry/torino_scale.html
The Torino Scale, adopted by the IAU in 1999, is a tool for categorizing potential Earth impact events. An integer scale ranging from 0 to 10 with associated color coding, it is intended primarily to facilitate public communication by the asteroid impact hazard monitoring community.

NASA earth impact monitoring:
https://cneos.jpl.nasa.gov/sentry/
Sentry is a highly automated collision monitoring system that continually scans the most current asteroid catalog for possibilities of future impact with Earth over the next 100 years.

NASA's page on comets:
https://science.nasa.gov/solar-system/comets/
NASA's central page on comets. The resources section contains videos, animations and activities on comets.

ESA's view Rosetta's comet
https://sci.esa.int/comet-viewer/
This interactive tool allows you to view Rosetta's target comet (67P/C-G) from all angles.

The SkyLive's Comets database
https://theskylive.com/comets
This page provides a comprehensive list of the bright comets currently visible in the sky. This list is updated with new information several times per day.

SkyLive's Comet Haley

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https://theskylive.com/3dsolarsystem?obj=halley
Visualization of the orbit of Comet Halley (1P/Halley) in an interactive 3D Solar System viewer and simulator.

2 Main Belt, Kuiper Belt, Oort cloud, NEOs

ESA's NEO Toolkit:
https://neo.ssa.esa.int/neo-toolkit
With this Toolkit you will be able to obtain high accuracy ephemerides, precisely locating asteroids and their orbits in the night sky or the Solar System or simulating the close approach of those objects that may come closest to Earth.

NASA's Oort cloud multimedia resources
https://science.nasa.gov/solar-system/oort-cloud/multimedia/
A set of online resources to explore and learn more about the Oort cloud

NASA's exploration of the Kuiper belt
https://science.nasa.gov/solar-system/kuiper-belt/exploration/
Learning more about the Kuiper belt.

The main Asteroid belt
https://www.space.com/16105-asteroid-belt.html
Orientation about the main asteroid belt.

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