Near Earth Objects

Prep Time: 5 minutes	**Grades:** 5-8	**Lesson Time:** 50-60 minutes

Essential Questions:

- What are near-Earth objects?
- What is the difference between asteroids, comets, meteoroids, and meteors?
- How is distance measured regarding NEOs?

Objectives:

- SWBAT define the difference regarding NEOs.
- SWBAT explain how the distance of NEOs is measured.

Standards:

- MS-ESS1-2- Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
- RST.6-8.7 - Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

Teacher Prep:

- Materials: computer with projector (other option is to print out images), different colors of standard sized paper, stapler, pens, markers, ruler.
- Guide your students in building a model of the booklet they are going to make.

Teacher Notes/Background:

- NEO: an object in our solar system whose orbit around the Sun would bring it relatively close to the Earth.
- Asteroids: large rocky body in orbit of the Sun.
- Comet: small objects made of ice; come from Oort Cloud & Kuiper Belt.
- Meteoroid: small particle from comet or asteroid orbiting the Sun.
- Meteor: a meteoroid that enters the Earth's atmosphere and vaporizes.
- AU: stands for astronomical unit a unit of measurement. One AU is equal to the distance from Earth to the Sun.

Engage (5 minutes)	**Turn and Talk:** • Students should get into small groups and discuss NEOs. • Write down 2 things I know and 1 question I have. • Share out questions and ideas.	**Materials:** • Pen or pencil

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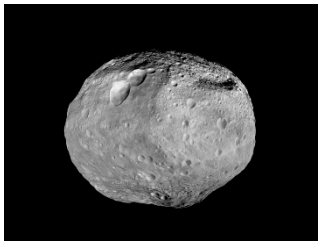
Explore (5 minutes)

Distinctions:

- Print out images to distribute to small groups or show them on a projector to students.
- Ask the students to identify the images. The images attached are of an asteroid, a comet, and a meteor.
- Asteroid



- Comet

- Meteor

Materials:

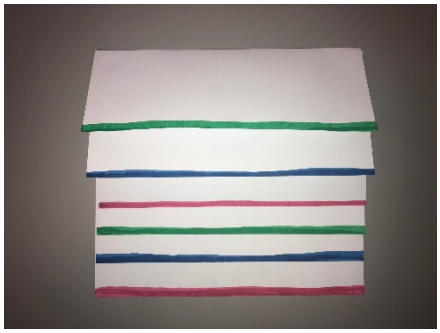
- Computer with projector or printed out images
- Asteroid image
- Comet image
- Meteor image

Explain (30 minutes)

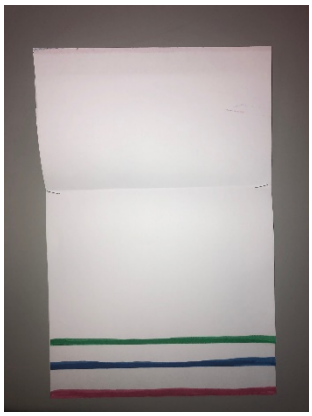
Foldable Booklet:

- Layer the papers so that there is space in between them. (Different colors are preferred, or you can use white paper and show the separation as pictured with markers).

- Fold them over so that more layers are created. The fold should slightly above the center of the top paper.



- Staple the inside of the book using an extra-long stapler.



- 3 pieces of paper will make 6 flaps, one for each term. Add more piece of paper if you wish to fill the books with more terms or a cover page.
- The terms included should include asteroid, meteor, meteoroid, comet, NEO, and Astronomical Unit (AU).

Materials:

- Standard sized paper
- Pen
- Markers
- Ruler
- Stapler

	• Have students title each fold, define the terms, write down where they can find the objects, and other details. They should also draw pictures to illustrate what the object looks like or a visual representation of the term. • Use a ruler to neatly label each fold.	

Elaborate (5 minutes)	**Share Out:** • Have students share out the details they included about NEOs. • Students should explain the details they chose to include in their illustrations (did they draw craters? A tail for the comet?).	**Materials:** • Completed books

Evaluate (5 minutes)	**Wrap-up Questions:** • What is the difference between the different types of NEOs? • How many miles are in one AU? • Have you ever seen a NEO in the night sky? What did it look like? • How often do you think meteor showers occur?	**Materials:** N/A

Extensions and Enrichment:

- This same activity can be done for the planets in our solar system. Simply add more pieces of paper to the booklet.
- If resources are available, this can also be done as a PowerPoint presentation instead of a physical booklet. This way, students can search for actual images of NEOs.

Additional Resources:

- https://solc.gsfc.nasa.gov/kidszone6.html
- https://www.nasa.gov/audience/forstudents/k-4/more_to_explore/Asteroids-Comets-Meteorites.html
- https://dawn.jpl.nasa.gov/Meteorite/explore_asteroids.html