

Elective 7: Reading and Writing in Science with the Common Core State Standards for ELA Reading and Writing in Science and Technical Subjects

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NASA Resource: [Teaching Science Vocabulary with *The Shape of a Moon's Orbit*](#)

CCSS in Science & Technical Subjects Grades 6-8:

1. Craft and Structure

- **RST.6-8.4.** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

2. Integration of Knowledge and Ideas

- **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).

3. Range of Reading and Level of Text Complexity

- **RST.6-8.10.** By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

Physical Science Learning Outcomes:

- **8.PS2.2** Conduct an investigation to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

The Shape of a Moon's Orbit

About the article. In this article, the orbital path of Dione (one of Saturn's many moons) is described. Using diagrams and descriptions, the article explains that Dione's orbit is wavy rather than perfectly circular, due to the gravitational pull of the Sun. Since a moon's orbit also depends on how fast the planet is orbiting, how fast the moon is orbiting, and how far the moon is away from the planet, the article also compares Dione's orbit with the orbit of Earth's moon for further illustration.

Flesch-Kincaid Grade Level Readability: 6.9; Lexile Framework for Reading: 1020

Lesson Format:

1. Follow the lesson format as recommended in the attached resource.
 - a. Activate and Build Background Knowledge
 - i. Do the moons of all planets orbit in the same way?
 - ii. Word Map - *orbit* completion.
 - b. Set Purpose for Reading
 - i. Ask if any planets or moons have orbits that are not circular.
 - ii. Introduce article *The Shape of a Moon's Orbit*.
 - iii. Word Map - *trajectory* completion.
 - iv. Pre-read article
 - v. Read article and discuss Word Map - *trajectory*
 - c. Integrate Text and Experience
 - i. Project [Image of Dione and Saturn](#) and discuss relative difference in size between moon and planet.
 - ii. Focus attention on visual representation on front of article to describe what it shows or if they notice anything confusing.
 - iii. Next focus attention on visual representation on back of article to compare with diagram on front.
 - iv. Discuss why images were included and how visual representation
 - d. Apply New Ideas
 - i. Return to the guiding question: *Do the moons of all planets orbit in the same way?* Describe the similarities and differences between the orbits of Dione and Earth's moon
 - ii. Project the [image of Dione with a few of Saturn's other moons](#) Elicit predictions about how Hyperion,, Epimetheus, and Lapetus orbit around Saturn. Remind them to cite evidence from the text for their responses.
2. Writing prompt to help students to narrate their thinking about concepts of force and motion.

After reading the article *The Shape of a Moon's Orbit*, what are your thoughts on the differing amounts of the force of gravity on objects of different sizes? How do you feel this affects the motion of objects that are smaller or larger or that may be moving at different speeds?