

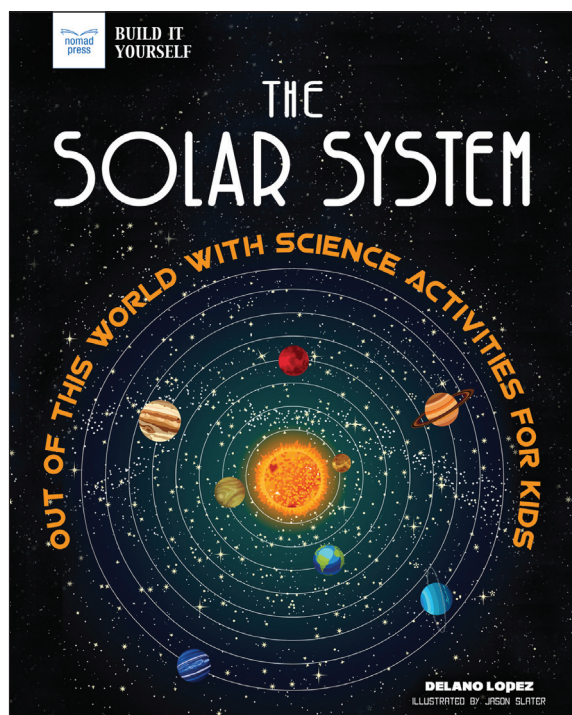


CLASSROOM GUIDE

The Solar System: Out of This World with Science Activities for Kids

Nomad Press offers concise classroom guides to help educators explore content-related topics with students and encourage them to develop ideas in meaningful ways. Includes Essential Questions and Common Core Connections.

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Age: 9–12

Grade: 4–6

Softcover: 9781619307971, \$17.95

Hardcover: 9781619307940, \$22.95

eBook: all formats available, \$12.99

Specs: 8 x 10, 128 pages, color interior

Focus: Earth/Space Science

GRL: Z

Look up! What do you see? The sun, moon, stars, other planets? You're checking out the solar system!

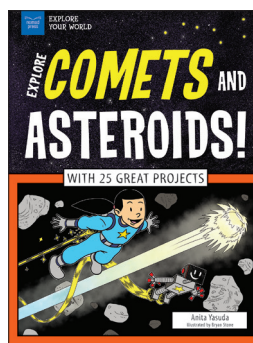
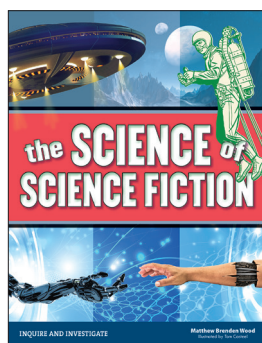
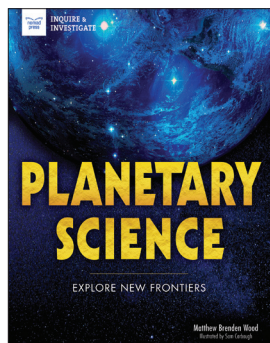
The Solar System: Out of This World with Science Activities for Kids invites middle school kids on a journey of a lifetime to explore the comets, meteors, asteroids, sun, planets, and moons that make up the solar system. Kids learn about the history of space exploration and discovery, along with the tools of astronomy that have made it possible to study celestial objects even outside our own solar system. While space seems far away, and really, it is, *The Solar System* brings it closer to the classroom with fun facts and engaging language kids will find exciting!

The Solar System includes hands-on STEM activities and critical thinking exercises related to astronomy and space exploration. Fun facts, links to online primary sources and other supplemental material, and essential questions encourage readers to take a deep dive toward the outer limits of our home!

Learn more about *The Solar System* at nomadpress.net/nomadpress-books/solar-system



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ESSENTIAL QUESTIONS TO ASK

BEFORE READING

1 Establish Background Knowledge

- a What do you know about the beginnings of the universe?
- b How do you think scientists gain knowledge about events that happened before humans existed?
- c How might learning about the distant past inform us of the future of the solar system?

2 Skill Introduction

- a What do you do when you come to a word or phrase you do not know?
- b How do photographs and videos help someone learn about a topic?

CCC: CCSS.ELA-Literacy.L.8.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

DURING READING

1 Check for Understanding

- a How did the telescope change astronomers' views of the solar system?
- b How might we view the solar system if the telescope had never been invented?
- c Why do the scientific meanings of words sometimes change? Do you think Pluto should still be considered a planet?
- d Why do we keep building larger, more powerful telescopes? Why do we develop ways of traveling farther from Earth for longer periods of time? What is our goal?

CCC: CCSS.ELA-Literacy.SL.8.1c Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.

KEY VOCABULARY

asteroid, debris, dwarf planet, exoplanet, Kuiper Belt, neutron, phenomenon, radiation, solar system



It can be hard to wrap your head around the enormous size of space and the distances between things in space. Try this video for some comparisons. Can you spot the Minecraft world?
<https://www.youtube.com/watch?v=uaGEjrADGPA>



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ESSENTIAL QUESTIONS TO ASK

AFTER READING

1 Summary and Expansion

- a How did stars and planets form in the solar system?
- b How are the terrestrial planets and Jovian planets similar? How are they different?
- c Why do some astronomical objects remain undiscovered for so many centuries?
- d How might people use sails and space elevators in the future?
- e What are some other innovative ways humans might travel in space someday?
- f Do you think it's more important to explore space or to funnel resources toward working on solving problems here on Earth, such as climate change? Are the pursuits of different kinds of knowledge related to each other?
- g What can we learn from the failures that have happened as we try to explore more of space?
- h Are there moral issues to the practice of mining asteroids or moons to gain the resources that might be there? Why or why not?

CCC: CCSS.ELA-Literacy.SL.8.3 Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.

CCC: CCSS.ELA-Literacy.WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

CCC: CCSS.ELA-Literacy.RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

COMMON CORE CONNECTIONS

Grade: 8 Language CCSS.ELA-Literacy.L.8.3,4,4a,4b,4c,4c,5,5b,6

Grade: 6-8 Science & Technical Subjects CCSS.ELA-Literacy.RST.6-8.1,2,3,4,5,6,7,8,9,10

Grade: 8 Speaking & Listening CCSS.ELA-Literacy.SL.8.1,1a,1c,1d,2,3,4,5,6

Grade: 6-8 Writing HST CCSS.ELA-Literacy.WHST.6-8.1,2,4,6,7,8,9,10



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COMMON CORE CONNECTIONS

Grade: 8 Language

CCSS.ELA-Literacy.L.8.3,4,4a,4b,4c,4c,5,5b,6

3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.

4 Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.

4a Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

4b Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., precede, recede, secede).

4c Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

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5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

5b Use the relationship between particular words to better understand each of the words.

6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Grade: 6-8 Science & Technical Subjects

CCSS.ELA-Literacy.RST.6-8.1,2,3,4,5,6,7,8,9,10

1 Cite specific textual evidence to support analysis of science and technical texts.

2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

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.

5 Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

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).

8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

10 By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.



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COMMON CORE CONNECTIONS

Grade: 8 Speaking & Listening

CCSS.ELA-Literacy.SL.8.1,1a,1c,1d,2,3,4,5,6

- 1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
 - 1a Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
 - 1c Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.
 - 1d Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.
- 2 Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
- 3 Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.
- 4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
- 5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
- 6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 8 Language standards 1 and 3 here for specific expectations.)

Grade: 6-8 Writing HST

CCSS.ELA-Literacy.WHST.6-8.1,2,4,6,7,8,9,10

- 1 Write arguments focused on discipline-specific content.
- 2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- 4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- 6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
- 7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- 8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
- 9 Draw evidence from informational texts to support analysis reflection, and research.
- 10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.



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Activity

DESIGN A MARS ROVER

Imagine that you are a NASA engineer. How would you design a Mars rover? What equipment would your rover have? How would you make your rover stable? How would your rover land on the surface of Mars?

➤ **Brainstorm your ideas for a new Mars rover.** To begin, decide on the goal of the program so you know what features the rover needs to have to complete the goal. Is it meant to collect soil samples? Take photographs? Gather air samples? All of these?

➤ **Sketch your ideas in your science notebook.** Begin to decide on the supplies you'll use to build a model. Do you want materials that can move easily? Strong materials? Flexible materials?

➤ **Gather your supplies and begin to build your model.** Follow your designs, but don't be afraid to veer from your original drawings if you discover other ways of doing things.

➤ **When you have a finished model, test it.** Does it move the way you want it to? Is it capable of collecting the samples you need?

DID YOU KNOW?

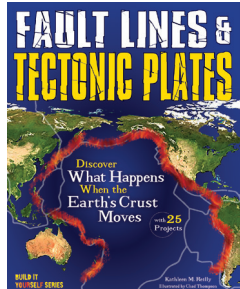
In March 2018, Mars rover *Curiosity* celebrated 2,000 sols, or Mars days, on the planet!

Try This!

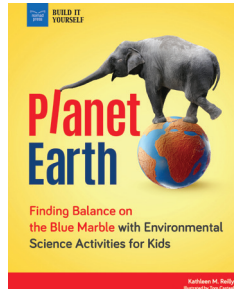
Was your design a success? Why or why not? Brainstorm in your science journal about what you could improve. Try out your ideas and see if they make a difference. Record your observations in your science journal.

Check out more titles and other great activities at nomadpress.net.

More Books About Earth and Space Science!



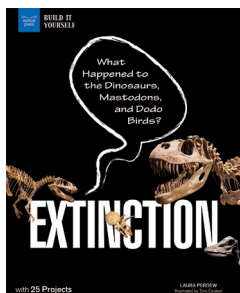
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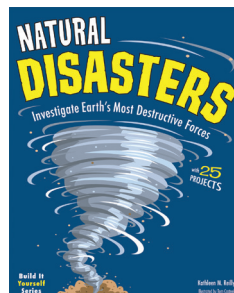
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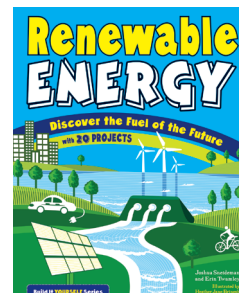
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Author: Laura Perdwé



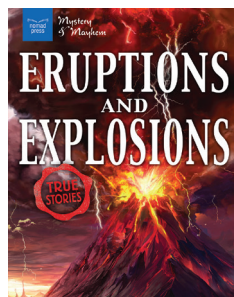
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Author: Judy Dodge Cummings



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