

# APPENDIX C

## DISCIPLINARY LITERACY IN SCIENCE

### **When scientists read, they**

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- Assume an objective stance
- Ask “why” and “how” more than “what”
- Rely on data, sketches, charts, and illustrations
- Make connections from known concepts to new concepts
- Determine validity of sources and quality of evidence
- Pay attention to patterns
- Make predictions
- Review and reflect
- Recognize importance of precise scientific vocabulary
- Search for answers
- Look for details and evidence

### **When scientists write, they**

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- Use precise wording
- Compose in phrases, bullets, graphs, or sketches
- Favor passive voice
- Seek exactness over craft
- Communicate in a systematic format
- Distinguish facts from opinions
- Generate questions
- Provide details, narratives, and causal effects
- Use technical language

### **When scientists think, they**

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- Allow curiosity to drive learning
- Look for connections

- Understand when they need more data
- Rely on prior knowledge or research
- Consider new hypotheses or evidence
- Propose explanations
- Create solutions
- Question
- Pay attention to ethical concerns and stewardship
- Consider how to present knowledge
- Visualize or create models as a way of understanding and representing

## **Websites for Teaching Science**

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<http://www.npr.org>

The National Public Radio site includes news articles on a variety of topics including science, health, politics, technology, world, business, race, and culture.

<http://www.sciencedaily.com>

This popular science news website covers all sorts of science topics, from health and medicine to matter and energy.

<http://www.nbc.com>

The NBC site offers current science news with sections also on health, business, and more.

<http://www.sciencenews.org>

An award-winning biweekly news magazine, this site covers important research in all fields of science, publishing concise, accurate, and current articles that appeal to both general readers and scientists.

<https://www.livescience.com/topics/youtube-science-channels>

This is the source for YouTube's most intriguing and entertaining science videos.

<http://www.sciencenewsforstudents.org>

A great source for psychology, health, and science articles that are current and of high interest.

<https://biomimicry.org/history/>

Biomimicry is an approach to finding nature-inspired solutions for a healthy planet. This site includes a variety of fields such as energy, architecture, transportation, agriculture, medicine, and communication.

<https://docs.google.com/document/d/1P6ByKHS-pLLxq-487WfgWp3B6MZyItO3dl6ZfR9mcZc/edit?usp=sharing>

Use this website for interactive sites that are useful as a review for biology topics.

<https://askabiologist.asu.edu/venom/what-are-proteins>

This site has visually appealing information on an assortment of biology topics.

<http://www.ebizmba.com/articles/science-websites>

Check out the most popular science websites all in one place.

<http://www.ala.org/aboutala/offices/resources/sciencenovels>

This site offers a list of scientifically themed novels for students, elementary through middle school.

## **Book Recommendations for Starting a Classroom Library**

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*The Break of the Finch* by Jonathan Weiner. In this story of groundbreaking scientific research, readers learn from scientists as they watch Darwin's finches and come up with a new understanding of life itself. This talented author uses elegant language to explain scientific theory.

*Chicken, Pig, Cow On the Move* by R. Ohi & M. Kusugak. Students can analyze the motion of the animals by creating motion maps, position versus time graphs, and velocity versus time graphs. A good book for a kinematics and/or acceleration unit.

*Climbing Mount Improbable* by Richard Dawkins. The author offers careful explanations and beautiful illustrations in this discussion of evolutionary adaptation. The author explores amazing adaptations, from spiders to figs to the evolution of wings.

*The Disappearing Spoon* by Sam Kean. Read aloud the chapter titled "Geography Is Destiny" as an introduction to the periodic table.

*Enlightenment Now: The Case for Reason, Science, Humanism, and Progress* by Steven Pinker. Cognitive scientist Steven Pinker uses seventy-five graphs that will stun the reader and illustrate the good that is happening in the world. He addresses such topics as peace, happiness, health, and prosperity.

*Four Fish: The Future of the Last Wild Food* by Paul Greenberg. Readers will learn about the four fish that dominate our menus—salmon, sea bass, cod, and tuna—and the process that gets them to our table. Greenberg also explores the impact humans have had on the ocean.

*Headstrong: 52 Women Who Changed Science and the World* by Rachel Swaby. Students will enjoy reading about famous scientists and Nobel Prize winners as well as lesser known innovators who changed our lives.

*The Immortal Life of Henrietta Lacks* by Rebecca Skloot. Twenty years after Henrietta Lacks dies of cancer, her family finds out that her cells had been taken without permission and were being used in biological research. The intersection of socioeconomic factors with science and medicine will fascinate readers.

*Lives of the Scientists: Experiments, Explosions (and What the Neighbors Thought)* by Kathleen Krull, illustrated by Kathryn Hewitt. Students will love reading about famous scientists while also learning about unusual facts, quirky personality traits, and funny stories.

*Mr. Archimedes' Bath* by Pamela Allen. This picture book is an excellent way to teach the data collection method of determining the volume of a solid. It delights readers with animal characters and funny illustrations.

*One Minute Mysteries: 65 Short Mysteries* by Eric Yoder and Natalie Yoder. This book makes science fun. Each 1-minute mystery (solutions included) exercises critical thinking skills while covering Earth, space, life, physical, chemical, and general science.

*The Periodic Table: Elements With Style* by Adrian Dingle, illustrated by S. Basher. Designed to resemble popular social media websites, the pages of this book feature “homepages” for each of the chemical elements. Profiles, supposedly written by the elements themselves, are informative and entertaining.

*Rosalind Franklin: The Dark Lady of DNA* by Brenda Maddox. In 1962, Wilkins, Crick, and Watson received the Nobel Prize, however, Rosalind Franklin, a girl of fifteen, provided the data and photographs of DNA that were crucial to their discovery. Find out more about the story behind the story.

*Science Verse* by Jon Scieszka, illustrated by Lane Smith. Science concepts become sing-along songs or poems that make science lively.

*The Sixth Extinction* by Elizabeth Colbert. The author delves into man-made extinctions occurring during our present time, a phenomenon the author calls the 6th extinction. She explores the threat of human behavior in a compelling account.

*Soonish: Ten Emerging Technologies That'll Improve and/or Ruin Everything* by Kelly and Zach Weinersmith. These authors investigate future technologies through interviews of scientists, exploring topics such as nuclear fusion, powered toasters, and 3D organ printing. Students love this book.

*Sports Science for Young People* by George Barr. Barr explores the scientific principles underlying sports. Topics include inertia versus motion, gravity, speed, trajectory, and action versus reaction.

*Stiff: The Curious Lives of Human Cadavers* by Mary Roach. This author has a series of books about science topics. Students love these books, which are weird, gross, funny, and informative.

*Superbug: The Fatal Menace of MRSA* by Maryn McKenna. McKenna, a science journalist, pulls readers into her fascinating research about this pathogen and the shocking truth about its impact.