



THE

STEAM

Science

Technology

Engineering

Art

Math

Team



Simple science explained

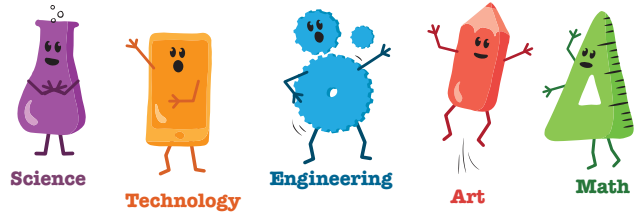
Teacher's Guide

Prepared by
Katy Stager for



Reading Is
Fundamental
RIF.org

The STEAM Team Teacher's Guide



Note to Educators

The STEAM Team provides students with a bright and cheery introduction to STEAM subjects, guided by the STEAM Team characters—Science, Technology, Engineering, Art, and Math—who are always on hand with helpful tips, fun facts, and simple explanations.

The STEAM Team focuses on STEAM subjects as they pertain to the umbrella of “science.” Topics include the universe, simple machines, and the human brain, along with 31 others. The content and design of the topics invite readers to use the text as a starting point to encourage further investigation of a given STEAM theme. This text also briefly introduces the scientific method and provides an excellent opportunity to practice the scientific method as it relates to learning about the world around us. While exploring a STEAM topic as a group, brainstorm questions and focus the discussion on the six steps (question, research, hypothesis, experiment, analysis, conclusion) of the problem-solving process.

The book begins with an introduction from Professor Robert Winston, which explains the kid-friendly design, followed by an introduction to the STEAM Team characters, including a brief description of the STEAM acronym. Each of the 34 STEAM topics is given a two-page spread that begins with a single large-print paragraph to introduce the theme. Each two-page spread includes real photo clips, colorful illustrations, and elementary diagrams where relevant. Text is presented under bold key words and headings with bulleted material and a variety of fonts used for emphasis. Text on each page may be read in any order the reader chooses. Throughout the text, STEAM Team characters provide relevant facts, questions, and real-life applications of topic material in text bubble format. The book concludes with a glossary of terms and an index of material.

As students read the book, have them keep a list of subjects that pique their interest, noting why they are interested and what they'd like to discover in further exploration. You may then choose to follow your students' interest while aligning the projects you choose to complete as a class with grade-level standards.

This book is recommended for students in grades K–4.

Lesson Plan

For additional resources go to RIF's Literacy Central (www.rif.org/DK). There you'll find word lists, puzzles, games, and other resources.

Discussion Questions

Pre-Reading Questions

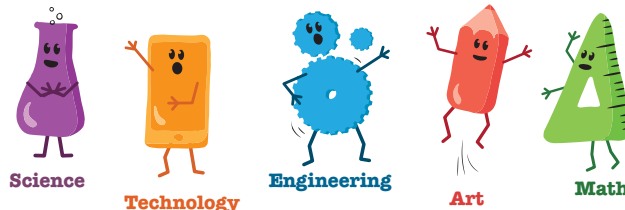
What is science? How is science helpful? Can science be harmful? What does “STEAM” stand for? What are some ways that STEAM topics are related?

Reading

Read the book, or sections of the book, with students as a group. Begin on page 6, and discuss the elements of STEAM. Go to the Table of Contents and read or display the list of topics to give students an idea of what is in the book. After reading, make the book available for students to examine on their own. Emergent readers may be motivated to attempt to read individual facts, and pre-readers will enjoy looking at the pictures and recognizing relevant vocabulary words.



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With pre-readers and emergent readers, answer these questions as a group. Completing this lesson plan as a whole fulfills the following standards: CCSS.ELA-LITERACY.RI.K.10 and CCSS.ELA-LITERACY.RI.1.10.

Post-Reading Questions

- 1 Are any of the words we've read or discussed new to you? Make a list of words you learned from reading this section of the book, and discuss what the words mean. (CCSS.ELA-LITERACY.RI.K.4, CCSS.ELA-LITERACY.RI.1.4, CCSS.ELA-LITERACY.RI.2.4, CCSS.ELA-LITERACY.RI.3.4, CCSS.ELA-LITERACY.RI.4.4)
- 2 After reading the Introduction on pages 4–5, list three reasons why science is important according to contributing author Professor Robert Winston. Why do you feel science is important? (CCSS.ELA-LITERACY.RI.K.1, CCSS.ELA-LITERACY.RI.1.2, CCSS.ELA-LITERACY.RI.2.6, CCSS.ELA-LITERACY.RI.3.6, CCSS.ELA-LITERACY.RI.4.1)
- 3 Read pages 6–7, which describe the STEAM acronym. Write the acronym on the board or on a piece of paper for everyone to see, and ask students to recall from memory what each letter stands for. (CCSS.ELA-LITERACY.RI.K.1, CCSS.ELA-LITERACY.RI.1.1, CCSS.ELA-LITERACY.RI.2.6, CCSS.ELA-LITERACY.RI.3.2, CCSS.ELA-LITERACY.RI.4.4)
- 4 On pages 20–21, “The Water Cycle,” arrows and pictures are used to describe how water on Earth moves around in a cycle. In your own words, use the arrows and pictures to explain Earth's water cycle. (CCSS.ELA-LITERACY.RI.K.7, CCSS.ELA-LITERACY.RI.1.7, CCSS.ELA-LITERACY.RI.2.7, CCSS.ELA-LITERACY.RI.3.7, CCSS.ELA-LITERACY.RI.4.7)
- 5 Solids, liquids, and gases are states of matter, which is made up of tiny particles called atoms and molecules. Describe how these particles act and why they act that way in each of the three states of matter. Refer to pages 22–23. (CCSS.ELA-LITERACY.RI.K.3, CCSS.ELA-LITERACY.RI.1.3, CCSS.ELA-LITERACY.RI.2.3, CCSS.ELA-LITERACY.RI.3.3, CCSS.ELA-LITERACY.RI.4.3)
- 6 The weather where you live may be affected by climate change. Look at pages 24–25 and pages 40–41. Make a list of factors that influence climate change, and discuss how a warmer climate may affect your local weather and your life each day. (CCSS.ELA-LITERACY.RI.K.3, CCSS.ELA-LITERACY.RI.1.3, CCSS.ELA-LITERACY.RI.2.3, CCSS.ELA-LITERACY.RI.3.3, CCSS.ELA-LITERACY.RI.4.3)
- 7 Pages 34–35 describe “The Arctic Food Web” using an arrows diagram to show what animals in that habitat eat and how they are linked together. Without reading the text, look at the diagram and explain the flow of the food web, one animal at a time. (CCSS.ELA-LITERACY.RI.K.7, CCSS.ELA-LITERACY.RI.1.7, CCSS.ELA-LITERACY.RI.2.7, CCSS.ELA-LITERACY.RI.3.7, CCSS.ELA-LITERACY.RI.4.7)
- 8 When you look at each topic in the book, where do your eyes go first for information? Discuss how the design of the book, including different fonts and text sizes, sidebars, headings, use of color, and images, affects how you read the book and what information you identify as important. (CCSS.ELA-LITERACY.RI.K.5, CCSS.ELA-LITERACY.RI.1.5, CCSS.ELA-LITERACY.RI.2.5, CCSS.ELA-LITERACY.RI.3.5, CCSS.ELA-LITERACY.RI.3.7, CCSS.ELA-LITERACY.RI.4.7)
- 9 Archimedes is an important historical figure. Who was he? When and where did Archimedes live? What did he discover? How did he make this discovery? Refer to page 67. (CCSS.ELA-LITERACY.RI.K.1, CCSS.ELA-LITERACY.RI.1.1, CCSS.ELA-LITERACY.RI.2.1, CCSS.ELA-LITERACY.RI.3.1, CCSS.ELA-LITERACY.RI.4.1)
- 10 When two surfaces rub against each other, it creates a force called friction. Using what you learned in “Friction” on pages 68–69, explain why mountain bikes have thick, grooved tires and racing bikes have thin, smooth tires. (CCSS.ELA-LITERACY.RI.K.8, CCSS.ELA-LITERACY.RI.1.8, CCSS.ELA-LITERACY.RI.2.8, CCSS.ELA-LITERACY.RI.3.8, CCSS.ELA-LITERACY.RI.4.8)



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Cross-Curricular Activities (Review and Assessment)

*Note to Educators on NGSS Alignment: *The STEAM Team* includes information on various STEAM categories, some of which will match the NGSS for your grade level better than others. You may choose to direct students to those projects that best match your grade-level NGSS.

1. Writing Activity: Build a Bot

Pages 74–75 introduce “Robots.” Write “robot” on the board and ask students to create their own robots by drawing and writing a brief description of the robot that includes a list of tasks their robot can perform. Have students compare and contrast their creations with those of the student sitting next to them. Ask each pair of students to write down three ideas as to why engineers design and build robots.

[CCSS.ELA-LITERACY.W.K.2; CCSS.ELA-LITERACY.W.K.5]

[CCSS.ELA-LITERACY.W.1.2; CCSS.ELA-LITERACY.W.1.5]

[CCSS.ELA-LITERACY.W.2.2; CCSS.ELA-LITERACY.W.2.5]

[CCSS.ELA-LITERACY.W.3.2; CCSS.ELA-LITERACY.W.3.5]

[CCSS.ELA-LITERACY.W.4.2; CCSS.ELA-LITERACY.W.4.5]

NGSS Alignment: K-ESS3-2, 1-PS4-4, 2-PS1-2, K-2-ETS1-2, 3-ESS3-1, 4-ESS3-2]

2. Data-Gathering Activity: Seed Growth Observation and Comparison

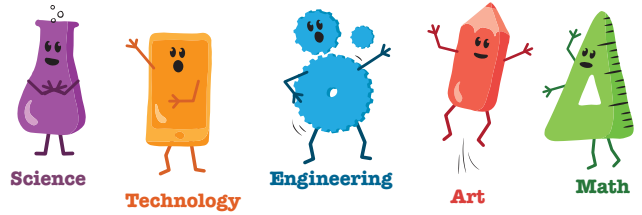
K–2 educators may choose to complete this activity as a class, while students in grades 3 and 4 will benefit from a combination of small group and independent work. Materials include plastic cups or containers with proper drainage, planting soil, seeds (corn, barley, pea, clover, radish), spray bottles to water the plants, and rulers. Plant the seeds—one container per each kind of seed—either as a class or in small groups. Be sure to provide an adequate light source.

Provide the following data observation chart to help students measure, track, and compare plant growth:

Date			
Corn			
Barley			
Pea			
Clover			
Radish			
Notes			



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Cross-Curricular Activities (Review and Assessment)

2. Data-Gathering Activity: Seed Growth Observation and Comparison (continued)

Walk students through one day of observations to be sure they understand the process. Observations in the chart may be recorded every other day to allow time for noticeable changes and growth, and should include measurements for each sprout (labeled A, B, C, etc.), made using a ruler. Use the Notes portion of the chart to dictate a summation of overall growth (or lack thereof) for the day, and any problems or unique factors that may arise.

[CCSS.ELA-LITERACY.W.K.7; CCSS.ELA-LITERACY.W.K.8]

[CCSS.ELA-LITERACY.W.1.7; CCSS.ELA-LITERACY.W.1.8]

[CCSS.ELA-LITERACY.W.2.7; CCSS.ELA-LITERACY.W.2.8]

[CCSS.ELA-LITERACY.W.3.7; CCSS.ELA-LITERACY.W.3.8]

[CCSS.ELA-LITERACY.W.4.7; CCSS.ELA-LITERACY.W.4.8]

NGSS Alignment: K-LS1-1, 2-LS2-1, 2-LS4-1, 3-LS3-1, 3-LS3-2, 4-LS1-1

3. Research Activity: Climate Change of Heart

Climate change, discussed on pages 40–41, is a part of our planet's history, but rapid warming like we see today is unusual in the history of our planet. Divide students into groups and provide classroom and online resources to allow each group to research climate change and answer the following questions:

- 1) If climate has always changed, why are people concerned about it NOW? What kinds of problems could climate change cause?
- 2) Is there a solution to the problem of climate change? Describe five ways we can help stop or reverse climate change.

[CCSS.ELA-LITERACY.W.K.2; CCSS.ELA-LITERACY.W.K.8]

[CCSS.ELA-LITERACY.W.1.2; CCSS.ELA-LITERACY.W.1.8]

[CCSS.ELA-LITERACY.W.2.2; CCSS.ELA-LITERACY.W.2.7; CCSS.ELA-LITERACY.W.2.8]

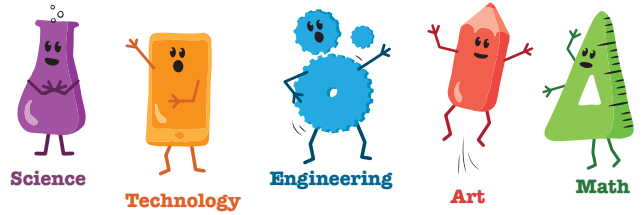
[CCSS.ELA-LITERACY.W.3.2; CCSS.ELA-LITERACY.W.3.6; CCSS.ELA-LITERACY.W.3.7]

[CCSS.ELA-LITERACY.W.4.2; CCSS.ELA-LITERACY.W.4.7; CCSS.ELA-LITERACY.W.4.8]

NGSS Alignment: K-ESS2-2, K-ESS3-3, K-2-ETS1-1, 2-ESS1-1, 3-LS4-1, 3-LS4-3, 3-LS4-4, 3-ESS2-2; 4-ESS3-1, 3-5-ES1-2



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Cross-Curricular Activities (Review and Assessment)

4. Multimedia Presentation: Full STEAM Ahead!

Divide the class into five groups of students and assign each group one STEAM acronym topic area: Science, Technology, Engineering, Art, and Math. Using the digital and print resources available in your classroom, have each group create a presentation that includes text, charts, drawings, diagrams, graphs, video, audio, and/or other multimedia elements as appropriate. Make sure each student has a chance to practice using digital tools. Allow each group to present their multimedia project to the class.

Projects should creatively answer the following questions:

- 1) Explain your STEAM word. What does it mean, and how does your STEAM topic connect with the other four STEAM topics?
- 2) How do people use your STEAM topic in everyday life?
- 3) What kinds of problems does/could your STEAM topic help solve?
- 4) What would life be like if we didn't have your STEAM topic?
- 5) Choose one of the 34 STEAM subjects that we explored in *The STEAM Team* and explain how your STEAM word is related to or used within that subject area.

[CCSS.ELA-LITERACY.SL.K.1; CCSS.ELA-LITERACY.SL.K.5]

[CCSS.ELA-LITERACY.SL.1.1; CCSS.ELA-LITERACY.SL.1.5]

[CCSS.ELA-LITERACY.SL.2.1; CCSS.ELA-LITERACY.SL.2.5]

[CCSS.ELA-LITERACY.SL.3.1; CCSS.ELA-LITERACY.SL.3.5]

[CCSS.ELA-LITERACY.SL.4.1; CCSS.ELA-LITERACY.SL.4.5]

NGSS Alignment: K-ESS3-2, 1-PS4-4, 2-ESS2-1, 3-ESS3-1, 4-4PS3-4

5. Problem-Solving Scenario: Underwater Ecosystem

Pages 36–37 discuss ecosystems. Coral reefs are being degraded by many factors. Have students write a plan that includes the causes of coral reef damage, explains problems caused by the continued loss of coral reefs around the world, and suggests solutions and tools to stop or slow the process of coral reef decline. Ask students to include a diagram to show the ecosystem and demonstrate their solution. Students should also provide appropriate citation of sources.

[CCSS.ELA-LITERACY.W.K.2; CCSS.ELA-LITERACY.W.K.3; CCSS.ELA-LITERACY.W.K.8]

[CCSS.ELA-LITERACY.W.1.2; CCSS.ELA-LITERACY.W.1.3; CCSS.ELA-LITERACY.W.1.8]

[CCSS.ELA-LITERACY.W.2.2; CCSS.ELA-LITERACY.W.2.3; CCSS.ELA-LITERACY.W.2.8]

[CCSS.ELA-LITERACY.W.3.2; CCSS.ELA-LITERACY.W.3.3; CCSS.ELA-LITERACY.W.3.7]

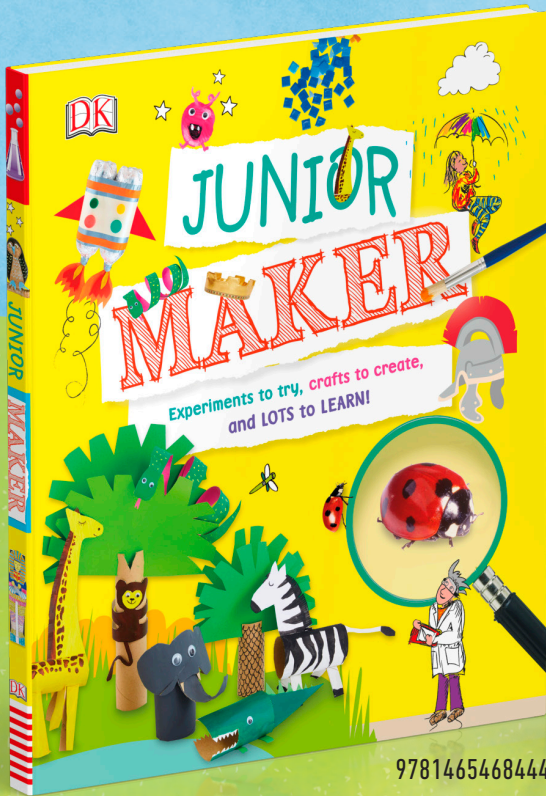
[CCSS.ELA-LITERACY.W.4.2; CCSS.ELA-LITERACY.W.4.3; CCSS.ELA-LITERACY.W.4.7]

NGSS Alignment: K-ESS3-3, K-2-ETS1-1, 3-LS4-4, 3-5-ETS1-1, 3-5-ETS1-2



Create. Play. Learn.

Books for Makers Ages 5 to 9



Also Available

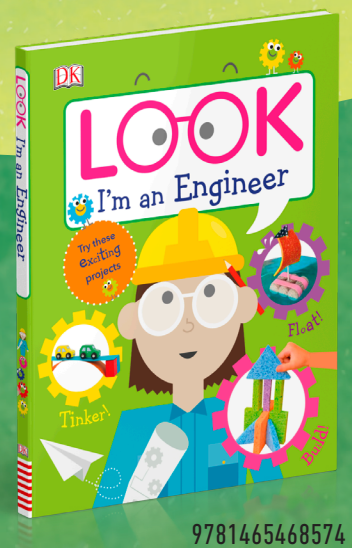
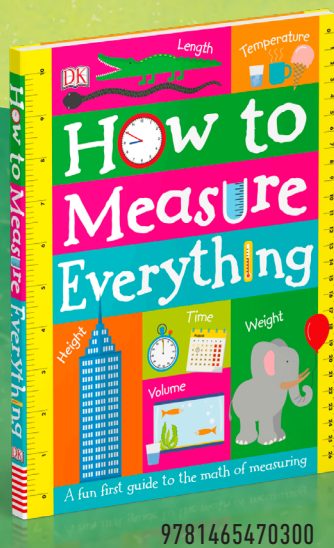
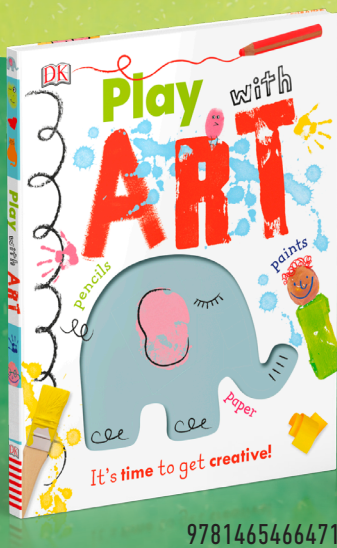


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