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Smithsonian STEAM Readers—Grade K

This sample includes the following:

Management Guide Cover (1 page)

Table of Contents (1 pages)

How to Use This Product (6 pages)

Lesson Plan (20 pages)

Reader (11 pages)

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Smithsonian

STEAM Readers

Science ■ Technology ■ Engineering ■ Arts ■ Mathematics

Management Guide

Teacher Created Materials

Grade
K

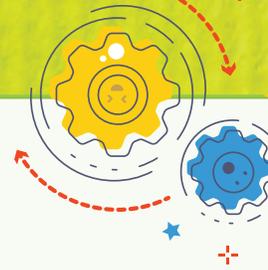
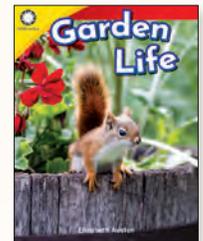
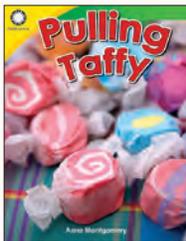
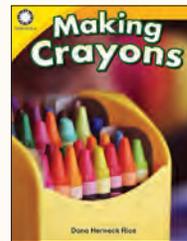
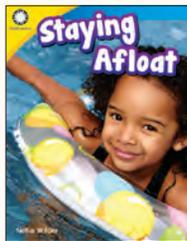
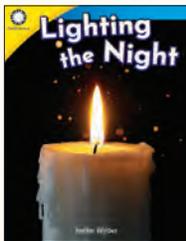
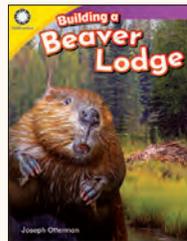
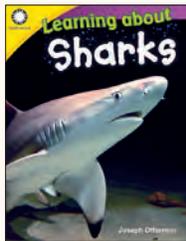
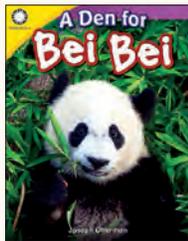


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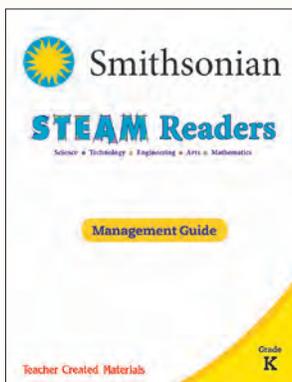
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Kit Components

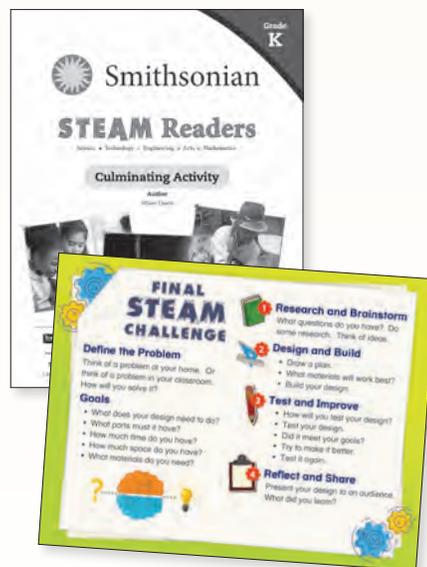
15 lesson plans with 6 copies of each book



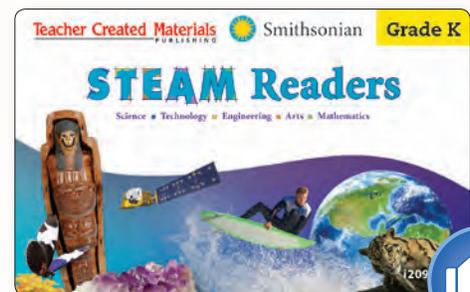
Management Guide



Culminating Activity



Digital and Audio Resources

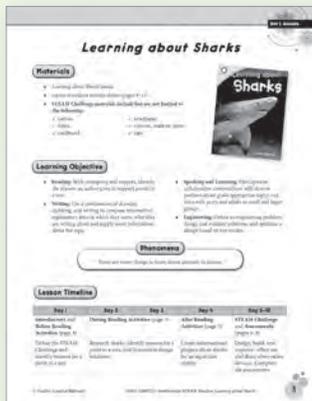


Lesson Plan Components

Each 10-day lesson sequence is organized in a consistent format for ease of use.

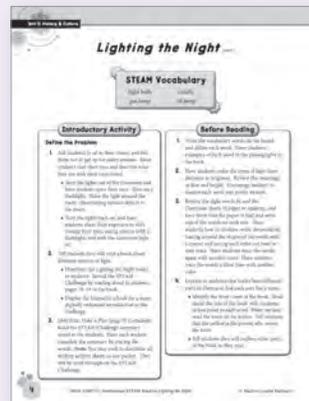
Overview

- The overview page includes learning objectives, a materials list, and a suggested timeline for lessons.



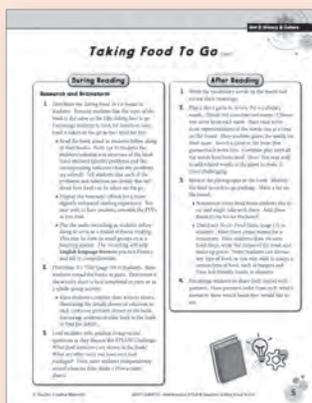
Day 1

- Students are introduced to the STEAM Challenge, vocabulary, and reading skill.



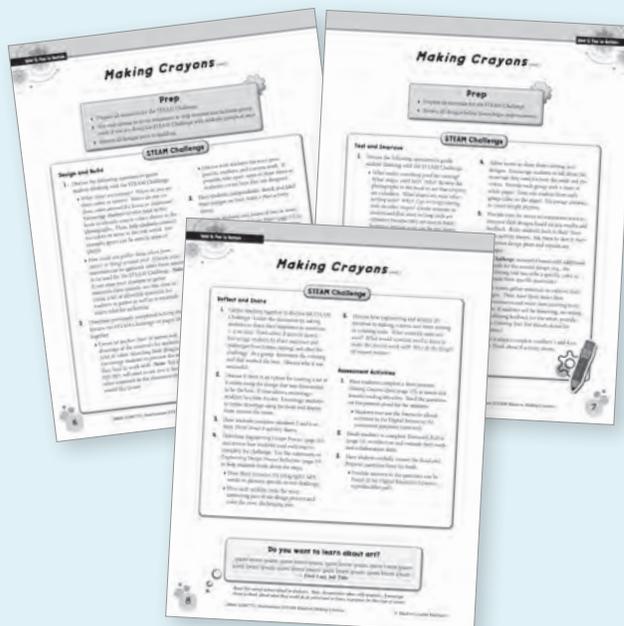
Days 2–4

- Students complete reading and writing activities as they gain knowledge that will help them with the STEAM Challenge.



Days 5–10

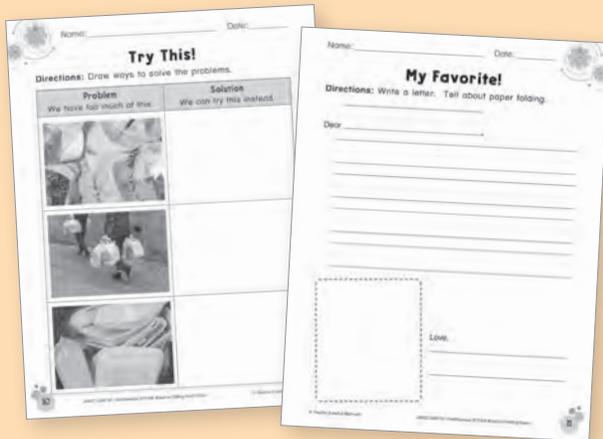
- Students take what they've learned and apply it to design, build, test, and improve a solution.
- Students reflect, share work, and take assessments.



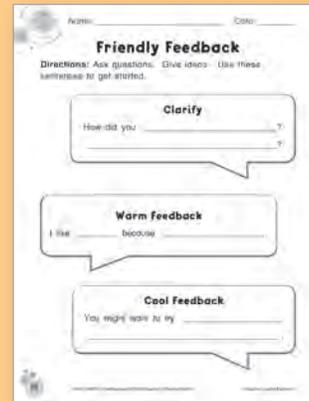
Lesson Plan Components (cont.)

Student Activity Sheets

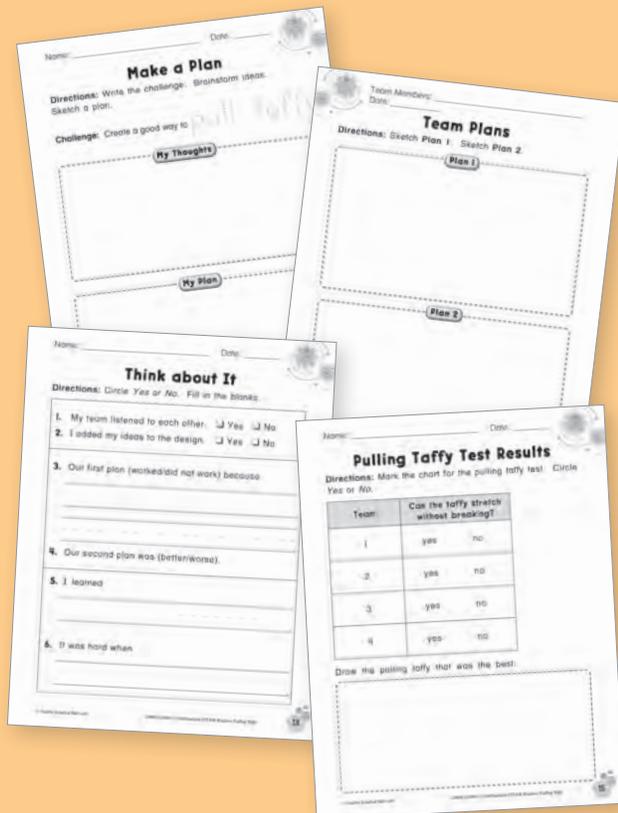
Literacy skills are supported with meaningful activities that **promote higher-order thinking skills**.



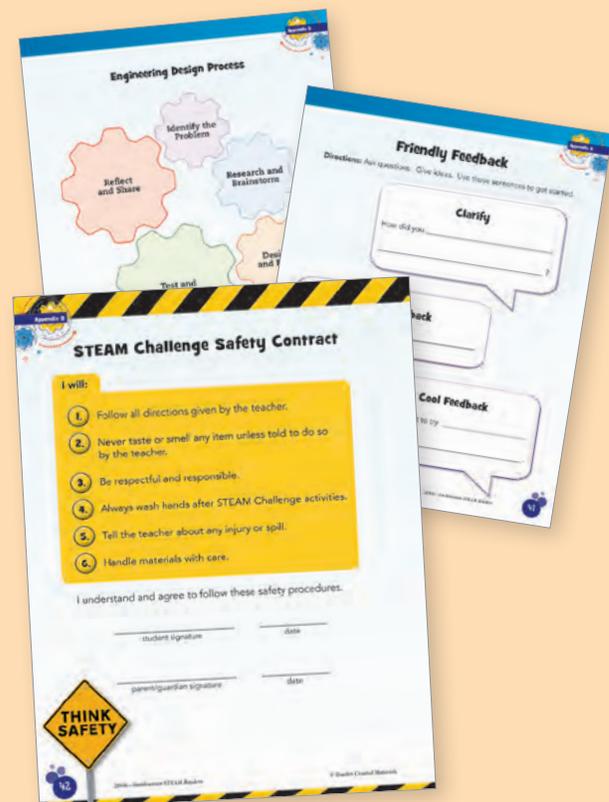
Effective feedback techniques are supported with **sentence frames** to help students provide feedback to peers and to facilitate productive classroom dialogue.



STEAM Challenge activity sheets support students throughout the **engineering design process**.



Appendix B includes quick reference sheets for students and teachers.



Assessments

Assessments guide teacher decisions and improve student learning. *Smithsonian STEAM Readers* offers balanced assessment opportunities. Assessments require students to demonstrate analytical thinking, comprehend informational texts, and write evidence-based responses.

Quizzes

Each lesson plan includes a quiz with multiple-choice questions and a short-answer question. These assessments include text-dependent questions and may be used as open-book evaluations. Answer keys are provided on page 2 of each lesson.

STEAM Challenge

STEAM Challenges include a *Teamwork Rubric* and an *Engineering Design Process Checklist*. These guide students to reflect on and evaluate their work and collaboration skills.

Name: _____ Date: _____

Making More Doughnuts Quiz

Directions: Listen to your teacher. Answer the questions. Show what you know.

1. Whose job is it to make doughnuts?

A. teachers
 B. bakers
 C. doctors

2. Why were doughnut machines made?

A. Doughnuts were made at home.
 B. Bakers made doughnuts.
 C. People wanted more doughnuts.

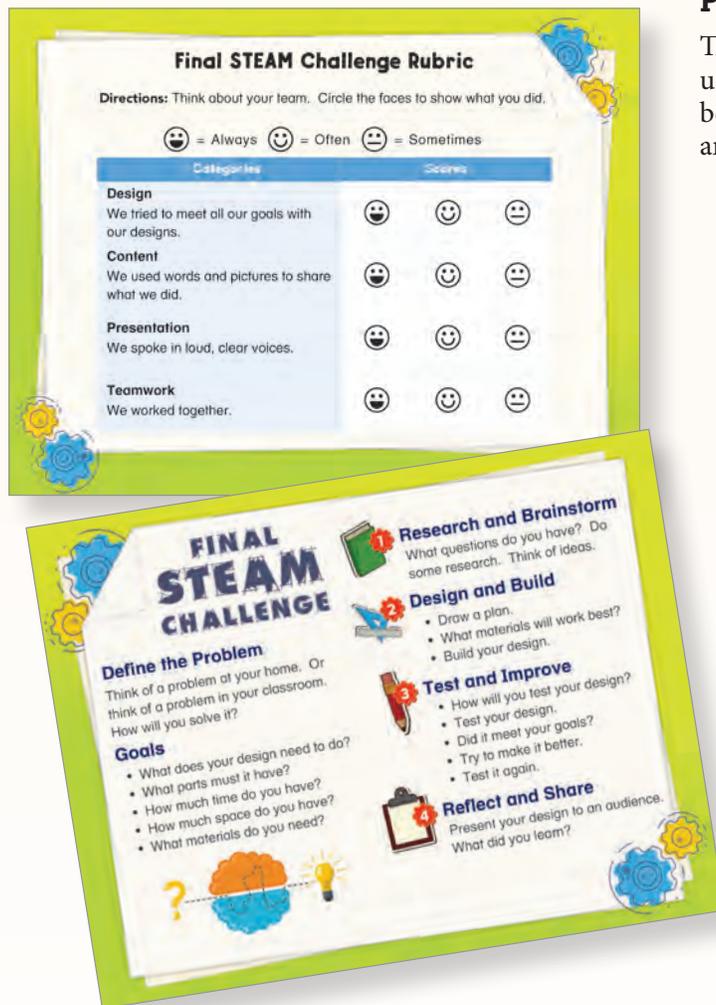
3. Where are doughnuts mainly sold?

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Assessments *(cont.)*

Culminating Activity

The Culminating Activity asks students to apply what they have learned in an engaging and interactive way. Students use what they have learned to solve real-world problems in a final STEAM Challenge.



Final STEAM Challenge Rubric

Directions: Think about your team. Circle the faces to show what you did.

😊 = Always 😊 = Often 😐 = Sometimes

Categories	Always	Often	Sometimes
Design We tried to meet all our goals with our designs.	😊	😊	😊
Content We used words and pictures to share what we did.	😊	😊	😊
Presentation We spoke in loud, clear voices.	😊	😊	😊
Teamwork We worked together.	😊	😊	😊

FINAL STEAM CHALLENGE

Define the Problem
Think of a problem at your home. Or think of a problem in your classroom. How will you solve it?

Goals

- What does your design need to do?
- What parts must it have?
- How much time do you have?
- How much space do you have?
- What materials do you need?

1 Research and Brainstorm
What questions do you have? Do some research. Think of ideas.

2 Design and Build

- Draw a plan.
- What materials will work best?
- Build your design.

3 Test and Improve

- How will you test your design?
- Test your design.
- Did it meet your goals?
- Try to make it better.
- Test it again.

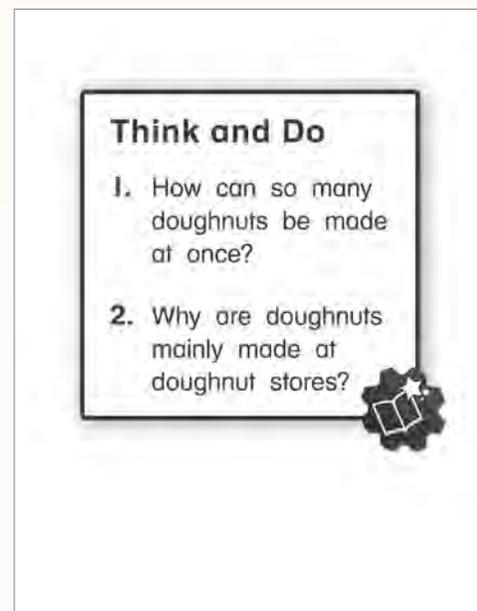
4 Reflect and Share
Present your design to an audience. What did you learn?

Think and Do

Think and Do questions can be found on the inside back covers of the books. Questions require various levels of critical thinking and can be used for instruction or assessment.

Progress Monitoring

There are several points throughout each lesson when useful evaluations can be made. These evaluations can be based on group, paired, and individual discussions and activities.



Think and Do

1. How can so many doughnuts be made at once?
2. Why are doughnuts mainly made at doughnut stores?

Pacing and Instructional Setting Options

Smithsonian STEAM Readers is flexibly designed and can be used in tandem with a core curriculum within a science/STEAM/STEM block and/or literacy block. It can also be used in makerspaces to integrate literacy with the engineering design process. Teachers should customize pacing according to student need and the teacher's preferred instructional framework, such as Balanced Literacy.

Smithsonian STEAM Readers within the Balanced Literacy Framework

Modeled and Shared Reading/Writing	The Before, During, and After Reading activities in each lesson of this series offer opportunities for teachers to activate students' prior knowledge, as well as model fluency and metacognition as they read aloud from the text and guide students through reading and writing activities.
Small-Group Reading/Workshop	The During Reading, After Reading, and STEAM Challenge activities in each lesson of this series can be completed during small-group instruction, in centers, or at workstations, depending on students' previous learning experiences and their need for teacher support.
Independent Reading	Professional audio recordings, PDFs of the books, and Interactiv-eBooks are provided to support independent reading at workstations and listening centers.
Assessment	This series offers multiple formative and summative assessment opportunities that can be used to guide instruction and assess learning (see pages 20–21 for details).

The following pacing and instructional setting options show suggestions for how to use this product. Two pacing options are provided.

Option 1 includes both literacy and STEAM Challenge activities. This option spans 10 instructional days and requires approximately 30–45 minutes a day, for a total of 75–112.5 hours over the course of 150 days.

Day 1	Day 2	Day 3	Day 4	Days 5–10
Introductory and Before Reading Activities	During Reading Activity		After Reading Activity	STEAM Challenge and Assessments

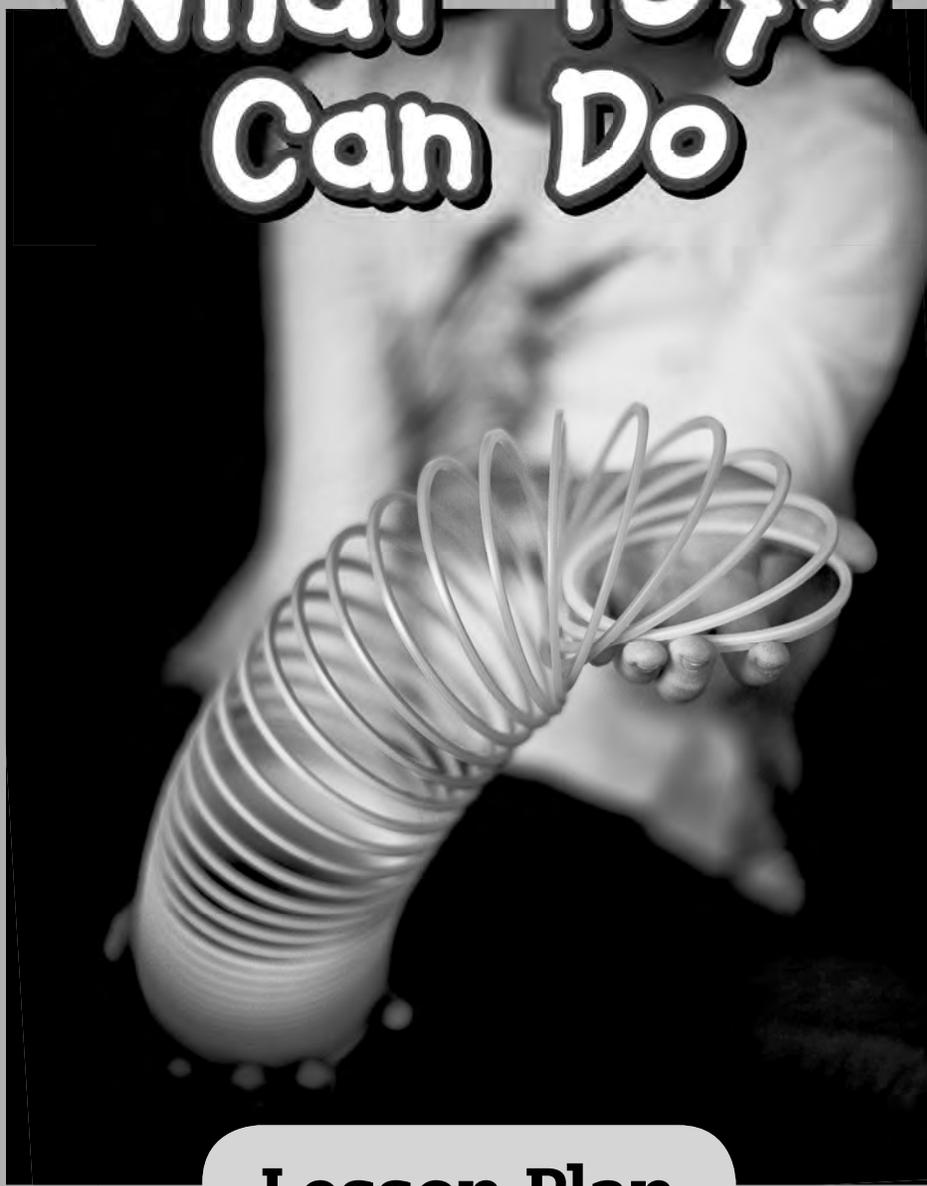
Option 2 includes only literacy activities. This option spans five instructional days and requires approximately 30–45 minutes a day, for a total of 37.5–56.25 hours over the course of 75 days.

Day 1	Day 2	Day 3	Day 4	Day 5
Before Reading Activity	During Reading Activity		After Reading Activity	Assessment Activities

What Toys Can Do



Unit 3
Fun in Action



Lesson Plan

Author

Jodene Lynn Smith, M.A.



Smithsonian

STEAM Readers

Science ■ Technology ■ Engineering ■ Arts ■ Mathematics

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References to digital components are included for educators who purchased the full kit: *Smithsonian STEAM Readers: Grade K*. Please disregard digital component references if this lesson was purchased in a different product configuration.

Answer Key: *What Toys Can Do*

page 10—What Can Toys Do?

Students should write or draw about four of the following: roll, spin, jump, bend, walk, build, or color.

page 11—Make It Jump

Student responses will vary but may include:

1. Grab and turn the handle.
2. The door opens.
3. The monkey jumps out.

page 17—What Toys Can Do Quiz

1. A
2. B
3. fly

What Toys Can Do

Materials

- ▶ *What Toys Can Do* books
- ▶ copies of student activity sheets (pages 9–19)
- ▶ **STEAM Challenge materials include but are not limited to the following:**
 - ✓ blocks or pieces of wood
 - ✓ construction paper
 - ✓ markers or crayons
 - ✓ paper bowls/cups
 - ✓ plastic bottles
 - ✓ plastic straws
 - ✓ stapler
 - ✓ tape



Learning Objective

- ▶ **Reading:** With prompting and support, identify the reasons an author gives to support points in a text.
- ▶ **Writing:** Participate in shared research and writing projects.
- ▶ **Speaking and Listening:** Participate in collaborative conversations with diverse partners about grade appropriate topics and texts with peers and adults in small and larger groups.
- ▶ **Engineering:** Define an engineering problem, design and evaluate solutions, and optimize a design based on test results.

Phenomena

Toys move in many ways.

Lesson Timeline

Day 1	Day 2	Day 3	Day 4	Days 5–10
Introductory and Before Reading Activities (page 4)	During Reading Activities (page 5)		After Reading Activities (page 5)	STEAM Challenge and Assessments (pages 6–8)
Define the STEAM Challenge and identify reasons to support the topic.	Research toys, identify reasons to support the topic, and brainstorm design solutions.		Participate in a shared writing project to tell how a toy works.	Design, build, test, improve, reflect on, and share toys. Complete the assessments.

What Toys Can Do (cont.)

STEAM Vocabulary

bend	roll
build	spin

Introductory Activity

Define the Problem

1. Take a quick survey of students by asking the question, *What is your favorite toy?* Encourage students to respond to the question in complete sentences and include their reasoning: *My favorite toy is _____ because _____.* Record students' responses on the board and discuss the results.
2. Distribute the *What Toys Can Do* books to students. Reveal the STEAM Challenge by reading aloud to students pages 18–19 of the book.
 - Display the Interactiv-eBook for a more digitally enhanced introduction to the challenge.
3. Distribute *Make a Plan* (page 9) to students. Read the STEAM Challenge summary aloud to students. Have each student complete the summary by tracing the words.

Note: You may wish to distribute all student activity sheets as one packet. They will be used throughout the STEAM Challenge.

Before Reading

1. Write the vocabulary words on the board, and define each word.
2. Add some additional action words from the book to the board if desired: *jump, walk,* and *color.*
 - Work with the group to determine an action to show the meaning of each word.
 - Call out a word, and have students perform the action.
3. Introduce the sentence pattern used throughout the book by writing it on the board: *Some toys _____.* Practice reading the sentence a few times with students. Then, ask them to complete the sentence with different ways toys can move. Have several students share their ideas.
4. Display the cover of the book, and read the title to students. Tell them that the title tells what the whole book will be about. Explain that as students read the book, they should identify reasons the author gives to support the idea of what toys can do.

What Toys Can Do (cont.)

During Reading

Research and Brainstorm

1. Distribute the *What Toys Can Do* books to students. Remind them that the title of the book provides the topic. As students read the book, they should look for ways the author tells more about the topic.
2. Read the book aloud to students as they follow along in their own books. Encourage students to point to each word in their books. Then, reread the book, encouraging students to read along with you.
 - ▶ Display the Interactiv-eBook for a more digitally enhanced reading experience. You may wish to have students annotate the PDFs as you read.
 - ▶ Play the audio recording as students follow along to serve as a model of fluent reading. This may be done in small groups or at a listening station. The recording will help **English language learners** practice fluency and aid in comprehension.
3. Distribute *What Can Toys Do?* (page 10) to students. Encourage them to return to the text to write or draw ideas the author provides to support the topic of the book. Guide students in this activity as needed. Out of all the author's ideas, have students choose four things the toys can do.
4. Lead students with guiding thoughts and questions as they discuss the STEAM Challenge: *What makes toys move? Do all toys have moving parts? Why or why not? What makes a toy fun?* Then, have students independently record ideas on their *Make a Plan* activity sheets.

After Reading

1. Write the vocabulary words on the board. Review each word and definition. Reinforce each word by choosing a student to act out a word and having other students guess the word.
2. Distribute *Make It Jump* (page 11) to students. Have them draw the steps to make the jack-in-the-box jump. For example:
 - ▶ Grab and turn the handle.
 - ▶ The door opens.
 - ▶ The monkey jumps out.
3. Gather students together, and have them share their ideas for the three steps to make the toy jump.
4. Work as a group to write directions for making the toy jump.
 - ▶ Collectively decide on the three steps.
 - ▶ Record a sentence describing each step on chart paper.
 - ▶ Have students illustrate the steps.



What Toys Can Do (cont.)

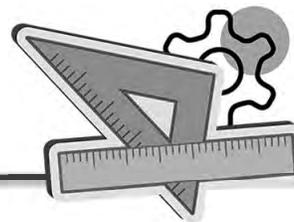
Prep

- ▶ Prepare all materials for the STEAM Challenge.
- ▶ You may choose to invite volunteers to help monitor and facilitate group work if you are doing the STEAM Challenge with multiple groups at once.
- ▶ Review all designs prior to building.

STEAM Challenge

Design and Build

1. Discuss the following questions to guide student thinking with the STEAM Challenge:
 - ▶ *What ways do the toys in the book move?*
Return to the pages in the book to have students review that toys can: roll (pages 2–3), spin (pages 4–5), jump (pages 6–7), bend (pages 8–9), walk (pages 10–11), build (pages 13–14), or color (pages 15–16). Encourage students to be specific in their descriptions of how the toys move (e.g., *The robot can walk in a straight line.*)
 - ▶ *What are some other ways toys can move?*
Refer students to pages 16–17 to recall that some toys, such as kites, can fly. Encourage students to use their prior experiences with toys to name other ways toys can move.
2. Distribute previously completed activity sheets. Review the STEAM Challenge on pages 18–19 together. Create an anchor chart of names and drawings of the materials for students to refer to when recording their designs. Encourage students to preview all the materials available.
 - ▶ Discuss with students designs that toys have so they can move in specific ways. For example, for a toy to roll, it must be in the shape of a ball, cylinder, cone, or have wheels.
3. Ask students to independently sketch and label their designs on the *Make a Plan* activity sheets.
4. Organize students into teams of two or more. Distribute one copy of *Team Plans* (page 12) to each team. Ask teams to have members share their plans. Then, have each team choose, sketch, and label a team plan.
 - ▶ **Challenge** students by adding goals (e.g., the toy must roll, or it must be built with specific materials).
5. Explain to students that when they build their models, they must follow their design plans. Reassure them they will have an opportunity to change and improve their design plans after they present them. Review classroom expectations for working with materials. Then, give teams time to gather materials and build toys.
 - ▶ Digitally record students' processes to share at a later date with students and parents.
6. Distribute *Think about It* (page 13) to students. Explain that reflection is an important part of the engineering design process. Read aloud numbers 1 and 2 on the activity sheet, and have students mark their responses. Ask volunteers to share.



What Toys Can Do (cont.)

Prep

- ▶ Prepare all materials for the STEAM Challenge.
- ▶ Review all designs before teams begin improvements.

STEAM Challenge

Test and Improve

1. Discuss the following questions to guide student thinking with the STEAM Challenge:
 - ▶ *What makes a toy fun?* Return to each photograph in the book, and discuss what makes each toy fun. For example, the toy on page 3 can be moved around, and the jack-in-the-box can surprise you. Encourage students to share their experiences with each toy.
 - ▶ *Which materials help keep toys from breaking?* Return to each photograph in the book, and discuss the material each toy is made out of. For example, the top is made of wood (page 5), and the robot (page 11) is made of metal. Make a list of all the materials the toys in the book are made of: metal, wood, plastic, and wax. Discuss with students that each toy is made of sturdy material and does not break when it is played with. Ask students how this information will help them choose the materials they use for their toys during the challenge.
2. Gather teams for testing. Explain that teams will offer feedback after the test. Use *Friendly Feedback* (page 14) to review best practices for giving feedback.
3. Distribute *Toy Test Results* (page 15) to students, and ask them to record results for each team.
4. Gather students together to test the toys. Have each group share their toy and how to play with it. Then, place the toys in different locations around the room, and encourage students to move throughout the room as they play with the toys. Provide enough time for students to play with all the toys.
5. Provide time for teams to brainstorm ways to improve their designs based on test results and feedback. Refer students back to their *Team Plans* activity sheets. Ask them to sketch their improved design plans and explain any changes.
 - ▶ **Challenge** successful teams with additional goals for the second design (e.g., the toy must roll, or it must be built with specific materials).
6. Have teams gather materials to improve their designs. Then, have them make their improvements and retest their toys. (**Note:** If students will be observing, recording, and offering feedback for the retest, provide extra *Toy Test Results* sheets to students.)
7. Have students complete numbers 3 and 4 on their *Think about It* activity sheets.

What Toys Can Do (cont.)

STEAM Challenge

Reflect and Share

1. Gather students together to reflect and share about the STEAM Challenge. Ask students to identify toys that were easy to move. Have students identify toys that were fun. Ask guiding questions to help students reflect on the results: *What made a toy fun? Which toys did you play with the longest? Why?*
2. Guide students to see if there is a correlation between toys that were easy to move and toys that were fun. *Why or why not?*
3. Discuss students' answers to numbers 1–4 on their *Think about It* activity sheets. Can the group think of ways to improve some of the toys that were created? If possible, allow time for students to build and test their ideas.
4. Have students complete numbers 5 and 6 on their *Think about It* activity sheets.
5. Distribute *Engineering Design Process* (page 16) to students, and review how they used each step to complete the challenge. Use the statements on *Engineering Design Process Reflection* (page 19) to help students think about the steps.
 - ▶ Have students annotate the infographic with words or pictures specific to this challenge. Prompt and guide students with questions as needed to help them more fully develop their experiences during each step.

6. Ask students to identify careers related to the book. Guide students to see that even toys need engineers and designers to create them.

Assessment Activities

1. Have students complete a short posttest, *What Toys Can Do Quiz* (page 17), to assess this lesson's reading objective. Read the questions on the posttest aloud for students.
 - ▶ Students may use the Interactiv-eBook activities in the Digital Resources for assessment purposes (optional).
2. Guide students to complete *Teamwork Rubric* (page 18) to reflect on and evaluate their work and collaboration skills.
3. Have students verbally answer the Think and Do questions from the book.



Do you want to invent toys that move?

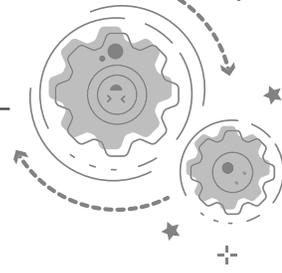
“Inventing a toy, such as an airplane, uses math and science skills.”

— Russ Lee, Chair, Aeronautics Department, National Air and Space Museum, Smithsonian

Read this career advice aloud to students. Read the author's name and job title. Discuss the advice, and encourage students to think about what they could do at school and at home to prepare for this type of career.

Name: _____

Date: _____



Make a Plan

Directions: Write the challenge. Brainstorm ideas.
Sketch a plan.

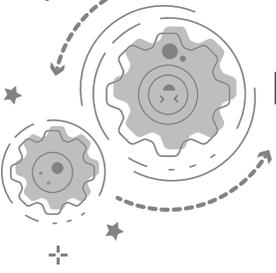
Challenge: Create a *new toy* that
is *fun*.

My Thoughts

Large dashed rectangular area for writing thoughts.

My Plan

Large dashed rectangular area for writing a plan.



Name: _____

Date: _____

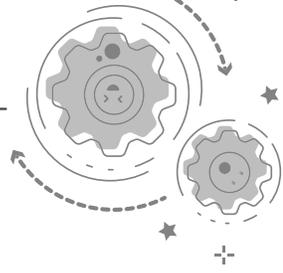
What Can Toys Do?

Directions: Write or draw about four things toys can do.

<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>

Name: _____

Date: _____



Make It Jump

Directions: Draw the steps for how this toy works.



1

Dashed-line box for drawing step 1.

2

Dashed-line box for drawing step 2.

3

Dashed-line box for drawing step 3.

Team Members: _____

Team Plans

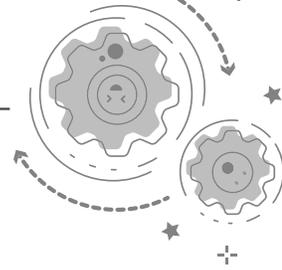
Directions: Sketch **Plan 1**. Sketch **Plan 2**.

Plan 1

Plan 2

Name: _____

Date: _____



Think about It

Directions: Check *yes* or *no*. Circle the words. Fill in the blanks.

1. My team listened to each other. yes no

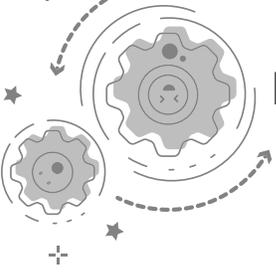
2. I added my ideas to the design. yes no

3. Our first plan (worked/did not work) because

4. Our second plan was (better/worse).

5. I learned

6. It was hard when



Name: _____

Date: _____

Friendly Feedback

Directions: Ask questions. Give ideas. Use these sentences to get started.

Clarify

How did you _____
_____?

Warm Feedback

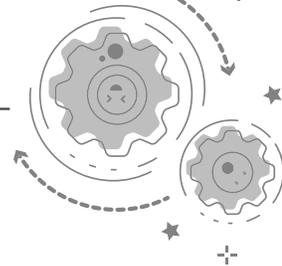
I like _____ because _____.

Cool Feedback

You might want to try _____
_____.

Name: _____

Date: _____

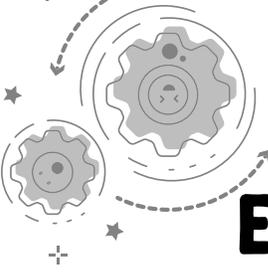


Toy Test Results

Directions: Mark the chart for the toy test. Circle *yes* or *no*.

Team	Is the toy easy to move?	Is the toy fun?
1	yes no	yes no
2	yes no	yes no
3	yes no	yes no
4	yes no	yes no

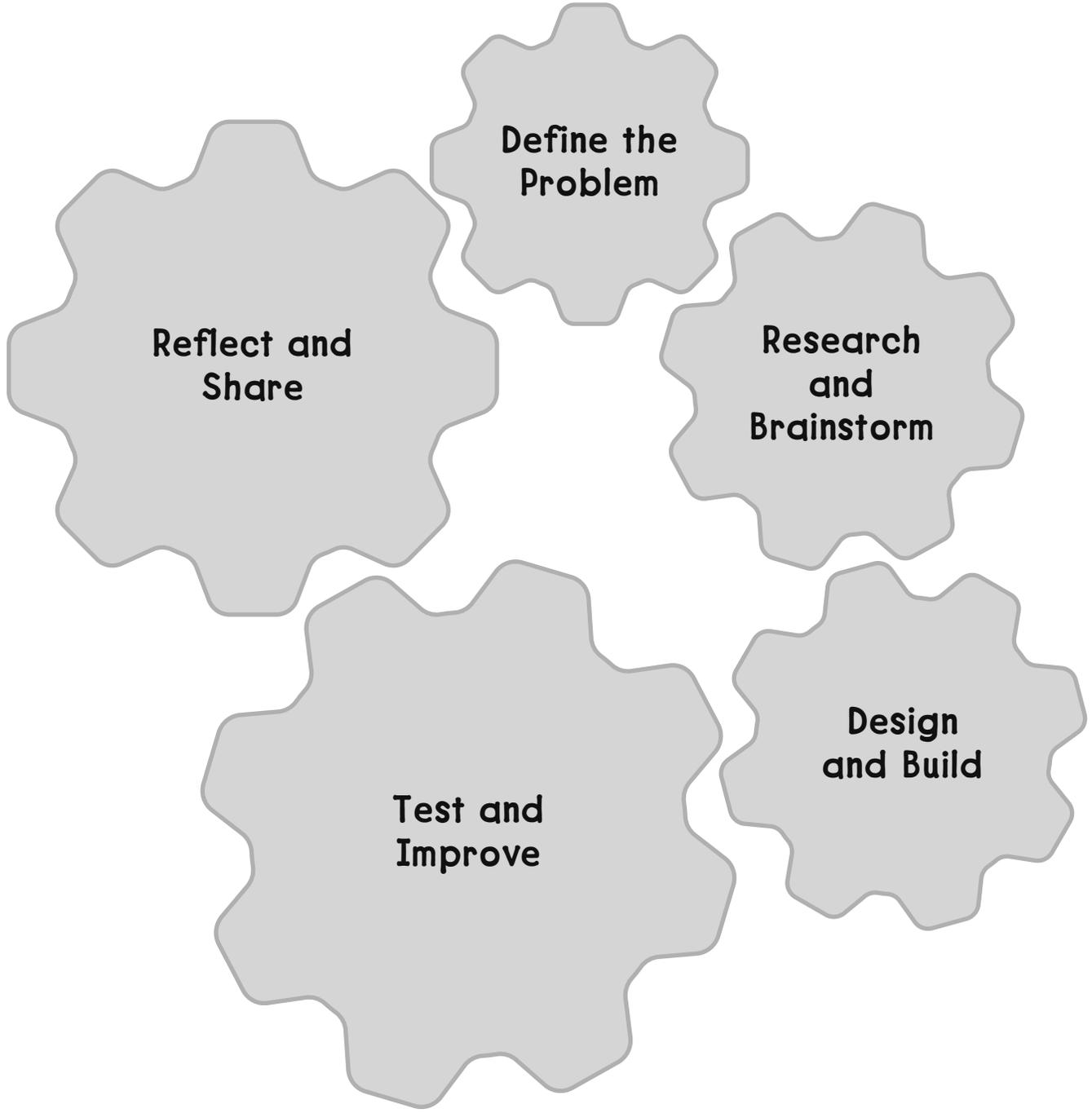
Draw the toy that was the best.



Name: _____

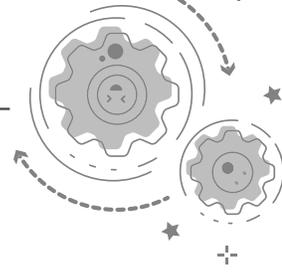
Date: _____

Engineering Design Process



Name: _____

Date: _____



What Toys Can Do Quiz

Directions: Listen to your teacher. Answer the questions. Show what you know.

1. What can roll?

(A) car



(B) jack-in-the-box



(C) robot



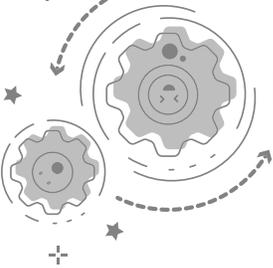
2. How can a top move?

(A) It bends.

(B) It spins.

(C) It jumps.

3. What can a kite do?



Name: _____

Date: _____

Teamwork Rubric

Directions: Think about your team. Circle the faces to show what you did. Write about how you helped.

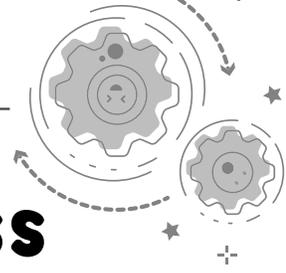
= Always = Often = Sometimes

I listened to people on my team.			
I helped people on my team.			
I shared ideas with people on my team.			
We made choices as a team.			

I helped my team when I _____

Name: _____

Date: _____



Engineering Design Process Reflection

Directions: Read the list. Check the boxes to show what you did.

Define the Problem

- I understood the problem or task.

Research and Brainstorm

- I researched and brainstormed ideas.

Design and Build

- I designed and built models.

Test and Improve

- I tested and improved models.

Reflect and Share

- I reflected on and shared my work.



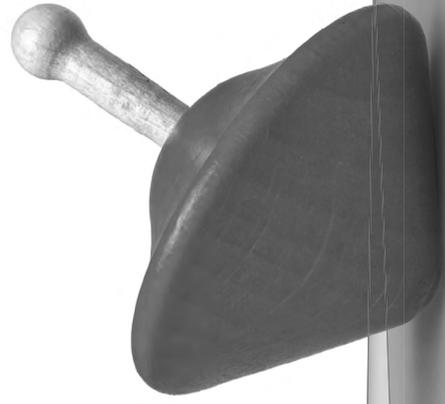
STEAM CHALLENGE

The Problem

There is a new toy store in town. They need a great new toy to sell.

The Goals

- Make a new toy.
- Your toy can be made from any material.
- Your toy should be fun to use. It should not break.



1 Research and Brainstorm

Learn about toys.



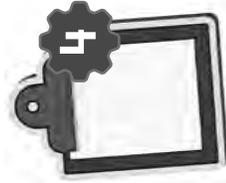
2 Design and Build

Draw your plan. Build your toy!



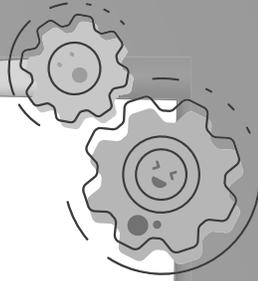
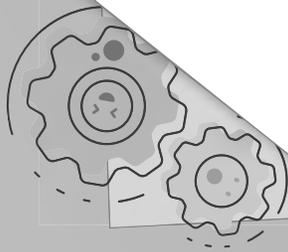
3 Test and Improve

Have a friend play with your toy. Then, try to make it better.



4 Reflect and Share

What did you learn?





Smithsonian

What Toys Can Do

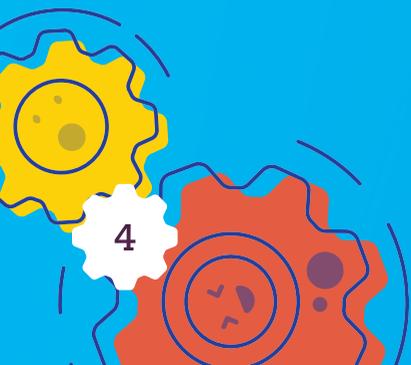


Dona Herweck Rice

Some toys roll.



Some toys spin.



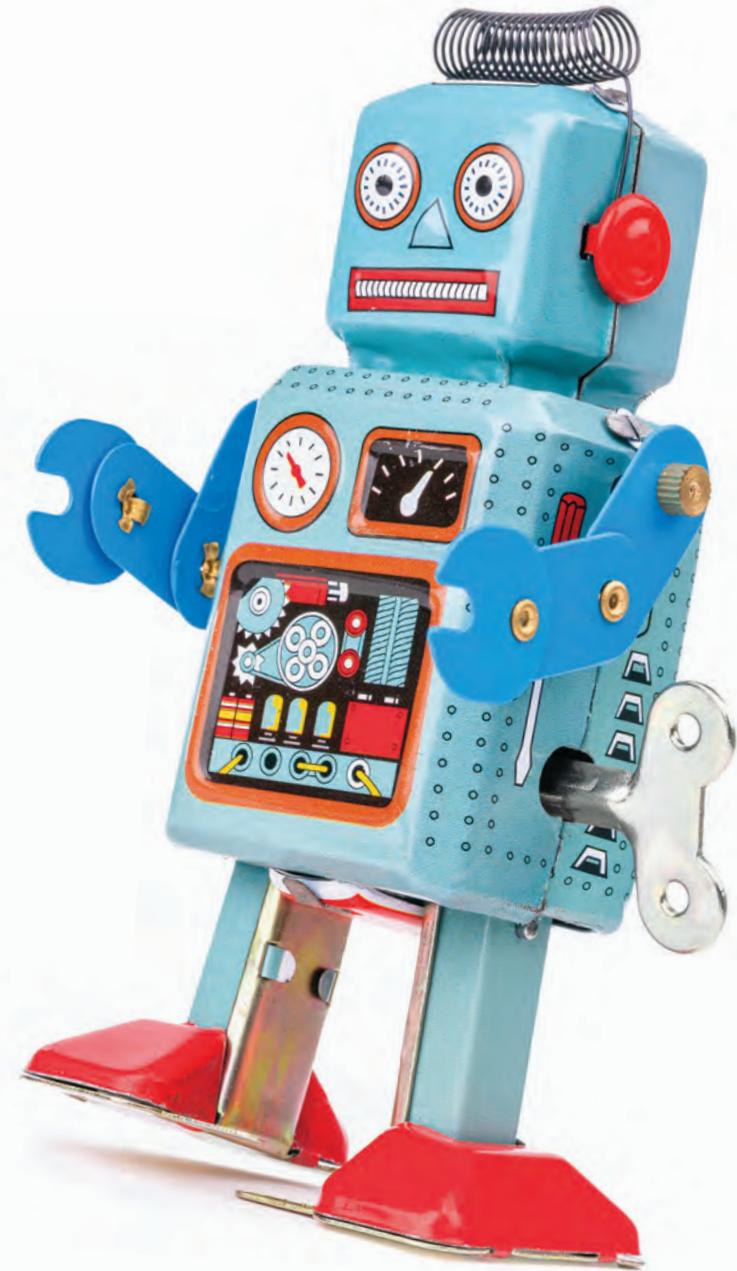
Some toys jump.



Some toys bend.



Some toys walk.



Some toys stack.

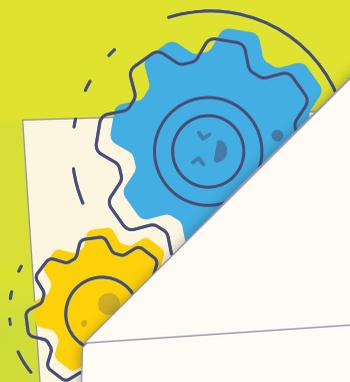


Some toys color.



All toys are really fun!





STEAM CHALLENGE

The Problem

There is a new toy store in town. They need a great new toy to sell.

The Goals

- Make a new toy.
- Your toy can be made from any material.
- Your toy should be fun to use. It should not break.



Research and Brainstorm

Learn about toys.



Design and Build

Draw your plan. Build your toy!



Test and Improve

Have a friend play with your toy. Then, try to make it better.



Reflect and Share

What did you learn?

Consultants

Amy Zoque

STEM Coordinator and Instructional Coach
Vineyard STEM School
Ontario Montclair District

Siobhan Simmons

Marblehead Elementary
Capistrano Unified School District

Publishing Credits

Rachelle Cracchiolo, M.S.Ed., *Publisher*
Conni Medina, M.A.Ed., *Editor in Chief*
Diana Kenney, M.A.Ed., NBCT, *Series Developer*
Emily R. Smith, M.A.Ed., *Content Director*
Véronique Bos, *Creative Director*
Robin Erickson, *Art Director*
Stephanie Bernard, *Associate Editor*
Mindy Duits, *Senior Graphic Designer*
Smithsonian Science Education Center

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Think and Do

1. What is one way that a toy can move?
2. What is a toy that can move in many ways?

