



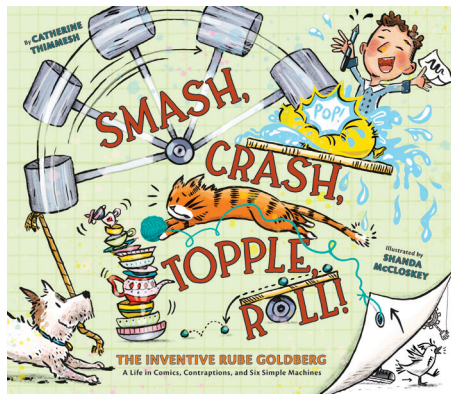
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# SMASH, CRASH, TOPPLE, ROLL!

## THE INVENTIVE RUBE GOLDBERG

A Life in Comics, Contraptions, and Six Simple Machines

By CATHERINE THIMMESH • Illustrated by SHANDA McCLOSKEY



## About the Book

Award-winning author Catherine Thimmesh's irresistibly engaging text and artist Shanda McCloskey's energetic, cartoon-style artwork introduce readers to the life and creative legacy of Rube Goldberg, the world-famous inventor of crazy contraptions. A rollicking educational kids' book that is part biography, part inspiration, and part physics how-to, *Smash, Crash, Topple, Roll!* posits the ultimate question...why do anything the simple way? (Especially if, for instance, there is a catapult option?)

Because, of course, there are lots of things you can do the simple way:

Set an alarm,  
flip a switch,  
open a door,  
toast some bread . . .

But what if, instead, you did things the Rube Goldberg way?

Endlessly entertaining,  
needlessly complex,  
and achieving a delicate balance of physics, humor, and excitement!

The book includes an overview of the six simple machines that power most of Goldberg's inventions and puts the tools for making real-life Rube Goldberg machines right into readers' hands. It's the perfect thing to spark the imaginations of budding inventors, artists, and thinkers of all ages—because the most promising relationships with science start not with a textbook but with the willingness to break stuff and ask silly questions!



## About This Guide

This curriculum guide contains pre-reading engagement and background information, inquiry activities, discussion strategies, and creative projects applicable to various curricula. *Smash, Crash, Topple, Roll! The Inventive Rube Goldberg: A Life in Comics, Contraptions, and Six Simple Machines* can be shared through reading aloud or by students reading the book independently. The before, during, and after activities listed can be modified for a range of grade levels. The Next Generation Science Standards (<http://www.nextgenscience.org/>) were considered in creating this guide.

### BEFORE READING

## What Do You Know?

Before introducing *Smash, Crash, Topple, Roll!*, create a two-column chart with the headings:

- ✓ What we know about Rube Goldberg
- ✓ What we know about simple machines

Next, show students the cover of the book. What information can be added to the chart after reading the title and viewing the illustrations? Share the website <https://www.rubegoldberg.org/> to learn more and provide a context for the reading.

Turn to the end pages and provide students a few minutes to look at the illustrations of the six simple machines. Ask them to name the simple machine and the illustration that depicts an example of that machine.

Additional information can be added to the chart as the book is read aloud. If students are reading the book independently, further details can be added to their Investigation Notebook.

## Fascinating Fun Fact

Turn to the next page in *Smash, Crash, Topple, Roll!* and share that Rube Goldberg is the only person listed as an adjective in the Merriam-Webster Dictionary. Discuss the meaning of the term adjective. Then, read the definition accompanying the Rube Goldberg entry: “Doing something simple in a very complicated way that is not necessary.”

Ask, “Can you think of something you have done that should have been simple to do, but you made the task much more complicated or difficult?” Have students share their answers with the class or turn and talk to the person next to them (to avoid possible embarrassment!).

## Nineteen Simple Steps?

Brainstorm the steps in reading a book with students and list them on a chart. How many steps are there to accomplish the task?

If possible, project the pages of the section entitled “The Simple Way to Read This Book.” As you read



the text at the bottom, point to each step, A through S. An alternative would be to ask students to read the text through a “popcorn reading” strategy where each student reads the text for a letter. Again, point to that part of the illustration as the student reads. Provide a few minutes to assign students a letter and have them practice reading the phrase before reading it aloud.

## DURING READING

### Investigation Notebook

Students will use an Investigation Notebook that will contain a comprehensive collection of their work before, during, and after the reading of *Smash, Crash, Topple, Roll! The Inventive Rube Goldberg: A Life in Comics, Contraptions, and Six Simple Machines*. This notebook will consist of:

- Information about Rube Goldberg and simple machines
- Preparation for literature circles
- Observations
- Construction plans
- Wonderings, ponderings, and reflections

### Fierce Wonderings

One or more pages in the Investigation Notebook should be devoted to Fierce Wonderings, a term coined by author and educator Ralph Fletcher. Fierce Wonderings are persistent questions and curiosities that ignite exploration and fuel the writing and/or inquiry process. While reading *Smash, Crash, Topple, Roll!*, students may generate questions about Rube Goldberg or simple machines. Some Fierce Wonderings students might ponder:

- Definition of specific words
- Curiosity about specific images
- Lingering questions after the book ends
- Bottomless questions (one question prompts another)
- BIG questions (leading to further inquiry and research)

### Nonfiction Literature Circles

Nonfiction books are excellent choices to discuss in a literature circle format. These informative books expand students’ natural curiosity about the world. Discussing a book in small groups of five to seven students is the hallmark of literature circles. To enhance discussion, each student takes responsibility for a role. The value of literature discussion roles is to demonstrate the various ways to think about and respond to a book.

*Smash, Crash, Topple, Roll!* is structured with a few pages containing information about Rube Goldberg, followed by expository text explaining two simple machines. This structure is used throughout the book and lends itself to different discussion strategies. One strategy would be to read all the sections about Goldberg first and then discuss the pages featuring simple machines. Another approach would



be to divide the book into three portions to discuss Goldberg and the simple machines simultaneously.

Students should use their Investigation Notebook to prepare for their discussion role. Their entries may include questions, lists, diagrams, charts, or sketches.

Here are a few roles that would support the discussion of *Smash, Crash, Topple, Roll!* Assign each student a role or have them select their own.

- **Qualified Questioner:** Develops a list of questions the group might want to discuss about the book. The goal is to help others talk about big ideas in the reading and share their reactions.
- **Feature Finder:** Identifies afterword, glossary, captions, headings, diagrams, speech bubbles, captions, labels, sources, and other features.
- **Illuminating Illustrator:** Draws a picture related to the reading. It can be a sketch, cartoon, diagram, flowchart, or stick figure scene of something that happened in the book or a picture that conveys an idea about a simple machine.
- **Powerful Passage Picker:** Locates a few sentences or quotations in the text for the group to discuss. The idea is to return to especially interesting, powerful, funny, puzzling, or important sections of the reading and think about them more carefully.
- **Rockin' Researcher:** Digs up additional information about Rube Goldberg or the use of simple machines by searching websites and other nonfiction books.
- **Wondrous Word Wizard:** Selects words that are unfamiliar, powerful, or just feel awesome to say.
- **Inquisitive Inquirer:** Prepares a BIG idea chart by recording ideas and diagrams for constructing a contraption in response to *Smash, Crash, Topple, Roll!*

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## AFTER READING

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### Scavenger Hunt

Ask students to participate in a scavenger hunt to look for examples of the six simple machines around their house, school, and neighborhood. Have them bring the object to share with others or draw and label a picture of it in their Investigation Notebook.

### Character Analysis of Rube Goldberg

To gain insight into the history and actions of Rube Goldberg, students can conduct a character analysis. Students should consider the traits, words/quotes, actions, behavior, and accomplishments shared in *Smash, Crash, Topple, Roll!* These might be described in the text or portrayed in the illustrations. Features of a character analysis may include:

- Analyzing a character's personality, strengths, and weaknesses.
- Exploring what motivates a character's actions.
- Examining how a character acts, speaks, and interacts with others.
- Tracking how a character changes over time.
- Considering successes and challenges of a character.

In their Investigation Notebook, students create a chart to record:

Characteristics	Evidence from text or illustration with page #	What evidence reveals about the character
Words		
Appearance		
Actions		
Accomplishments or challenges		

Students can share their examples in small groups or with the class. A class chart listing the information discovered about Rube Goldberg could also be generated.

## Simple Machines

Scaffold students' knowledge and understanding about simple machines by having them create and operate one or more simple machines. This will assist in the preparation for designing, constructing, and launching a Rube Goldberg-like contraption. There are numerous websites and videos containing directions for creating a simple machine using everyday items, such as:

- **Lever:** Craft stick catapult or pencil and ruler seesaw
- **Wheel and axle:** Pinwheel or paper plate game spinner
- **Inclined plane:** Milk carton water cascade or cereal box ramp
- **Wedge:** Play dough cutting with plastic knives and scissors or apple or cheese wedge eating
- **Screw:** Bottle cap or jar lid (to explore how the screw works)
- **Pulley:** Shoebox toy elevator or paper cup, thread spool, and string pulley

Students can record their observations in their Investigation Notebook.

## Think Like Rube Goldberg

A Rube Goldberg machine, a comically involved, complicated invention laboriously contrived to perform a simple operation, can be made using household, classroom, or office supplies such as paper cups, spoons, balls, rubber bands, strings, staples, pencils, etc. Visit <https://www.rubegoldberg.org/all-about-rube/cartoon-gallery/> to share cartoons created by Rube Goldberg to inspire this task.



The first step in designing a Goldberg-like machine is to think about an objective for the contraption. Here are a few ideas:

- Closing a door
- Turning pages in a book
- Watering a plant
- Pouring cereal into a bowl
- Dropping ice cubes into a glass
- Popping a balloon
- Ringing a bell
- Squeezing toothpaste onto a toothbrush

Next, students should consider the different simple machines and items needed to accomplish the task. Students should use their Investigation Notebook to draw a diagram of how each step of the action will occur and list the materials needed. After the contraption is designed, students should construct a sequence of mechanisms that trigger one another until the goal is achieved. This may require multiple attempts. Students should record through writing or drawing how successful each attempt was and any possible design flaws or room for improvement in their contraption.

## Possible Ponderings

After reading and discussing *Smash, Crash, Topple, Roll!* and creating and launching their Rube Goldberg contraptions, have students select one of these sentence starters to reflect on the book and the process of designing, constructing, and launching what they assembled. Students should write or draw their responses in their Investigation Notebook.

- ? I wonder why ...
- ? I don't see how ...
- ? I can't believe ...
- ? Why did ... ?
- ? I was surprised when ...
- ? I don't understand ...
- ? One thing that confused me was ...
- ? This reminds me of ...
- ? I think ... will happen next.
- ? I think ...

## About The Guide Creator

This guide was created by Cyndi Giorgis, Professor of Literacy Education and Children's Literature at Arizona State University.

