



Developed with Kristin Hotter

Volume 4 | Gr. K-4

# Design & Engineering: Make chores easier



### Time:

**Introduction:** 20 minutes

**Activity 1:** 40 minutes

**Activity 2:** 75-90 minutes (all 3 steps)

**Activity 3:** 30 minutes

**Total Time:** 165-180 minutes (If you're breaking this up into multiple class periods, complete Introduction and Activity 1 on Day 1, Steps 1 and 2 of Activity 2 on Day 2, and Step 3 of Activity 2 and Activity 3 on Day 3.)

### K-2-ETS1-1

Define a simple problem that can be solved through the development of a new or improved object or tool.

### K-2-ETS1-2

Develop a simple model based on evidence to represent a proposed object or tool.

### 3-5-ETS1-1

Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.



## Materials list

- *Rosie Revere, Engineer* by Andrea Beaty (listen aloud at <https://www.youtube.com/watch?v=4r8vTxeLcU>)
- Simple Building Materials Kit (TB27626)
- Art Page (included)
- Chore Bar Graph Page (included)

## Objectives

Students will be able to...

- Create a machine that solves a chore problem
- Make a bar graph that illustrates each classmate's most disliked chore
- Write a poem using the same rhyme scheme as *Rosie Revere, Engineer*

## Content

Introduce students to engineering with the rhyming book *Rosie Revere, Engineer*. As you read through the book, encourage students to look for characteristics an engineer might possess. Once students have a better understanding of the term "engineer," facilitate a discussion about chores that students dislike the most. From that discussion, help students work through a series of engineering steps. These steps will lead students to create a model of an invention that will help them complete the chore they dislike the most. Once students work through all the steps, they'll build a three-dimensional model of their invention. Finally, students will create a quatrain, using the same rhyme scheme as *Rosie Revere, Engineer*, about their chore invention.

## STEAM Connections

**Science** — Students will develop a plan that illustrates how each material they've chosen for their model will help to bring their invention to life. They'll do so by creating a detailed drawing that represents their invention.

**Technology** — Students will use an interactive whiteboard to tally the data from which students will create their bar graphs.

**Engineering** — Students will create a physical model of their scientific drawing that will help them complete the chore they dislike most.

**Art** — Students will complete an art page on which they'll illustrate and explain why they dislike a specific chore. Students will also write a quatrain poem about their chore invention that follows the rhyme scheme of *Rosie Revere, Engineer*.

**Math** — Students will survey their classmates to determine each classmate's most disliked chore. They will then create a bar graph that illustrates the collected data.

## Introduction

Create a K-W-L chart prior to the lesson.

1. Facilitate a discussion with students about the word "engineer." See what they already know prior to reading the book *Rosie Revere, Engineer*. Place their answers in the "K" column of the chart.
2. Show students some of the illustrations from the book. Ask them what they notice, then ask them what they want to know about engineering based on what they saw in the pictures. Place what students want to know about engineering in the "W" column of the chart.
3. Read or listen to *Rosie Revere, Engineer*.
4. Ask students what they learned about engineering from the book. Place what they've learned so far in the "L" column of the chart. If students are struggling with this part of the task, ask them to name some characteristics of Rosie that helped her to be an engineer. You can also ask them to name some characteristics that stopped her from being an engineer.



# K

WHAT I  
KNOW

# W

WHAT I  
WONDER

# L

WHAT I  
LEARNED





## Activity 1

1. Work as a whole group. Ask students to help you create a list of chores (picking up toys, emptying the dishwasher, making the bed, etc.). As students name chores, create a list on an interactive whiteboard. Students will later use the compiled list to mark their most disliked chore.
2. Facilitate a conversation in which students can talk about what chore they dislike completing the most and why.
3. Students will draw a picture illustrating their most disliked chore and write about it. The activity can be revised based on your grade level.

**Grades K-1:** Have students complete this sentence starter: I dislike \_\_\_\_\_ the most because \_\_\_\_\_.

**Grades 2-4:** Have students write a topic sentence telling what their most disliked chore is, then ask them to give two or three reasons why that particular chore is the one they dislike the most.

4. Once students have completed their art page, reconvene the group. Create a chart on which students can add a tally mark that indicates their most disliked chore. Ask students to come up one at a time to add their tally mark.
5. Add together how many marks correspond with each chore.
6. Ask students to identify the top five most disliked chores.
7. Provide students with the bar graph sheet. Ask them to create a bar graph based on the data from the tally. (You can have them graph all of the chores or just have them graph the top five identified in the previous step.)
8. Take note of each student's most disliked chore. You'll likely want to use small groups of two to three students for Activity 2. Since students will be creating a model for an invention that solves their most disliked chore problem, they'll need to be put in groups according to their most disliked chore.

## Activity 2

1. Take a few moments to go back and look at *Rosie Revere, Engineer* one more time. Look specifically at pages where Rosie's, and other children's inventions are exhibited. For instance, ask students to look closely at the hot dog dispenser. What sorts of materials do they notice in her invention? (*paper towel rolls, tennis ball, rubber ducky, etc.*) Get students to recognize that the materials in all of the inventions are everyday items. It doesn't take expensive materials to create exciting inventions. Show students some of the materials they'll have the opportunity to work with on this project.
2. Tell students that they'll have the opportunity to create inventions like Rosie and her classmates. Explain there is a specific process involved when it comes to inventing something new.

**Step 1:** Invent something that will solve a problem. Ask students what problem Rosie was trying to solve for Uncle Fred. (*She was trying to help him keep snakes away.*) Remind students that in the previous activity, they all identified a problem in their lives: chores. Ask them to imagine a world where they didn't have to complete that chore that they dislike the most. What would they do with all that extra time? Tell them they have the power to invent something that will save them that time.

**Step 2:** Plan how to solve the problem. This includes drawing and thinking about your materials.

3. Explain to students that once they've figured out what problem they want to solve, they have to start planning. When they plan their invention, they need to think about what materials they want to use, how to use the materials, how they want their invention to work, and what they want their invention to look like. Provide a think-aloud example. You can use the one listed below or one of your own. As you're thinking aloud, create a simple sketch of what the machine you're describing might look like. *"Let's say picking up the toys in my room is the most disliked chore. What kind of invention would work best to pick up toys? It would probably be something that has wheels so it can move around my room on its own. It would need to have something that can come down and scoop up the toys that are on my floor. Since some of my toys are kind of big, like my stuffed animals, I'll need a big box on top to put the toys in once they've been scooped off the floor. Now that I have an idea of what I want my invention to look like, I need to think about materials. The most important thing for me to remember is that this is a model of my invention, so it's OK if the materials aren't all the perfect size yet."*
4. Look through the materials that students will have access to use and pull some materials that would work for their invention. Be sure to show objects that wouldn't work as well to show students not everything is the perfect fit and to show students your thought process.

**5. Step 3:** Build the model of your invention. Now it's the students' turn to take their inventions through these steps. Here's where students will break into the small groups you created at the end of Activity 1. Be sure to have students complete each step before moving onto the next. It might be beneficial to only complete steps 1 and 2 of the process during this class period. You can have students do the actual building of their invention in a subsequent class period.

### Activity 3

1. Refer back to the K-W-L chart created in the introduction. Ask students what they've learned about engineering now. Record any additional comments students make in the "L" column.
2. Look at *Rosie Revere, Engineer* one more time. Read a page or two to students to remind them of the book's AABB rhyme scheme.
3. Tell students they're going to make their own AABB 4-line poem about their own invention. Remind them that the last word in lines 1 and 2 rhyme. The last word in lines 3 and 4 also rhyme.
4. Work together as a class to create your own 4-line poem (quatrain) about the invention you used as a think-aloud during Activity 2. Below is a sample that you can use if you choose.

Picking up toys is my least favorite **chore**  
I always find it to be such a **bore**  
I used different tools to make a **device**  
Spending time doing other things is so much more **nice**

5. This assignment will likely need to be tailored to your particular grade level.  
**Grades K–2:** Create a second poem as a whole group. If you'd rather students work more independently, create a list of words students may use as the last word of lines 1 and 3. Then brainstorm a list of other words that rhyme with those words that students could use for lines 2 and 4.  
**Grades 3–4:** Students either work independently or with their engineering partner to create their four line poem.

<b>K</b> WHAT I <b>KNOW</b>	<b>W</b> WHAT I <b>WONDER</b>	<b>L</b> WHAT I <b>LEARNED</b>



## SEL Power-Up Reflection

Suggested questions for an SEL-focused discussion after you finish your creations.

### GROUP REFLECTION

1. Why do you think it is important to do chores?
2. Why do we have to do things we don't like to do?
3. What are some ways that you deal with doing things we dislike?
4. What was your thinking process when you were choosing how to make something easier?
5. What was the hardest part of this project?
6. Did your team ever disagree about your invention? How did you come to agree?
7. Does your invention help only you? If not, how does it help others?
8. Did writing a poem about your invention help you explain it to others?

### SELF-REFLECTION

1. Did I try my best on this project? If you had to give yourself a score from 1-10, with 10 being *I did my best work* and 1 being *I didn't put any effort in my work*, what score would you give yourself?
2. How did I feel as I worked on this project?
3. What role does science play in my life?
4. Can thinking like an engineer help me in other areas of my life?



# Chore bar graph

Volume 4

Name: \_\_\_\_\_ Date: \_\_\_\_\_

