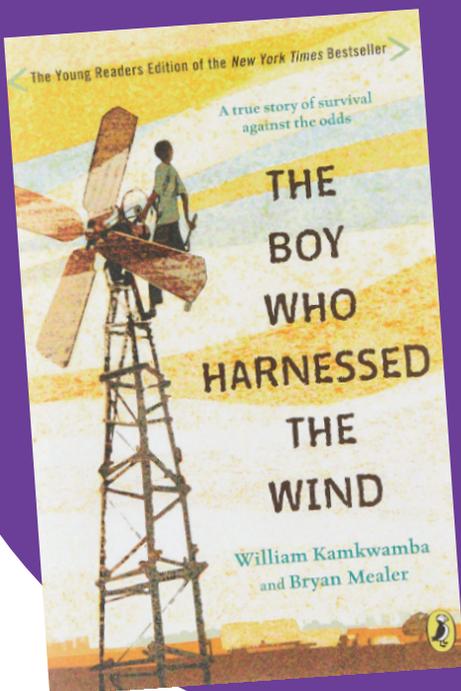


# INNOVATIVE SOLUTIONS



## The Boy Who Harnessed the Wind

By William Kamkwamba and Bryan Mealer, authors

Anna Humas, illustrator



Katie C.

*"The Independence Feeder I made would give our pets a chance to be fed when our family is busy or away from home."*



## Introduction

Original thinkers often feel compelled to take action and bring their new ideas to life through tinkering. While engaged with this novel students will learn how the main character persevered and use inventive thinking to improve the lives of his family and others in his village.

### LEARNING OBJECTIVES

- Through engagement with text, students will demonstrate the ability to use observation, visualization, and a design process to meet people's needs.
- Students will demonstrate the ability to use research, background knowledge, and creative thinking to conceptualize innovative, non-standard ways of using equipment.

## Vocabulary

harness  
observe  
electricity

circuit  
persevere  
supply and demand

## Essential Questions

- How do observation and visualization help inventors see new ways to help others?
- What can happen when an inventor's idea is no longer helpful?
- How is the concept of re-invention or innovation helpful to the design process?

## Guiding Questions

- By today's standards, what unusual challenges did William and his village face?
- How did William work towards overcoming these challenges considering his lack of scientific knowledge?
- How did William's successes help to make his village a better place in which to live?

### Crayola Supplies

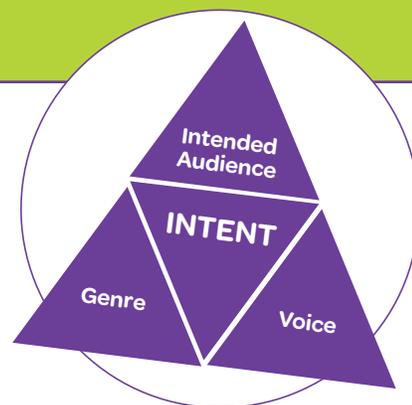
- Take Note Erasable Highlighters®, 6 ct.
- Take Note Permanent Markers®, 12 ct.
- Metallic Colored Pencils®, 8 ct.
- Color Sticks® Colored Pencils, 24 ct.

### Other Supplies

- Scissors
- Construction Paper
- Blank White Paper
- Glue Sticks
- Pencils

## Intentional Writing Framework

Students consider the following as they write:



**INTENT** – Why are you writing this? What is the purpose of this communication?

**INTENDED AUDIENCE** – Who are you writing to? How will this information influence your writing?

**VOICE** – What voice will you use in your writing (emotional/logical/credible)?

**GENRE** – What genre will you select so it is best suited to your intent and your intended audience?



The mind of an inventor is ever-engaged, observing everyday objects with a unique perspective and sensing possible new uses for something that has been discarded or had limited roles. Tinkering can have amazing results as is the case for William and his Malawi village.

- While engaging in the narrative, ask students to highlight significant information that deepens their understanding of William’s story.
- Have students work collaboratively in groups and ask them to sketch a graphic organizer that displays the information they highlighted as significant. Bring together the small groups to discuss the differences and similarities in how their organizers depict William, his family, and show how their lives were changed due to his perseverance and creative thinking. During the whole class discussion, ask students to summarize the steps in an inventor’s creative process. How do innovations go from ideas, to design sketches, to tangible objects?
- Each small group of students will select an innovation that they determine will be helpful to the class. They will do research to learn more about the problems and unmet needs. They will explore recent inventions to inspire ideas for their innovative changes that will improve products. Urge them to create sketches as they take research notes.
- Students will select and collect designated recycled items (that meet the safety criteria of no sharp edges, no toxic containments, etc.) to use in turning their ideas into prototypes. Members of each team will sketch prototype ideas that are accompanied by a few sentences that describe unmet needs and their products benefits before they perform a trial run of presenting their prototype.



- Urge small groups to share their presentations with each other and feedback. As students prepare their new product ideas, needs/benefit statements, and explain the process that led to the innovation, they will hear product improvement suggestions from classmates in these small group clusters.
- Once the group is satisfied with their product, the team will prepares a presentation for the entire class which would include a three-dimensional prototype of their invention or innovation.
- Encourage groups to discuss how their collaboration process—decision making, conflict resolution, and shared accountability for the work—was beneficial to the project.



- Students will reflect upon and respond to their classmates’ presentations. The audience members are responsible for providing constructive feedback that would help other teams with their invention/innovation and the presentation.
- Encourage teams to ask essential questions that elevate the discussion to better understanding consumers needs and the design process. They can also ask focused questions that could help classmates improve their prototypes.



- To help connect this lesson with written communications as well as visual and oral presentations, use the creatED Intentional Writing Framework. Ask students to prepare their presentations by thinking of their intent—main idea, intended audience, voice, and genre.
- As a written extension after their presentations, ask students to write to future student inventors using a genre of their choice. They could write an advertisement, a skit, a rap/song, whatever genre they feel conveys their intent to their intended audience.
- Their writing might describe how William’s story inspired them and they might address other ways inventors get inspiration.
- Provide time for students to share their work with another classroom and hear others’ responses to their ideas.

## Student Reflection

- How did highlighting significant passages in the text and working as a team to graphically organize information assist your group?
- Explain how you used sketching to visualize your ideas and design an invention or innovation.
- How did your team use collaboration and problem-solving skills during this lesson?
- How did learning about William's story and then practicing an innovation exercise help you identify personal strengths in the creative process?

## Teacher Reflection

- In what areas did the students excel? In what areas do the students need more practice?
- How did this cross-curricular STEAM approach to innovation connect to literacy skills? What other related activities would deepen these connections?
- What strategies did you employ to help your students improve their collaboration and problem-solving skills? What other strategies might you have employed?



## Standards

### LANGUAGE ARTS

- Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade-level topics, texts, and issues, building on others' ideas and expressing their own ideas clearly.

### .SCIENCE

- Define a design problem that can be solved through the development of an object, tool, process, or system using multiple criteria that include constraints such as scientific knowledge that may limit possible solutions

### MATHEMATICS

- Solve real-world mathematical problems.

### VISUAL ARTS

- Document early stages of the creative process visually and/or verbally in traditional or new media.
- Demonstrate willingness to experiment and take risks in artistic thinking and art making.
- Visually demonstrate how creative art making and critical thinking strategies are used to investigate a problem.
- Collectively plan, prepare, and present selected artworks, based on a theme, for display and include informational materials for the viewer.

Making Stories Visible



A collaboration between Crayola creatED® and Follett.