

Novel Engineering Books

Novel Engineering projects are designed around books that teachers choose, generally trade books with interesting plots, rich characters and detailed descriptions of the setting. Teachers sometimes read the text to students as students follow along or ask the students to read in groups. In both cases, they work to ensure that students understand the text and can use it as a resource for their engineering projects. As they read the text, students are prompted to identify problems faced by characters in the text. They then discuss whether these problems are ones that might be addressed with a product or process that they students could design in the classroom. From this list of engineering problems, each small group of students is asked to choose a problem that interests them or that they find particularly important in the story. The teacher gives each student group the task of designing a working prototype that could solve the chosen problem.

In some cases, particularly early in the school year, a teacher may choose to choose the problem for the students and ask them to design a variety of solutions. Teachers may also limit the list of problems to ones that he or she believes are particularly rich and/or important. Many teachers provide a template for students to take structured notes during book reading or a planning worksheet to initiate the design process.

Because of the variety of books and the inherently open-ended nature of the Novel Engineering approach, no two Novel Engineering units will look exactly the same. Below is a table with three of the books used by Novel Engineering teachers, some problems identified by students, and examples of prototypes designed to address these problems.

The following table gives a snapshot of the books some NOVEL ENGINEERING classrooms have used, problems identified by the students and solutions designed and built by students.

Book	Grade	Plot	Problems identified by students	Solutions designed by students
<i>A Snowy Day</i> by Ezra Jack Keats	1st	Peter plays in the first snowfall of the year and makes a snowball to keep. It melts in his pocket and he is sad and worried the snow will be gone.	Keeping Peter's snowball longer.	Insulated snowball savers. Portable insulated snowball saver.
<i>Clementine</i> by Sarah Pennypacker	2 nd	Clementine is a 2nd grader living in NY. She and her family live in a high rise where her father is the custodian. He is trying to keep the building clean and safe and get rid of the pigeons.	Clementine helps her father the custodian keep pigeons off the building.	-Owl: with movable wings and attached megaphone that projects predator sounds. -Fan with large blades that will deter pigeons from landing on ledge.
<i>The Three Javelinas</i> by	1 st and 2 nd grade	Three little javelinas try to keep the coyote from eating them.	How to help the coyote get his meal or how to protect the javelinas.	-House with trick chimney's that will discourage the coyote. -House with a roof that has spikes on it so the coyote can't get to chimney.

<i>Pop's Bridge</i>	3 rd	Two boys watch their fathers build the Golden Gate Bridge and experience positive and negative aspects of working on the bridge.	People fall off the bridge during construction of Golden Gate Bridge	Backpack that becomes a bungee cord Parachute with parts that span the bridge
<i>The Mouse and the Motorcycle</i>	3 rd			
<i>If You Lived in Colonial Times</i> Ann McGovern	3 rd	Expository book describing the lives of people in the English colonies before the Revolutionary War	Transporting water and watering gardens Dirty water Picking vegetables	Garden watering system using central place to dump buckets of water and tubes for distribution Filtration system for removing dirt from water Hinged vegetable picker with a long handle
<i>Hugo Cabret</i>	3 rd			
<i>Tales of a 4th Grade Nothing</i>	4 th			
<i>Tarrantula in my Pocket</i>	4 th			
<i>Tuck Everlasting</i>	4 th			
<i>Trumpet of the Swans</i>	4 th			
<i>The Mixed-up Files of Mrs. Basil E. Frankweiler</i> E.L. Konigsburg	4 th	Claudia and Jaime run away from home and stay at the MET in NYC. They face challenges such as a	Carrying around \$24 in loose change	A backpack with a padded false bottom to hide money and muffle the sound

		shortage of funds, avoiding detection, and the desire to learn about a mysterious sculpture that may have been created by Michelangelo.	Getting around the city without paying too much Seeing the statue when it is always surrounded by crowds	A scooter made from found materials with a wheel system created from rows of ping pong balls A telescoping periscope with adjustable mirror flaps
<i>The Fabulous Journey of Edward Tulane</i>	4 th			
<i>The Gorilla Who Wouldn't Grow Up</i>	4 th			
<i>James and the Giant Peach</i> Roald Dahl	4 th	James lives with two aunts who treat him badly. James drops magic crystals by a peach tree and creates a giant peach and some large talking insect friends. The peach floats during a sea voyage and takes to the air with the help of a flock of seagulls.	James is trapped by a tall fence at his aunts' house Cloud people throw ice balls at the peach as it floats by The peach gets stuck on the spire of a skyscraper.	Prototype of a trampoline and figuring out how to position it so James does not hit the wall Ice tube deflection system – a tube with a build in slingshot to send the ice ball back at the cloud people Small-scale LEGO Crane to lift the peach off the spire and place it on a truck
<i>Number the Stars</i>	4 th			
<i>Shiloh</i>	4 th			

<p><i>City of Ember</i> Jeanne DuPrau</p>	<p>5th</p>	<p>Ember was built centuries ago and far underground to protect a group of people from nuclear war. The city's people do not know that they are underground or that they need to return to the surface. Lina and Doon learn that Ember is doomed and figure out how to escape.</p>	<p>Carrying Lina' toddler sister during the long trip out of Ember</p> <p>No communication system between houses at night when lights are off</p> <p>It will be difficult to transport everyone in Ember to the surface.</p>	<p>A carrier designed to carry a toddler safely and comfortably</p> <p>A system to carry messages between houses using string, pulleys and bells</p> <p>A Ferris wheel-like system for carrying people up and out of Ember</p>
<p><i>Hatchet</i></p>	<p>5th</p>			
<p><i>The Most Dangerous Game</i> by Richard Connell</p>	<p>6th</p>	<p>A professional hunter is marooned on a deserted island and becomes the prey of a fellow hunter that lives on the island.</p>	<p>Escaping the tower</p> <p>Walking on quicksand</p>	<p>Zipline</p> <p>Pipe to divert smoke from</p>
<p><i>Island of the Blue Dolphins</i> by Scott O'Dell</p>	<p>6th-8th</p>	<p>Based on true events; a young woman is stranded on an island after her tribe abandons their home. She has to survive, find shelter, food, protect herself from</p>	<p>Getting food without using a weapon. Women are not allowed to touch or use them</p>	<p>Fish catcher with a long handle that has bait inside to lure fish inside and then is designed to keep them inside</p>

		the elements and a pack of wild dogs.	<p>A sturdy shelter that can withstand the elements and protect her from the wild dogs</p> <p>Ways to protect and store her food in order to keep it from other animals</p> <p>Protection from the wild dogs</p>	Pulley system so the main character can suspend food in baskets away from animals
<i>Muncha, Muncha, Muncha</i>	1-7*			
<i>Westlandia</i>	1-7*			

* Can be used as a skill building book