



The Big Book of Engineering Challenges

Celeste Baine, Cathi Cox-Boniol

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Engineering challenges are design problems that require students to identify needs, define problems, identify design criteria and constraints, develop solutions, and evaluate their solutions. In these activities, there are more than one right answer. The right design is usually one that meets the engineering criteria and is built within the materials budget. Students will design, construct, and test their engineering design solution and collect relevant data (if applicable). They will then evaluate the solution in terms of design and performance criteria, constraints, priorities, and trade-offs while also identifying possible design improvements.

This easy and exciting time and work saving book was developed to help middle and high school teachers with no engineering background teach engineering. By using the Engineering Design Process, students begin to look at problems, issues and constraints from multiple viewpoints and in relationship to an assortment of situations and scenarios. Good engineering design considers people's needs to determine the best solution. By solving problems that consider the needs of people, the doors to creativity open wide and student engagement increases. As students build skills in using the Engineering Design Process, they no longer need to sit back and wait for instructions. Instead, they explore, create, design, innovate, imagine, test and evaluate their solutions.

In *The Big Book of Engineering Challenges*, Celeste Baine and Cathi Cox-Boniol have done it again! Taking cues from their bestselling *Teaching Engineering Made Easy* series, Baine and Cox-Boniol have crafted an exceptional activity guide that gives classroom teachers an easy and dynamic way to meet curriculum standards and competencies. Their must-have resource for middle school teachers includes 30 activities with standards alignment for the National Science Education Standards (NCES), the International Technology and Engineering Educators Association (ITEEA), the Common Core State Mathematics Standards, and the Next Generation Science Standards (NGSS).

By completing activities in *The Big Book of Engineering Challenges*, students will see connections to the world around them at the same time they develop problem solving skills that they can use in school and throughout their life. The activities do not require a formal science lab and can be done with materials that are inexpensive and easy to find.

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