

Exhibit Teacher's Guide

Collaborate with Us

- The Kokomo-Howard County Public Library can share information about the exhibit and the library's events by sending home flyers, or teachers can link to the library's website from their classrooms' websites: discovertech.khcpl.org
 - Plan an event with the library, or encourage students to volunteer at the exhibit!
 - Work with us to feature your students' work as part of the exhibit.

Classroom Connections

Classroom content and activities can expand upon and reinforce Discover Tech engineering content. KHCPL can help you find reliable sources. Here are just a few of the examples:

- **Design Squad** <http://pbskids.org/designsquad/parentseducators/>
This PBS site has lessons, resources, and teacher guides to engage students in hands-on engineering.
- **Engineering is Elementary** <http://www.eie.org>
This site includes free curriculum for grades 3-5 (called Engineering Adventures) and middle school (Engineering Everywhere) in out-of-school time.
- **NASA Beginning Engineering, Science and Technology (BEST)** <http://www.nasa.gov/audience/foreducators/best/>
These activity guides help teach students the engineering design process.
- **TryEngineering** www.tryengineering.org
This site features a variety of lesson plans allowing teachers to apply engineering principles in the classroom.
- **eGFI: Dream up the Future** <http://teachers.egfi-k12.org/>
Tools include engineering lesson plans, class activities, outreach programs, and more.

About the Exhibit

Discover Earth Exhibit Stations	Pre-K through 2	3-5 th grades	6-8 th grades	9 th grade and up
Videos of Engineers Without Borders				
Game-Changers Touch Table				
Discover Tech Quiz Game				
Tabletop Arch building activity				
Large Building Block activity				
Inventors' Lab Station				
Solar Power Station				
Photo Wall "I am an Engineer"				

Younger elementary students (K-2) are introduced to engineering problems as situations that people want to change.

- Students can define engineering problems, such as designing boats that can float, lights that can turn on, and instruments that can make music.
- Students can compare solutions, such as lamps with on/off switches and lamps that turn on or off when touched, and test and evaluate them.
- Students can convey solutions through representations, such as a drawing or a physical model.

Older elementary students (grades 3-5) are more formally problem-solving as part of engineering design.

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- Students can specify the criteria and constraints that a possible solution to a simple problem must meet, such as limiting materials for designing the tallest model tower to straws, tape, and scissors.
- Students can improve solutions based on simple tests, such as building a model of a pinwheel then testing it and determining ways to make it move more easily.
- Students can explore multiple solutions to a problem, such as testing different types of paper airplanes for how far they fly.

Middle school students (grades 6-8) can focus on the engineering solutions within the larger context of the problem.

- Students can consider limitations to possible solutions, such as expense, the location it must be built, and whether the solution is acceptable to the local people.
- Students can systematically test and refine a solution, such as developing strategies for measuring how effective a solar cell is: how long it holds its charge compared to how long it takes to charge and how bright it can make a light bulb glow.
- Students can combine parts of different solutions to create new solutions, such as combining multiple strategies to filter dirty water.

Key Engineering Concepts

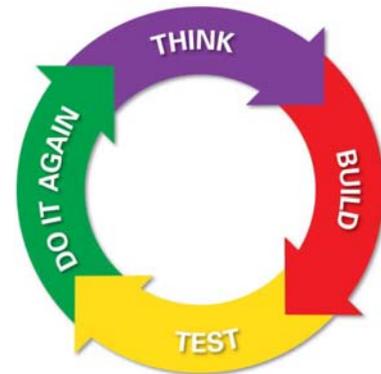
Engineers design and support the systems (infrastructure) that support the way we live today.

- Engineers solve problems that improve lives, like how to get clean water to rural communities.
- They help humanity face the known and unknown needs of our communities and the planet — using the finite resources available.
- Engineers solve problems that make life more fun, like planning, designing, and building community parks.

Engineering Process

Engineers tackle challenges through a methodical process: think, build, test . . . and do it again!

- Engineers think about a problem and factors they have to consider to solve it.
- They come up with an idea and build a prototype.
- They test the prototype.
- Then they repeat the process to improve their results.



Low Tech High-Impact Technology

Even simple technologies have the power to improve lives. Some of the simplest machines have been around for centuries, and continue to be central to engineering

- Inclined planes and screws
- Wedges
- Levers

Engineering is a social endeavor.

- Engineers often work in teams, with different people contributing in different ways, to take on a challenge.
- Engineers build on the ideas of others.



Please contact KHCPL TODAY to discuss how we can work together to increase the community's STEM engagement! Lori Hugley, Project Director, at 765.453.4150.