

Teaching Engineering

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Getting Started

- This webinar is being recorded and will be posted on DiscoverE.org. We will email the link to you one week after the webinar.
- Have questions? Type your question in the “Question” space on your control panel.

Who are you?

How do you support students?

What ages of students do you support?



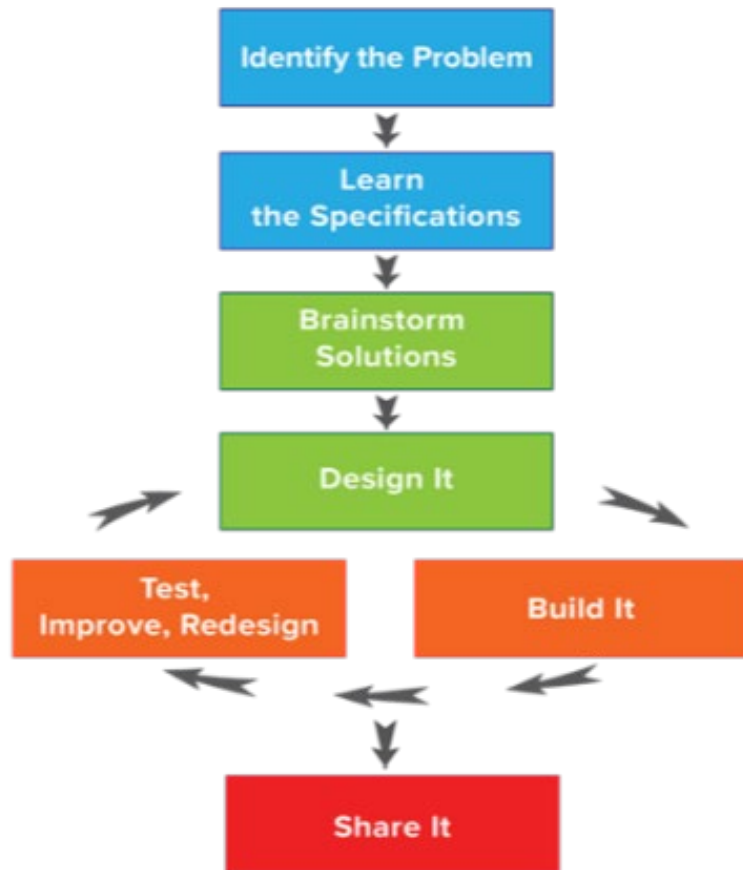


TEACHING ENGINEERING

Today's Agenda

- Overview of Engineering Design Process
- Hands-on Engineering Activity!
Controlling Sound
- Teach Engineering Resources
- DiscoverE Resources
- Q&A

Engineering Design Process



Problem: What problem am I solving

Specs:? What resources do I have? What's the budget? How much time do I have? Who's on my team? Who's my client? How will success be measured? What are my constraints?

Brainstorm: What do I know I already know? What do I need to learn? What materials do I have? What have others done?

Design/Build/Test: What idea do I want to try first? Did it work like I thought it would? What didn't work? What can I improve?

Share: What worked, what didn't? What would you do differently? What are your favorite features. What did you like about other teams' designs?

Who is DiscoverE?



We are the “E” in STEM

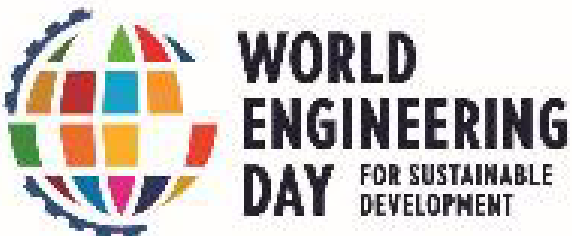
We support educators and volunteers to:

- Build Skills and Confidence
- Increase Interest and Knowledge
- Expand Opportunities



Resources

- 170 STEM Activities
 - Leader Notes
 - Student Instructions
 - Challenge Videos
 - Career Exploration
- Leader Training
- Outreach Grants



Formula for Success

Share positive engineering messages

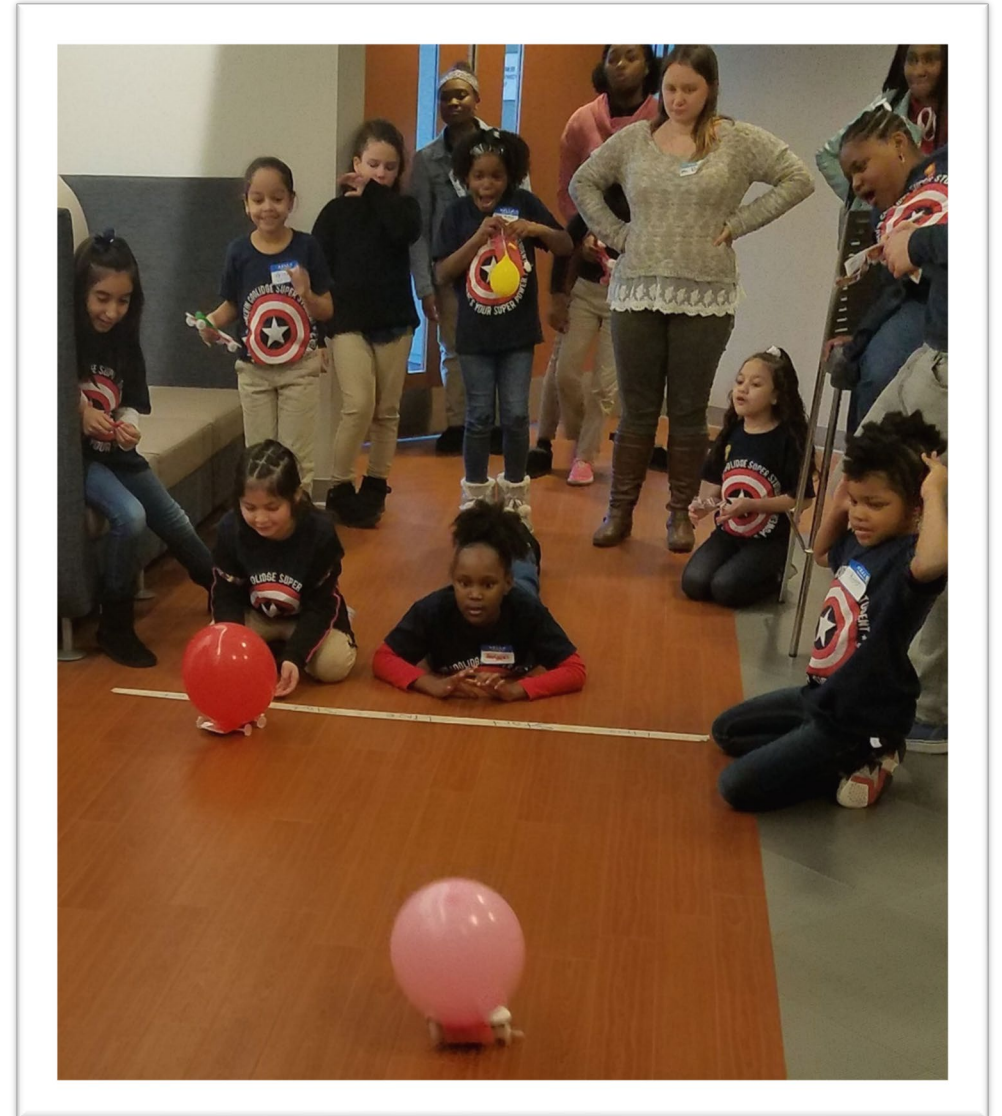
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Do Hands-on Activities & Active Facilitation

+

Support Interactions with STEM Role Models

= STEM Positive Students



Keys to Building a Student's STEM Identity

- Increase their interest
- Nurture curiosity with a positive attitude
- Help them see the value in STEM and how it aligns with their values and goals
- Build their confidence in their STEM skills
- Provide strong support networks
- Help them feel a sense of belonging



Finding STEM Volunteers

- Parents, neighbors, former students,
- Local Engineering Societies (SWE, ASCE, IEEE, ASME , CIE, etc)
- Local universities
- Local engineering firms





- Goal:** Celebrate engineers and inspire students
- Ask:** Volunteers and educators engage students & celebrate the work of engineers
- Resources:**
- STEM Activities
 - Training
 - Invite An Engineer Guide
 - Planning Guide
 - Certificates
 - Social Media Posts & Graphics

DiscoverE.org/EngineersWeek





- Goal:** Inspire girls to explore engineering
- Ask:** Engage girls in engineering – year round
- Resources:** Girl Day Planning Guide
Stickers
STEM Activities

DiscoverE.org/GirlDay



FREE Downloadable Resources

- Logos
- Ads
- Graphics
- Certificates
- Bookmarks
- ZOOM background
- Sample posts
- Customizable Language
- Spanish versions!

DiscoverE.org/downloadable-resources



DISCOVER

CHATS WITH CHANGE MAKERS

- Student host interviews engineers and technicians
- 45+ episodes available to stream
- Meet two new role models!
 - **Jan 26:** Robert Schomp, water resources engineer
 - **Feb 23:** Srimoyee Bhattacharya, chemical engineer & AI expert

DiscoverE.org/Chats



Meet Robert Schomp

- Robert is a water resources engineer who designs river habitats for salmon.

Premiering January 26!



Meet Srimoyee Bhattacharya

- Srimoyee is a chemical engineer and AI expert who leads a team of AI engineers and data scientists at Shell.

Premiering February 23!



What is Future City?

Middle and High School students work in teams to create cities that exist 100 years in the future based on an annual sustainability challenge.

Finding STEM Activities – DiscoverE.org

The screenshot shows the DiscoverE.org homepage. At the top, there's a navigation bar with links for Volunteer, Teach, Programs, Engineering Activities, STEM Careers, Support, and About. Below this is a section titled "Featured Engineering Activities" with three cards:

- Launch It**: 1 to 2 hours, 5-5. Participants consider Newton's Third Law of Motion with a simple experiment. Build a paper airplane and launch it to see how it flies.
- Make a Mechanical Hand**: 1 to 2 hours, 5-5. Students create a mechanical hand that can hold and release objects.
- Strongest Shapes**: 15 minutes to 1 hour, 5-5. Explore how different shapes (triangles, squares, circles, hexagons) hold up under pressure. Build a structure that can hold the most weight.

Below the featured activities is a search bar with filters for Type of activity, Time, Grade, Topic, and Discipline. At the bottom, there's a section titled "All Engineering Activities" with three cards:

- Summer of STEM 23**: Holiday, 3-5. Perfect for summer camps and out-of-school time programs. This free STEM journal features fun activities.
- AI Machine Learning**: Half Day, 5-10. The game Huxpaw demonstrates machine learning. How artificial intelligence can make decisions.
- AI: Assessing the Risks and Rewards**: Half Day, 6-8. AI is currently in use or under development in many fields.

The screenshot shows the "Windy City Tower" activity page. The page has a light blue background with a city skyline image. The title "Windy City Tower" is prominently displayed. Below the title is a brief description: "Participants learn about wind forces, strong building designs, and wind tunnel testing as they plan out and make a paper tower that meets specific design constraints and withstands much wind as possible without adding or losing any mass."

There are four filters: TIME (1 to 2 hours), CAREERS (Civil), GRADE (5-5), and TOPIC (Structures). Below these are three tabs: Leader Notes, Student Instruction, and Challenge Video. The "Student Instruction" tab is selected.

Materials

- 4 sheets of paper
- 2 yards of tape

Instructions

Introduce the design challenge to participants. They can use 4 sheets of paper and 2 yards of tape to make a tower that will stay in place with as much wind blowing on it as possible. With the following constraints:

- It must hold a metal washer at least 1" above the ground.
- It is free standing (not taped or attached to the testing surface).
- You may trade in your paper and tape for unacceptably weak and/or ugly designs.

Let participants plan their tower first and think about what design elements will provide the most stability but not catch too much wind.

Place the fan on the floor off to the side and turn it on so participants can feel their conditions as they work. Depending on the fan, decide which speed is strong enough to test towers that get close, but not so strong that most of the towers blow away from a farther distance.

On the right side, there's a "Share this activity with your network!" section with a "Share Activity" button. Below that is a logo for ASCE (American Society of Civil Engineers) with the text "Challenge created by: ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS".

Spotlight: Challenge Videos



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← View More Activities

Puff Mobiles

Renewable energy sources are in focus as participants build a wind-powered car using straws, Lifesavers candies, paper, and tape, and get their car to the finish line using as few puffs of air as possible.

TIME
45 minutes or Less

CAREERS
Environmental

GRADE
3-5
6-8

TOPIC
Design Challenge
Dream Big
Forces, Motion & Energy

Leader Notes Student Instruction Challenge Video

Materials +

Introduce +

Instructions +

Relevant Terminology +

Print Downloads

Share this activity with your network!
Enjoy this activity? Please let your friends know!
Share Activity

← Back to STEM Activities

Puff Mobiles (Student Instruction)

How can you build a car that moves as far as possible on a single breath of air?

Favorite Print

Overview

STEM careers
Environmental

Grade level
3-5
6-8

Topic
Forces, Motion & Energy
Design Challenge
Dream Big

Time
45 minutes or less

Related Assets
Instructor Guide

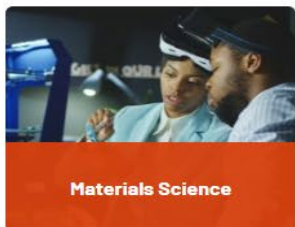
Make a donation →

Materials +

Instructions +

DiscoverE.org/Challenge-Videos

Types of Engineering Careers



DiscoverE.org/Engineering-Careers

Engineering Careers

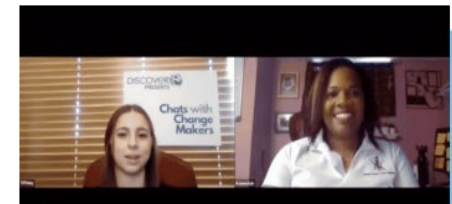
- Career Overview
- Meet Change Makers
- Salary Info
- Job descriptions for Bachelor's and Associate Degrees
- Related hands-on activities

Biomedical Engineering



Where would modern medicine be without the contributions of biomedical engineering? Imagine hospitals operating without X-rays, ultrasound, EKGs, and the thousands of high-tech procedures and devices that diagnose conditions, sustain health, and fight disease. With a career in biomedical engineering, you'll make a real difference in the lives of others. You might develop artificial lenses that restore sight to the blind, radiation treatments that fight cancer, or incubators that keep premature babies alive.

Meet Kameelah, an engineer and project manager at Merck who uses large machines to make the best medicines in the world.



Biomedical Engineering Overview¹



\$92,620

Median salary



19,300

Number of jobs in 2020



6%

Expected job growth in next 10 years



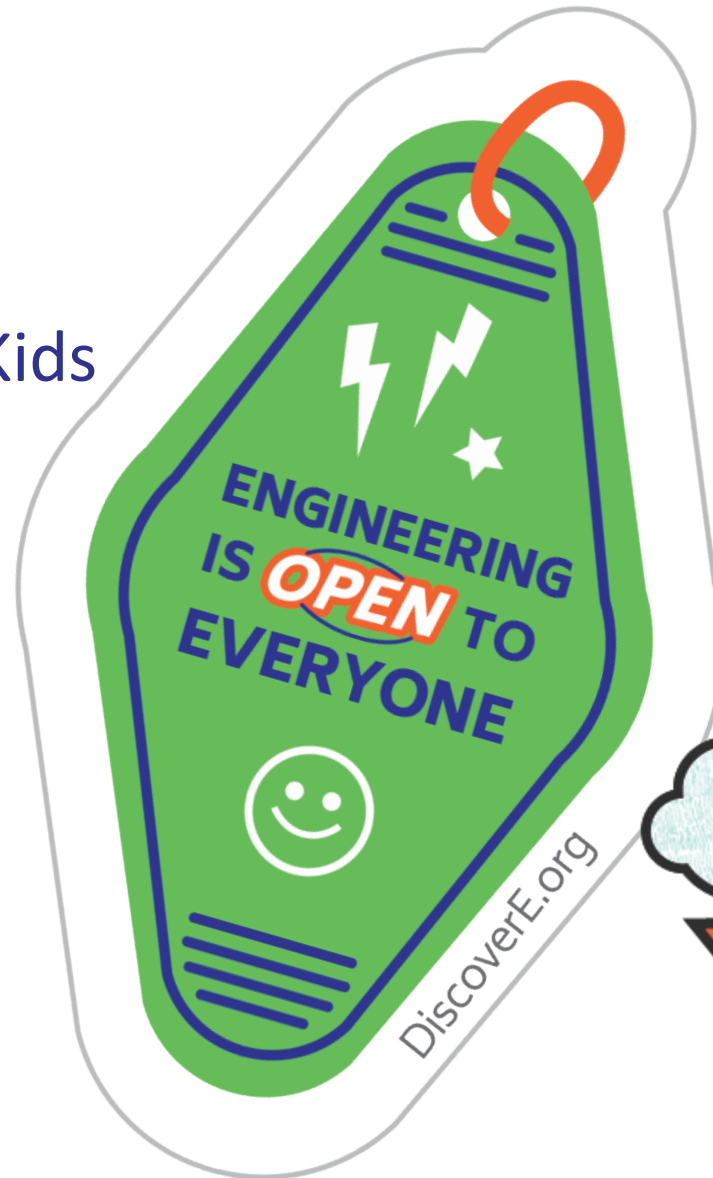
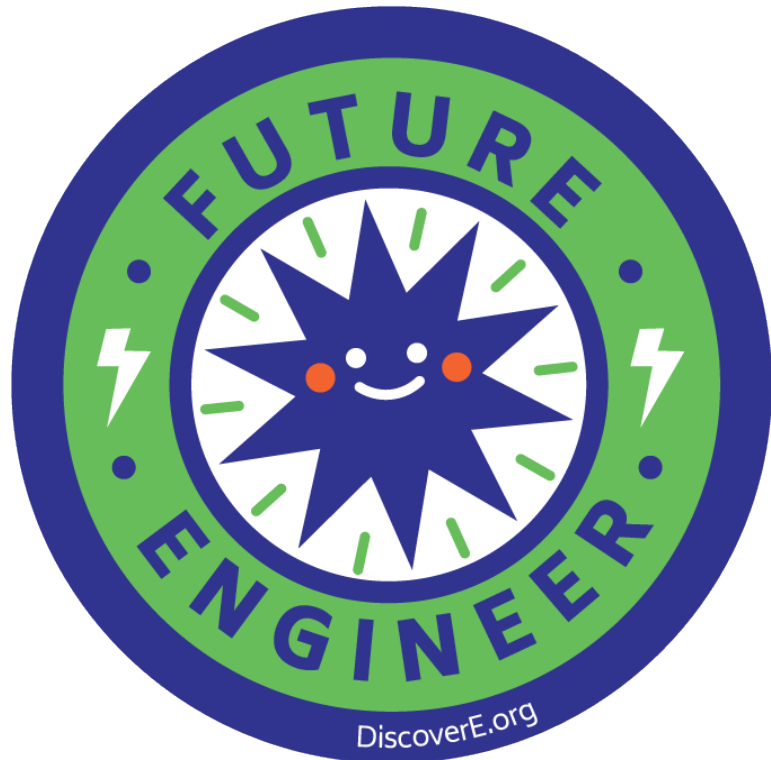
Explore more

American Institute for Medical and Biological Engineering
Biomedical Engineering Society (BMES)
Institute of Biological Engineering
Career Girls

Stickers!

store.discovere.org

10% Off Coupon: StickersForKids



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Email

Info@DiscoverE.org

Website

DiscoverE.org

Social Media



facebook.com/DiscoverE.org



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