Inspiring students, engaging educators, and strengthening communities to build a better world through the science of chemistry.
BUILDING THE FUTURE WORKFORCE
BY INSPIRING STUDENTS TODAY

When it comes to preparing the STEM workforce – those industries relying on science, technology, engineering, and mathematics – often the focus is on students in high school and post-secondary education.

But the truth is, if students aren’t inspired by science when they are young – as early as five years old – it gets increasingly harder to engage them in learning and ultimately, enter careers in STEM industries.

The Chemical Educational Foundation’s You Be The Chemist programs uniquely connect business and education in local communities to reach students early in life and ignite a passion for chemistry and science-related careers.

Companies and individuals in the science and chemistry industries have invested in You Be The Chemist since 1989, to inspire young students into a lifelong passion for these fields. Programs are implemented in partnership with schools and education programs so activities align with local workforce and learning needs.

You Be The Chemist continues helping businesses and education providers show young students the potential to build a better world through the science of chemistry.

Research shows that if more children are to enter the STEM pipeline, then educators in early elementary grades need to be prepared to provide interesting and engaging lessons that focus on developing children’s problem-solving and spatial ability while encouraging their intrinsic interest in STEM.
Strategies & Impact: HELPING BUSINESSES INVEST & EMPLOY

You Be The Chemist fills the workforce gap by engaging young students in science experiences.

You Be The Chemist Strategies:

- **Inspire students early** in life to pursue science and chemistry in study and careers.
- **Engage educators** to build their confidence in teaching hands-on science using common, inexpensive items.
- **Strengthen communities** by connecting students and educators with volunteers from science industries.

Impact:

- **Inspiring students.** We are serving a large and diverse student population.
  - 648,000 students engaged in the 2017-18 school year
  - 46% White
  - 17% African American
  - 17% Hispanic
  - 13% Asian
  - 47% Received Title 1 Funding (designation based on % of low income students)
- **Engaging educators.** We are empowering educators to teach science in grades K-8, and with the supplies needed to do so.
  - Approximately 1,800 educators supported
  - 84% feel confident in their ability to teach science in the classroom versus 48% before program participation

Impact:

- **Strengthening communities.** We are creating connections among students and volunteers from science and chemistry industries.
  - Aidan Blum participated in the National Challenge in 2006. He went on to major in chemical engineering and now works at PVS Chemicals, Inc.—the same company who sponsored the Local Challenge Aidan participated in as a sixth grader.

- **Approximately 1,800 educators supported**
THE AMERICAN WORKFORCE NEEDS STEM WORKERS

Students Must Be Better Activated to Consider Jobs in Science-Related Industries

America needs a workforce ready for STEM-related jobs at all levels – but it’s not happening.

Jobs are unfilled – opportunities abound for skilled and degreed workers.

Too few students receive early, hands-on science instruction to prepare them for employment.

Educators need more support to confidently teach science to young students.

In 2018, an estimated 1.2 Million STEM JOBS will not be filled by our nation’s employers.

More than half of 4th graders receive less than 3 hours of science instruction/week.

Few students are proficient in science:
- 32% of 4th graders
- 29% of 8th graders
- 20% of 12th graders

Research Shows:
- Hands-on Science Experience
- Collaborative Learning
- Higher Performance in Science

U.S. students lag international students in STEM rankings:
- Science: 23rd
- Math: 30th

The Basic STEM Skills Gap
38% of companies say at least half of their entry-level job applicants in the U.S. lack even basic STEM skills.

BY 2022: 1 Million STEM Opportunities

Educators need more support to confidently teach science to young students.

Educators surveyed before participating in You Be The Chemist programs report low confidence in their ability to teach hands-on science instruction.

www.ChemEd.org
You Be The Chemist Programs:
BUILDING THE FUTURE WORKFORCE

You Be The Chemist celebrates the role of science and chemistry in everyday learning and life.

Essential Elements
Professional development workshops that build confidence in teaching science.
We equip K-8 educators with best practices for STEM education, share resources for science learning, and build educator confidence in leading inquiry-based, hands-on learning.

Activity Guides
Hands-on science lessons that use common, inexpensive items to teach science in the classroom.
Hands-on learning is proven to engage young students in exploring science. Our Activity Guides are educator-friendly roadmaps for using household items, without formal lab space, so students can explore foundational science concepts anywhere.

Academic Challenge
Celebrate and elevate the science of chemistry to inspire students in the field.
This local, state, and national academic competition targets students in grades 5–8, when most U.S. students have not studied chemistry as its own subject. Students prepare for multiple-choice quiz bowl competitions and advance to the annual, prestigious National Challenge that celebrates the role of chemistry in businesses and communities.

Over 70% of attending educators since 2015 work in public schools 🏫
PARTICIPANTS ARE:
more confident teaching science; offer more hands-on learning in the classroom; and report that their students enjoy learning science more

Now in its 5th edition, with over 1,000 activities
Organized by content to align with standards | Spanish translation in production

82% of students are more interested in STEM careers after participating in the You Be The Chemist Challenge
You Be The Chemist: Essential Elements
Building Educator Confidence to Teach More Science, Better

Research Shows:

61%
Percentage of 4th graders whose schools provide supplies or equipment for science labs

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Educators surveyed before participating in You Be The Chemist programs report low confidence in their ability to teach hands-on science instruction.

Impact:

Educators surveyed before and after Essential Elements workshops and again 30 months later indicated an increased confidence in teaching science and plan to offer more science-based activities in the future.

Program Specifics:

In the U.S., minority students have the least experienced educators, limited access to supplies and equipment for science labs, and educators who lack the resources to succeed. Our Essential Elements program tackles these issues head on:

- Ability to deliver in partnership with local chemistry businesses
- Aligned with learning standards yet flexible for local use
- Time to practice using free, provided materials that educators will bring back to classrooms.
- Workshops taught by trained professional development providers
- Opportunity to complete required continuing education credits, for free

Impact:

Percentage of 4th graders whose schools provide supplies or equipment for science labs

Educators surveyed before and after Essential Elements workshops and again 30 months later indicated an increased confidence in teaching science and plan to offer more science-based activities in the future.

Our data show that workshop participants are more confident teaching science and they offer more hands-on learning in the classroom, and they report that their students enjoy learning science more.

“\text{I loved the connection between educators and professionals in chemistry.}”
You Be The Chemist: Activity Guides

“I love the hands-on activities. I can’t wait to take all these activities back to my classroom!”

Research Shows:

- U.S. students are not highly proficient in science: 32% 4th Grade

You Be The Chemist:

Hands-on science experiences develop students’ ability to engage in sustained scientific inquiry

Activity Guides Provide:

- Flexibility for hands-on science learning: no lab space or equipment needed; deliver in classroom or out-of-school time learning
- Student engagement with foundational science concepts that align with learning standards
- Educator and student confidence to explore science and chemistry

Impact:

- Nearly 150,000 students are reached through distributed Activity Guides
- Across 42 states

Program Specifics:

- Nearly 50 hands-on science activities using common, inexpensive items
- Real-world connections to careers and life that rely on science and chemistry concepts
- Explanations to help educators build confidence with science content and instruction
- Differentiation techniques to enrich learning in K-8, and across ability levels

Activity Guide Topics:

- Properties of Matter
- Chemical Reactions
- Energy
- Forces & Interactions
- Life & Earth Sciences

Where can I use the Activity Guides?

- Classrooms
- Libraries and museums
- At home
- Afterschool programs
- Science fairs
- Children’s hospitals
- Camps
- School family nights

...and more!
You Be The Chemist: Challenge

Celebrate and elevate the science of chemistry to inspire on-going study and careers

Research Shows:

- Early science exposure inspires students to further study and work in these fields
- Before high school, most U.S. students have not studied chemistry as its own subject, making it more difficult to prepare them for higher learning, training, and working in STEM fields

The Challenge Provides:

- Exposure to chemistry concepts in grades 5-8 — earlier than most U.S. students even begin studying chemistry
- Connections with industry professionals to see how chemistry offers needed and fulfilling careers
- Volunteer opportunities for science and chemistry professionals in their local communities, who play a critical role

“The Challenge has been eye opening for me as to just how important it is to reach out to younger students.”

Program Specifics:

Students prepare and then compete individually for their Local Challenge, if available in their communities. Participants seek to advance to their State and then National Challenge. Only one student from each state and territory is represented at the National Challenge annually. Nominated educators join their state’s student at the National Challenge to further celebrate the science of chemistry. In 2019, the Challenge is in its 15th year.

- Collaboration among science industries, educators, and community partners
- Local, state, and national academic competitions
- Flexible local programming so preparation can be part of the school-day or out-of-school time activities
- Approximately 100 Challenge volunteers, in 42 states plus D.C. and Puerto Rico, receive technical assistance and training
- College scholarships plus other prizes to National Challenge winners and participants

Impact:

- 86% of students feel more confident in their ability to understand chemistry
- 82% of students are more interested in STEM careers after participating in the You Be The Chemist Challenge
- 80% of students report having an increased awareness of chemistry’s role in everyday life

Impact: 82% of students feel more confident in their ability to understand chemistry