BioTechBuilder
CAREER & TECHNICAL EDUCATION

BioTechBuilder Program Proposal and Implementation Guide

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Biomanufacturing - Biomedical Science - Bioagriculture - Biodiesel

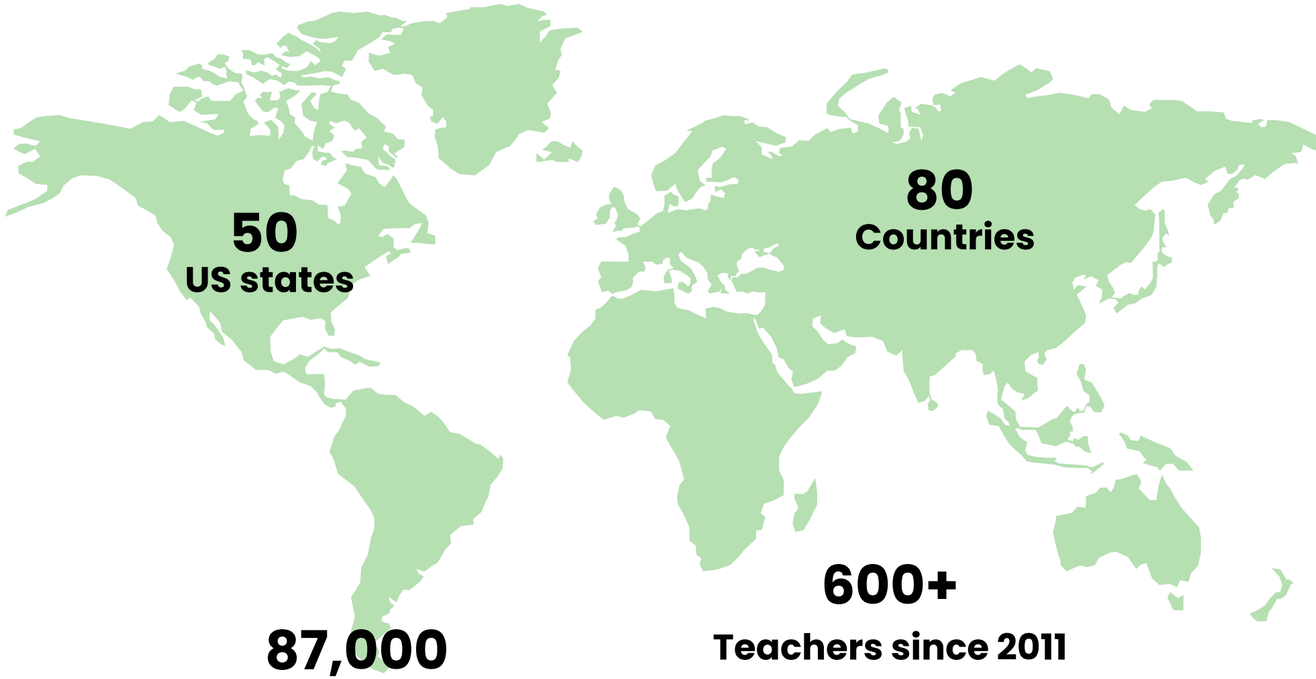
BioBuilder Educational Foundation

BioBuilder Educational Foundation

Established in 2011 from an award-winning team at MIT, the BioBuilder Educational Foundation aims for a world in which everyone's high school education prepares and inspires them to:

- Tackle complex challenges
- Pursue a wealth-building career
- Understand the world around them

In 2024, BioBuilder launched the skills-based *BioTechBuilder* curriculum to help meet the growing need for a skilled domestic biotech workforce.



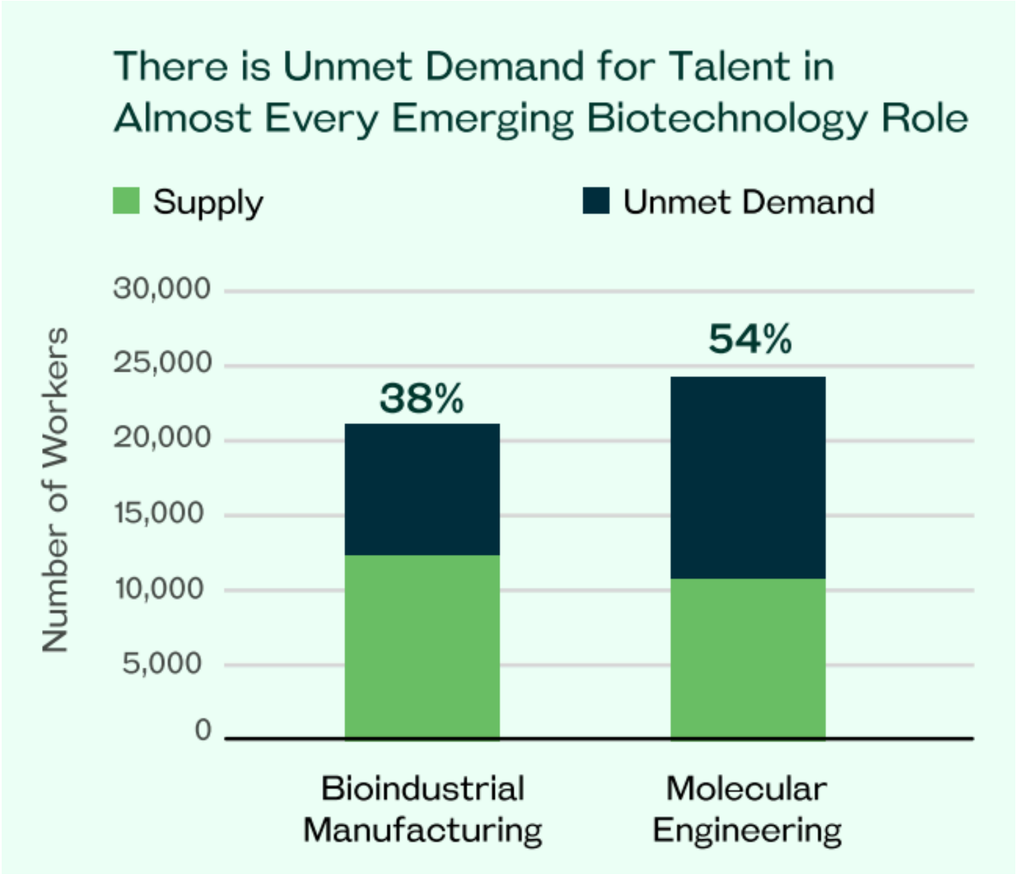
Dr. Natalie Kuldell
Founder and Executive Director of the BioBuilder Educational Foundation

"Every student deserves the chance not just to learn about biotechnology from a textbook, but to learn how biotechnology actually works—by doing the experiments, solving real problems, and collaborating the way scientists do.

Need for Skilled Biotech Workforce

Even as the bioscience sector contributes more than $3.2 trillion in total economic impact and employs 2.29 million workers, too few students are pursuing biotech pathways.

Many high-school graduates lack access to laboratory courses. Many entry-level biotechnology jobs do not require a bachelor's degree, yet few students graduate with the hands-on skills or credentials to fill those positions.



Read more of BioBuilder's 2026 case study of success from East Tennessee: "**Building the Bioeconomy from the Classroom Up: The East Tennessee Model"**

> ***BioTechBuilder has truly set a new standard in biotechnology education with its hands-on curriculum focused on skill-building, perfectly aligned with the needs of the biotech industry.***
>
> -Lance Bard
> Best of STEM Awards judge

BioTechBuilder Skills-Based Curriculum

01 Comprehensive Curriculum

Our off-the-shelf curriculum combines 45-minute lessons and lab training on essential skills and foundational approaches to DNA and protein analysis, biomanufacturing, and synthetic biology.

02 Industry-Aligned

Developed in partnership with industry-leading companies, *BioTechBuilder* prepares students for industry-recognized certifications, documenting their readiness for entry-level positions in the biotech industry.

03 Loved by CTE Educators

BioTechBuilder and our educator training won Best of STEM awards in 2024 and 2025. The curriculum has been adopted by high school life science teachers and biotech CTE instructors in Massachusetts, New Jersey, California, Indiana, Tennessee, Maryland, and Maine.

04 Educator Support

Our five-part training series allows teachers to learn on their own timeline and at their own pace through our interactive learning platform with videos, protocols, downloads, and lab activities. Teacher professional development on your district's schedule.

Partnerships That Prepare Students for Tomorrow

Through strategic partnerships with industry leaders, we offer a curriculum that's not just current but forward-thinking. Our network ensures students are college and workforce-ready, setting them up to pursue meaningful careers in the bioeconomy, with or without post-secondary education.

Inspired by **patients.**
Driven by **science.**

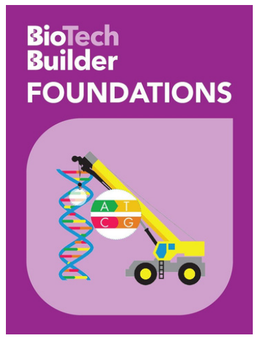
Helping students see themselves in science is why UCB chooses to partner with BioBuilder

BioTechBuilder Curriculum Modules

Module 1: Lab Skills

Introduces foundational technical skills and lab math

- Building a Solid Foundation (4 Lessons, 1 Lab Practical)
- Making Solutions (8 Lessons, 2 Lab Practicals)
- Growing Cells (4 Lessons, 2 Lab Practicals)



Module 2: Foundations

Molecular techniques for DNA and protein analysis

- DNA Analysis (12 Lessons, 3 Quizzes, 2 Lab Practicals)
- Protein Analysis (14 Lessons, 2 Quizzes, 3 Lab Practicals)

Module 3: Applications

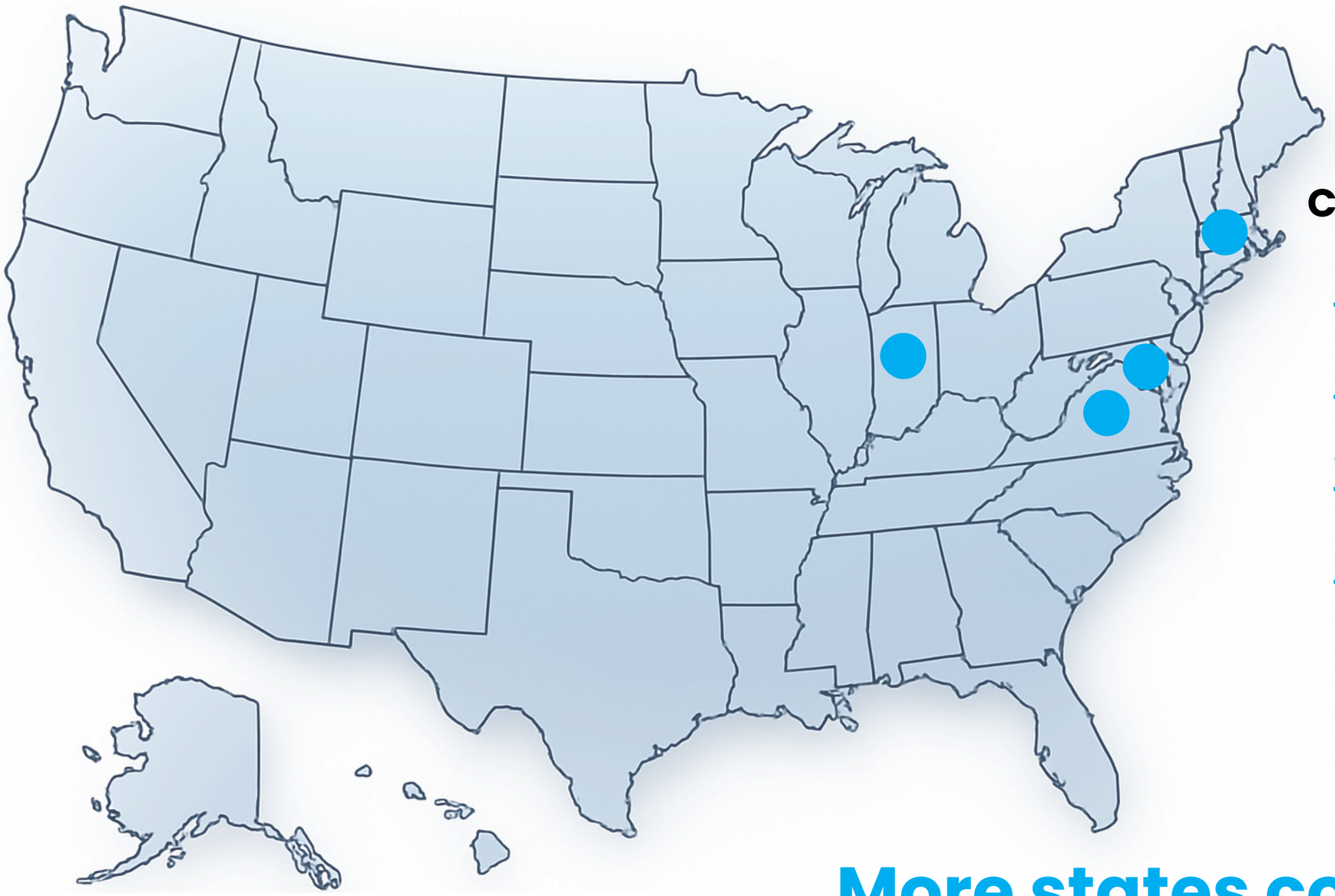
Industrial biotechnology- applications and commerce

- Biomanufacturing (14 Lessons, 3 Quizzes, 3 Lab Practicals)
- Synthetic Biology (20 Lessons, 3 Quizzes, 3 Lab Practicals, 1 Project)

See the full *BioTechBuilder* Module Overview

Curriculum Modules

BioTechBuilder Curriculum Alignments by State



Click to Download

[MA Alignment]

[MD Alignment]

[VA Alignment]

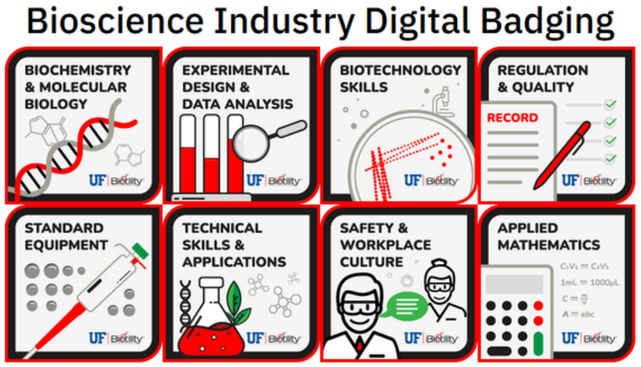
[IN Alignment]

More states coming soon...

Alignment with Industry-Recognized Certifications

BioTechBuilder is aligned with the Bioscience Core Skills Institute (BCSI) microcredentials, the Biotechnology Aptitude and Competency Exam (BACE), Bioscience Industry Digital Badging from Biotility, and the National Occupational Competency Testing Institute (NOCTI).

Biotility
BACE
CREDENTIALED



BCSI
BIOSCIENCE CORE SKILLS INSTITUTE

NOCTI
Alignment Network Member

"Microcredentials Develop Job-Ready Candidates"

-LSWC 2025 Life Science Workforce Trends Report

This logo signifies that BioBuilder has completed an independent alignment of its product(s) to NOCTI's publicly available standards and competencies per alignment guidelines. The use of this logo does not imply endorsement by NOCTI. In accordance with its ISO 17024 accreditation, NOCTI maintains a strict firewall between its assessments and any products labeled as preparation materials.

Industry-Recognized Certifications

Industry-Recognized Certification Alignment

BACE CREDENTIALED

BACE DIGITAL BADGES

- Safety & Workplace Culture
- Applied Mathematics
- Standard Equipment
- Biotechnology Skills
- Technical Skills & Applications
- Regulation & Quality
- Experimental Design & Data Analysis
- Biochemistry & Molecular Biology

BIOTECHBUILDER MODULES & ADDITIONAL CONTENT TO REVIEW

MODULE 1

MODULE 1: LAB SKILLS
Topic 1: Building a Solid Foundation
Topic 2: Making Solutions
Topic 3: Growing Cells

MODULE 2

MODULE 2: FOUNDATIONS
Topic 4: Analyzing DNA
Topic 5: Analyzing Proteins

ADDITIONAL REVIEW
- Autoclave
- Microscope
- Biosafety cabinet basics

MODULE 3

MODULE 3: APPLICATIONS
Topic 6: Biomanufacturing
Topic 7: Synthetic Biology

ADDITIONAL REVIEW
- Automation in the biotech industry

ADDITIONAL REVIEW
- Infrared and fluorescence spectrometry
- Immunoassays
- Assay development and validation

ADDITIONAL REVIEW
- Role of regulatory agencies, GLP, GDocP, HIPAA, and CAPA

EXPERIMENTAL DESIGN AND DATA ANALYSIS BADGE CONTENT

BIOCHEMISTRY AND MOLECULAR BIOLOGY BADGE CONTENT

BIOTECHNOLOGY APTITUDE AND COMPETENCY

BCSI
BIOSCIENCE CORE SKILLS INSTITUTE

MODULE 1: LAB SKILLS
BioTech Builder LAB SKILLS
- Topic 1: Building a Solid Foundation
- Topic 2: Making Solutions
- Topic 3: Growing Cells

MODULE 2: FOUNDATIONS
BioTech Builder FOUNDATIONS
- Topic 4: Analyzing DNA
- Topic 5: Analyzing Proteins

MODULE 3: APPLICATIONS
BioTech Builder APPLICATIONS
- Topic 6: Biomanufacturing
- Topic 7: Synthetic Biology

TOPIC 1
BCSI Safety- Hazard Assessment

TOPIC 2
BCSI Numeracy

TOPIC 3
BCSI Aseptic Technique
BCSI Small Volume Metrology

TOPIC 4
BCSI Preparation of Solutions

TOPIC 5
BCSI Quantitative Lab Skills I

TOPIC 6
BCSI Cell Density: Hemocytometer
BCSI Documentation and SOP

TOPIC 7
Any of the above BCSI credentials are appropriate to take after completing Topic 7

Industry-Recognized Certifications Awarded

Students in our High School Apprenticeship Challenge program complete the BioTechBuilder curriculum and test for industry-recognized certifications.

102 students have earned **291 BCSI or BACE Digital Badge credentials since 2024.**

Teacher Testimonials

BioTechBuilder is the backbone of the skills and knowledge I'm already teaching in my class. It's nicely organized, and it's going to reduce the mental load of trying to find all the bits myself. Using BioTechBuilder will allow me to be more creative in my classroom and more present with my students.

Erin Molden
Biotechnology CTE Instructor
Kettering Fairmont High School
Kettering, OH

Kelley's favorite features as a new teacher:

- Comprehensive curriculum includes how content applies to curricular frameworks
- Ready-to-use slide decks, material lists, and protocols
- Easy to adapt to any school schedule

Kelley Pagura
Biotechnology CTE Instructor
Lynn Vocational Technical Institute
Lynn, MA

BioTechBuilder and the educator training series are great for CTE teachers who need to stay current with industry.

Maria Bennes
Biotechnology CTE Instructor
Blackstone Valley Regional Technical High School
Upton, MA

Differentiators

What Sets *BioTechBuilder* Apart

Content	Design	Resources
Includes biomanufacturing content designed for a high school lab setting	Single organism used throughout curriculum	Includes student handouts and pre-lab assignments
Aligned with multiple industry-recognized certifications	Every lesson has a lab and a classroom component	Assessments included (quizzes and lab practicals)
Includes adaptation of BioBuilder's problem-based synthetic biology curriculum	Can be implemented as comprehensive curriculum or used to supplement existing curricula	Educator Training available online and on-demand

Budgetary Summary

BioTechBuilder
CAREER & TECHNICAL EDUCATION

Year-long curriculum licenses and kits for the three modules are available for purchase separately or together from **Carolina**. A classroom license provides access for one teacher and 24 students. An institutional license provides access to four teachers and 96 students.

PLEASE NOTE THAT THE LISTS BELOW ARE CURRENTLY BEING UPDATED. CHECK WITH BIOBUILDER FOR LATEST

WHAT'S INCLUDED:

Material Lists »

NEEDED BUT NOT INCLUDED:

Also Needed »

CAROLINA | Knowledge Center

Purchasing Options	Classroom License	Institutional License
Module 1: Lab Skills		
Curriculum Only	$1,000	$2,300
Consumables Only	$749	$2,500
Module 2: Foundations		
Curriculum Only	$1,000	$2,300
Consumables Only	$1,650	$5,625
Module 3: Applications		
Curriculum Only	$1,000	$2,300
Consumables Only	$2,050	$7,000
Modules 1, 2, & 3		
Curriculum Only	$2,500	$6,500
Consumables Only	$4,220	$16,500
Curriculum + Consumables	$6,500	$22,500
Curriculum Only, 3-Year License	$7,500	$67,500

Budgetary Summary

BioTechBuilder
CAREER & TECHNICAL EDUCATION

A **free cost calculator tool** is available to determine your specific equipment and consumable needs to guide budgeting and purchasing.

Per Teacher Cost Component	Initial Investment	Ongoing Annual Expenses
Carolina Purchase		
Curriculum & Kit w/Perishables from Carolina	$6,500	$6,500
Needed but Not Supplied		
Equipment & Additional Supplies	~$26,000	~$3,000
Professional Development		
Online Training Parts 1-5	$2,000	N/A
Biotech Lab Facility		
Workstations	Based on Needs	N/A

Funding Options

School Level

- Departmental Budgets (Science, CTE, STEM, Media, etc.)
- Resource / Cost Share Options
- Local & Business Partners
- Administrative Discretionary Funding

District Level

- CTE Departmental Funding
- Perkins Funding & District Match
- Perkins New & Innovative Earmarks
- Title I / SIP / GATE Funds
- Adoption & Instructional Materials
- Workforce Development Funds
- Capital Improvement (E-SPLOST) / Bond Funds

State Level

- Competetive Grants
- Workforce Development Funding
- Economic Impact Funding
- Innovation Funds

Private Funds

- Local Industry Partners
- Business Partners
- STEM Ecosystem Partners
- Benefactors' Donations
- Grant Applications

The ***BioTechBuilder* Cost Calculator** can assist with budget preparation based on your specific equipment needs.

Educator Training

Educator Training

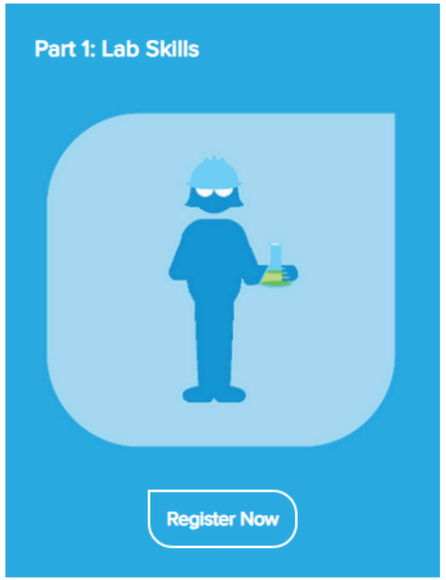
Our online training platform gives you access to:

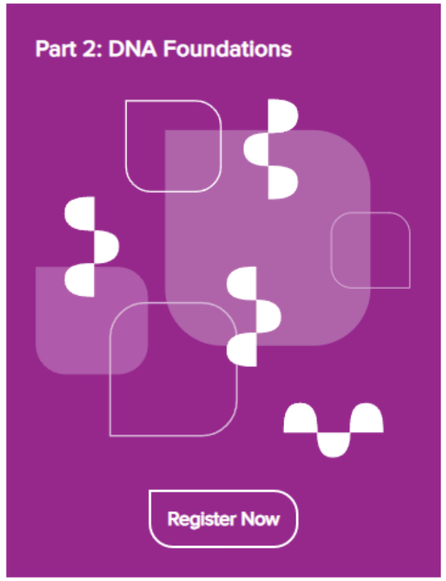
- Ready-to-use teaching slides
- Classroom and lab demonstration videos
- Lab materials and instructions to try the experiments yourself
- Student assignments
- Pointers for BCSI microcredential testing

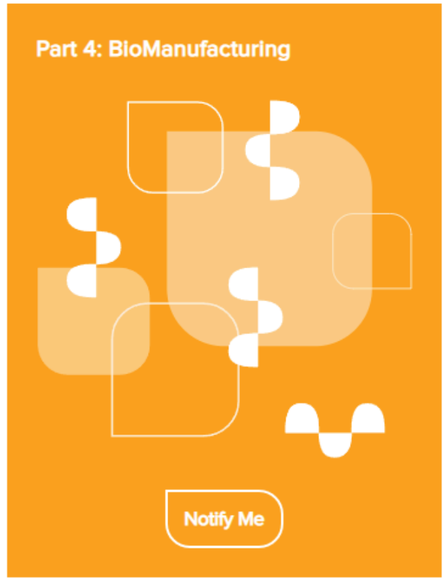
Complete all 5 parts to receive a *BioTechBuilder* Master Teacher Certificate and Laboratory Coat from BioBuilder

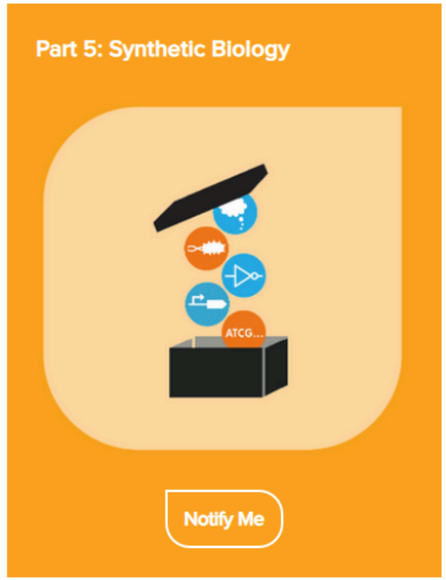
Download an Overview

Watch our Free Training Videos









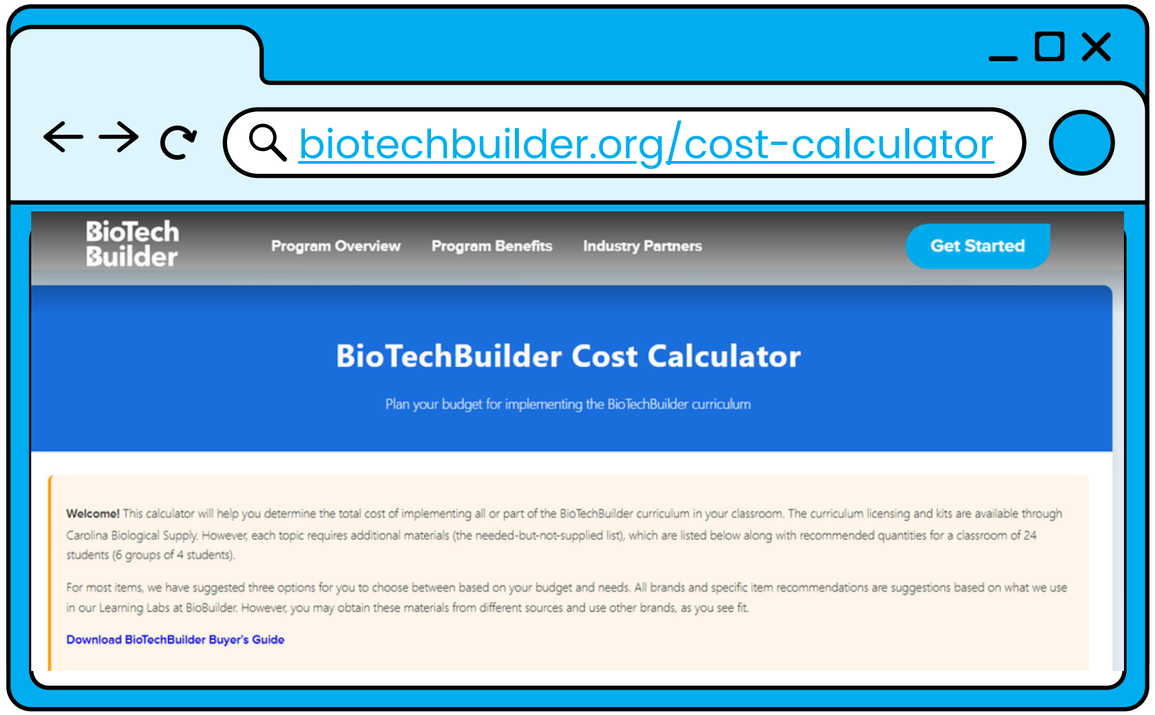
Resources

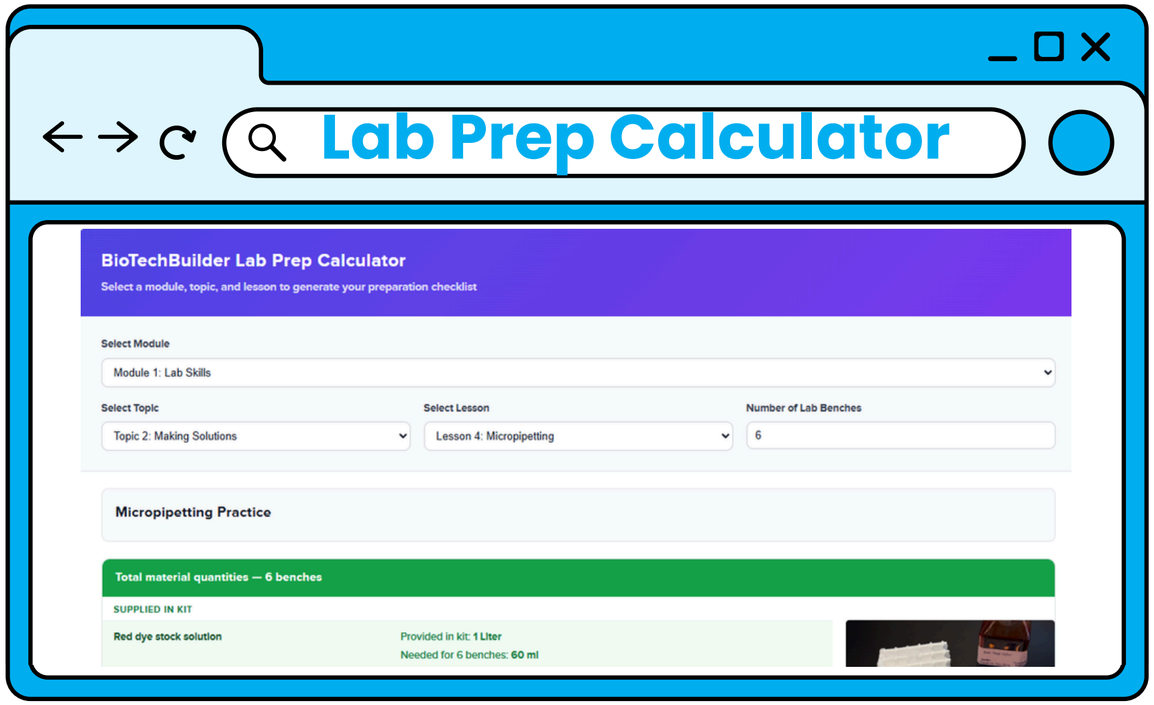
BioTechBuilder.org

Online Resources

YouTube

Watch our Free Training Videos





Free Cost Calculator:

Helps determine your total cost of implementing all or part of the curriculum based on your equipment, licensing, and training needs.

Lab Prep Calculator:

Assists teachers in setting up for labs based on number of lab groups. Access included with curriculum purchase.

BioBuilder

More Ways to Bring BioBuilder to Your School

BioBuilder adapts to regional context with two additional proven pathways

BioBuilder Curriculum-Led

- Classroom adoption anchored by published curriculum + commercial lab kits
- Lab kits sold via Carolina
- O'Reilly textbook
- Teacher PD online on demand and in-person summer opportunities
- Curriculum used in BioBuilder's three Boston Learning Labs
- **50 states + 80 countries**

BioBuilder.org

BioBuilderClub Program-Led

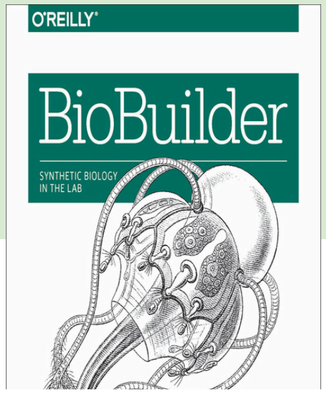
- BioBuilderClub program as 'tip of the spear' that grows into a regional ecosystem
- Lambert High School joined the BioBuilderClub to prepare students for the iGEM synthetic biology competition; Lambert's team grew to 20 GA teams
- First Southeast BioBuilderClub Final Assembly in March 2026
- **8× growth in GA in 3 years**

BioBuilderClub

Problem-Based *BioBuilder* Curriculum

BioBuilder

Problem-based learning curriculum and programs



BioBuilder is an open-access modular curriculum in Engineering Biology

Design Build Test

Students: integrate biology and engineering through practical, hands-on lessons, club activities, and school-to-work experiences.

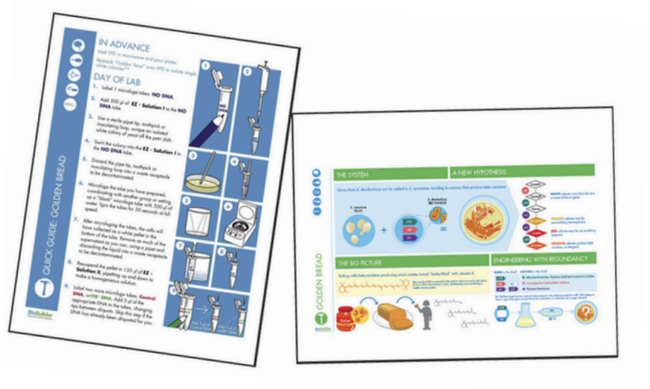
Teachers: learn new methods of teaching that engage and inspire the young scientists in their classrooms.

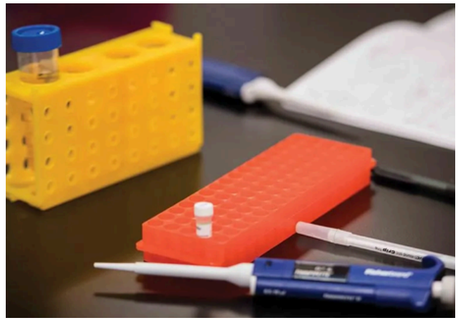
BioBuilder

Problem-Based *BioBuilder* Curriculum

Modular lab kits connecting synthetic biology with real-world questions in agriculture, medicine, and more using authentic, hands-on investigations.

Classroom and lab resources, reagents, most consumables





READINGS

- Chapter 6: Eau that Smell, from the BioBuilder Textbook
- Methods in Enzymology chapter describing this lab.
- Teacher's Lab Manual (color)
- Teacher's Lab Manual (B&W)

PPTS

- Introduction to Eau That Smell
- "Intro to SynBio" video lesson slides
- iGEM team Jamboree presentation slides

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CAROLINA®

BioBuilderClub

Student-Driven BioBuilderclub Program

Teams of 1-10 High School Students

+

Meaningful Real-World Problems

+

Virtual Guidance from Bioengineer Mentors

+

Engineering Design, Build, Test Cycle

→

Innovative Solutions Built from Living Systems

BioBuilderClub

Student teams who design-build-test their own project ideas

- 422 teams
- 27 US states and 10 countries
- 3,414 students
- 268 mentors

BioBuilder Educational Foundation

Empowering the next generation of scientists through hands-on learning

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