



Grant Project Guidance and Successful Projects

Key Elements of Competitive Projects

- **SIZE AND DURATION OF PROGRAM IMPACT:**
 - Enrollment and duration plans merits investment of funds
 - ♣ minimum of 15 students served, with explicit plans to scale
 - ♣ at least 1-2 weeks; 40 hours
- **LIFE SCIENCES CAREER ALIGNMENT:**
 - Content related to MLSC-defined life sciences careers
 - ♣ Biotech, Medical Technology, Biomanufacturing/Bioprocessing, Biomedical Science/Engineering, Pharmaceuticals, Diagnostics, Genomics, Bioinformatics, Digital Health, AI/data science for life sciences

Secondary Education Grant Project Examples

Exemplar 1

- **Project:** *High School Curriculum Expansion with Biotechnology*

In this project, MLSC grant funds purchased industry-relevant biotechnology equipment to support implementation of an integrated curriculum for approximately 300 students in grades 9–12. The project embedded biotechnology content within existing science courses, such as Biology and Chemistry, to strengthen science literacy, expand access to hands-on biotechnology learning, and increase student awareness of life sciences education and career pathways. Through this multidisciplinary approach, students were introduced to modern biotechnology concepts and laboratory practices that reflected authentic applications in life sciences fields.

Students practiced specific technical skills connected to life sciences careers including pipetting, gel electrophoresis, PCR, microbiology sterilizing techniques, and data analysis.

- **LIFE SCIENCES SKILLS DEVELOPMENT:**

- Skills-based curriculum
 - ♣ Specialized curriculum with specific and technical skills training related to life sciences careers
 - ♣ Skills descriptions with clear connections to life sciences careers
- Development of professional skills related to life sciences careers or tasks
 - ♣ Science and engineering practice, collaboration, continuous improvement process, presentation/communication, project management
- Authentic practice
 - ♣ Applied learning (real-world modeling/projects) with equipment-based solutions, multi-step projects, community/stakeholder presentations, etc.

- **INDUSTRY-RELEVANT EQUIPMENT:**

- Exposure to modern/industry-relevant equipment,

A Flex Block elective also provided a hands-on, project-based setting where students explored biotechnology and developed laboratory skills in a more applied learning environment. The project budget prioritized durable, industry-relevant equipment that could be used for multiple years and across classes and trainings sessions. Grant funds supported purchases such as a PCR machine, centrifuges, vortex mixers, compound microscopes, analytical and tabletop balances, an autoclave/sterilizer, an incubator oven with shaker, and a spectrophotometer. These investments gave students access to tools and technologies that mirrored biotechnology lab settings and supported long-term program sustainability.

The project advanced career awareness through multiple industry and non-industry partnerships leading to industry speakers, job shadowing, internships, and other interactive career exploration opportunities that connected students with life sciences professionals and workplace settings. Industry and community partnerships also supported curriculum alignment with industry-standard skills, equipment, and projects, better helping students understand how classroom learning translated into biotechnology careers.

Implementation and sustainability of the new curriculum was supported through professional development for four teachers by Project Lead the Way and biotech-focused training providers such as MassBioEd and Amino Labs. The

tools, technologies

- **CAREER AWARENESS:**

- Activities and/or events to increase awareness of and interest in life sciences careers or continuing education
 - ♣ Field trips, guest speakers or panels, careers website research, career fairs
 - ♣ Culminating projects connecting class skills to careers/field work
 - ♣ Connection between course equipment and real-world applications
 - ♣ Connection between course skills and career skills
 - Variety of skills areas and related careers
 - ♣ Extracurricular opportunities for skills-based practice or applied learning
- Development of career-readiness
 - ♣ Mock interviews, resume support, internships, work-based learning, etc.

project also identified a sustainability model that embedded biotechnology education across the science curriculum, developed teachers as in-house experts, secured diverse funding sources, and incorporated lab maintenance, supply replenishment, and teacher training into the annual budget. Evaluation systems included the Biotechnology Aptitude and Competency Exam, which provided a specific method for assessing student technical skills development related to biotechnology and life sciences.

Exemplar 2

- **Project:** *CTE Biotechnology Program Expansion*

In this project, MLSC grant funds supported expansion of a school's Career and Technical Education (CTE) Chapter 74 biotechnology curriculum to include cell structure and biomanufacturing experiments, demonstrations of industry-standard equipment, and stronger alignment with the Massachusetts Department of Elementary and Secondary Education (DESE) Biotechnology Frameworks.

The expanded program introduced 72 biotechnology students and 112 exploratory students in grades 9–12 to biotechnology and biomanufacturing practices, while connecting students to careers such as Laboratory

- Hands-on and interactive opportunities to explore life sciences careers

- ♣ Applied learning scenarios
- ♣ Experiential learning through internships
- ♣ Direct connection with professionals and industry settings
 - Mentoring, work review and feedback, etc.

- **PARTNERSHIPS:**

- Industry partnerships that promote *curriculum alignment with industry-standard skills, equipment, and projects*
 - ♣ Industry partners as curriculum or equipment-selection advisors
 - ♣ Collaboration with other schools and programs to expand the reach of life sciences programming and learning
 - Vertical alignment across schools in a district (Secondary Education Grant)
 - Partnerships between secondary schools and post-secondary institutions

Assistants/Associates, Research Assistants, Scientific Technicians, Biomedical Engineers, and Research Scientists. The enhanced curriculum deepened students' understanding of industry processes, developed hands-on technical skills, and engaged students in applied learning experiences aligned with life sciences career pathways.

Students received technical skills training in laboratory assays and techniques, documentation, aseptic practices, protein purification, protein separation, protein detection and quantification, cell culturing, media preparation, and related biotechnology applications. Grant-funded equipment enabled students to build proficiency with industry-relevant tools, including imagers, incubators, cell counting chambers, fluorescent microscopes, inverted microscopes, and other laboratory technologies. Evaluation systems included trimester report cards and project portfolios that documented students' skills development, yearly progress, and application of career technical knowledge and competencies.

Students further strengthened their technical skills and career awareness through annual participation in the Massachusetts Science and Engineering Fair and through co-op opportunities beginning in their junior year. Key partners, including Sanofi, AbbVie, Charles River Laboratories, Cytiva, BETC at WPI, and UMass Medical

- PARTNERSHIPS: Industry and/or non-industry partnerships that introduce students or trainees to people in the workforce
 - ♣ Job shadowing
 - ♣ Guest speakers
 - ♣ Site visits
 - ♣ Project feedback
 - ♣ Mentoring
- Strong industry and/or non-industry partnerships with direct support of project development and implementation
 - ♣ Letter of support with clearly defined commitments of service, or material supports
 - ♣ Varied types of partnerships
 - Speakers and/or demonstrations
 - Project advisory board
 - Curriculum support and development
 - Equipment advising
 - Judges for science fairs
 - Materials donations

Schools, supported implementation through site visits, program design and evaluation, and equipment advising.

The project served 184 students in its first year and included plans to expand enrollment in the biotechnology pathway in subsequent years. Instructor training in biomanufacturing from established curriculum providers, including BioBuilder, supported high-quality program delivery and alignment with state frameworks. To sustain the expanded curriculum, equipment inventory, and related program costs after the grant period, the district planned to leverage multiple funding partners (including district appropriations, public grants and private grants), ensuring continued access to enhanced coursework and extracurricular opportunities.

- Job Shadowing
 - Field trips
 - Host for events
 - Internships (for students and teachers)
 - Career Fairs/Networking events
 - Interviews for available job openings
- Partnership that reinforce, complement, supplement existing life sciences education or training
 - ♣ Vertical or horizontal curriculum alignment for school district (Secondary Education Grant)
 - ♣ Out-of-school time and school-day time alignment (OST Grant)

- **IMPLEMENTATION & SUSTAINABILITY SUPPORTS:**

- Training and support plans for instructors to deliver high-quality programming
- Clear goals and plan for program implementation, with lead personnel for described
- Plans for long-term implementation (sustainability

and growth: size, reach, skills)

- A significant portion of the **budget** is dedicated for equipment for long-term use and for multiple trainings, cohorts, or classes
- Clear plans and structures to address unexpected challenges in maintaining the program

- **EVALUATION SYSTEMS:**

- Specific plans for evaluating student technical skills related to life sciences
- Specific plans for tracking student outcomes after program completion