Massachusetts
LIFE SCIENCES CENTER

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; 20 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

Out-of-School Time Education Grant Project Examples

Exemplar 1

- **Project Overview:** *Applied Life Sciences: Biotechnology and Biomanufacturing Summer Program*

In this project, MLSC grant funds supported the addition of a life sciences pathway to an established summer program for high school students rooted in human skills development, project-based learning, and applied innovation. The new pathway immersed 15 students in hands-on project work, leadership development, systems thinking, and design iteration within biotechnology, medical device manufacturing, and applied life sciences research.

Students participated in authentic practice by completing a capstone aligned with real-world challenges and engaged in hands-on exercises such as process mapping, failure mode analysis, structured problem definition, and collaborative

• **LIFE SCIENCES SKILLS DEVELOPMENT:** o 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 o Development of professional skills related to life sciences careers or tasks ♣ Science and engineering practice (secondary students), collaboration, continuous improvement process, presentation/communication, etc. o Authentic practice ♣ Applied learning (real-world modeling/projects) with equipment-based solutions, multi-step projects, community/stakeholder presentations, etc. • **INDUSTRY-RELEVANT EQUIPMENT:**	design challenges modeled after industry scenarios. They learned about biotechnology and biomanufacturing industries and processes including the medical device product development lifecycle, manufacturing and sterile processing environments, quality assurance, regulatory considerations, and the connection between applied R &D and patient impact. Within the life sciences contexts and challenges, students developed skills in rapid prototyping, engineering, CAD design, 3D printing, laser cutting, electronics, and sensors. Through project-based work, they strengthened communication, collaboration, leadership, structured problem solving, and analytical thinking skills, with an emphasis on process and development skills utilized in life sciences careers. Students engaged directly with regional life sciences professionals and academic partners through guest speakers, career pathway discussions, and site visits to medical device companies, biotechnology companies, and healthcare organizations. They were connected to a broad network of industry and academic partners to explore life sciences careers and continuing education, including Boyd Biomedical, Sharp Sterile Manufacturing, Rousselot Robatel, Fibrocor Therapeutics, Berkshire Health Systems, the Institute for Applied Life Sciences, Massachusetts College of Liberal Arts, and Berkshire Community College.

- Exposure to modern/industry-relevant equipment, 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.

Students were assessed on increased life sciences industry awareness and interest, professional skills development, and technical skills development through quantitative and qualitative evaluations. Project coordinators planned to use these assessments to refine curriculum design and strengthen future cohorts.

Exemplar 2

- **Project Overview:** *Biomanufacturing After-School Series*

In this project, MLSC grant funds supported the launch of an eight-session immersive after-school program serving 125 middle and high school students from Central Massachusetts. The project focused on biomanufacturing and bioprocessing, and introduced students to related occupations including Bioprocess Technician, Manufacturing Associate, and Quality Control Technician. The curriculum was designed with reusable equipment and modular units that could be offered again or adapted for other age groups and formats. While building technical skills related to each focus-career, students learned about entry-level requirements, certificate programs, and advancement opportunities within the regional life sciences sector.

o 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:** o 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	The project incorporated life sciences skills development and authentic practice through a simulation in which students assumed the roles of entry-level biomanufacturing technicians working within a simulated production facility. Students followed Standard Operating Procedures, completed measurement and laboratory tasks, maintained batch records, and responded to simulated quality and compliance issues. Students used industry-relevant equipment to develop technical skills including micropipetting, serial dilution, solution and media preparation, use of analytical balances, pH monitoring, spectrophotometry, and batch documentation. The program also incorporated professional skills related to life sciences work, including attention to detail, accountability, teamwork, communication, problem solving, adaptability, and adherence to workplace standards. Student progress was measured through competency checklists, simulation-based performance measures, attendance and participation data, and pre- and post-program surveys. Specific targets included improved precision in micropipetting and measurement, successful completion of a multi-step dilution protocol, increased understanding of bioprocess and manufacturing technician roles, and increased interest in related life sciences careers. The project also planned to use findings to refine future program delivery. Students explored life sciences careers by connecting technical activities to specific biomanufacturing

institutions o 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 o 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	occupations, investigating education and training pathways, completing a Manufacturing Readiness self-assessment, and developing personalized life sciences pathway plans. Partnerships with Massachusetts Biomedical Initiatives and its network of life sciences companies supported curriculum development by advising on industry-aligned competencies, hiring needs, workplace expectations, and career pathways. Students engaged directly with professionals through guest speakers and career awareness activities coordinated with partner life sciences companies.

- Materials donations
- 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	