

Module 7: Applied Sciences - Innovation in Action

(Science – Interdisciplinary Applications & Engineering Integration)

Core Focus

Applied science is where theory meets impact.

This module explores how scientific disciplines intersect to drive innovation across medicine, agriculture, engineering, and environmental systems—emphasizing design, creativity, and solutions for real-world problems.

Key Concepts & Learning Goals

Theme	Topics
1. What is Applied Science?	- Bridging theory and practice - Examples from history and modern breakthroughs - Role in society and economy
2. Engineering Principles	- Design thinking process - Iteration, prototyping, and optimization - Problem-solving frameworks
3. Biomedical Sciences	- Disease prevention and treatment - Vaccines, diagnostics, and medical devices - Bioethics and access to healthcare
4. Agricultural Sciences	- Food production and food tech - Soil, water, and pest management - Sustainable and climate-smart agriculture
5. Materials Science	- Metals, polymers, ceramics, and composites - Smart materials and nanomaterials - Custom materials for specific challenges
6. Environmental Science & Engineering	- Pollution mitigation - Renewable energy systems - Water purification, conservation, and waste management
7. Interdisciplinary Science in Action	- Biochemistry, geophysics, astrobiology, bioinformatics - Combining disciplines for new frontiers - Case studies and innovation labs
8. Communicating Innovation	- Public engagement and science communication - Storytelling and design in presenting solutions - Role of art in science translation and impact - Entrepreneurship and pitching scientific ideas - Basics of intellectual property and patents

Hands-On Activities

- **Prototype a Product** (use design thinking to solve a problem)

- **Engineering Redesign Challenge**
 - **Build a Biofilter or Water Purifier**
 - **Medical Tech Hackathon**
 - **Science Communication Showcase**
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STEAM Integration

- **Science:** Core knowledge in biology, chemistry, physics, and earth science
 - **Technology:** Tools and digital modeling, medical devices
 - **Engineering:** Innovation, design, and testing
 - **Arts:** Infographics, industrial design, science visualizations
 - **Math:** Metrics, data analysis, modeling
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21st Century Skills Emphasized

- Innovation & Design Thinking
- Research Application
- Systems Engineering
- Communication & Collaboration