

Science Coach Curriculum Modules

Delivered via Canvas by Instructure

Module 0: Introduction to Innovation

- Creativity and Innovation
- Working within a Team
- Characteristics of Innovators
- Design Thinking

Module 1: Introduction To Research

- Why Conduct a Research Project
- Exploring Science Competitions
- Scientific Research Changes the World
- Sharing Research Findings
- Where Can Research Be Conducted?

Module 2: Developing A Research Question

- Creating a Logbook
- What Makes a Good Research Question
- Research Questions Around School, in Nature, and Everywhere
- Create Your Research Question
- Finding a Mentor

Module 3: Conducting A Literature Review

- What is Scientific Literature
- What is a Literature Review
- Literature Review Databases
- Potential Problems with Literature Reviews
- Conducting Your Literature Review
- Writing Your Hypothesis

Module 4: Research Ethics & Integrity

- Intro To Ethics and Integrity In Research
- Ethical Issues With Living Beings
- Ethical Issues With Handling Information
- Governing Bodies of Ethics
- Ethical Scenarios

Module 5: Study Design I

- Types of Variables
- Writing a Procedure
- Quantitative and Qualitative Studies
- Mixed Methods Study Designs
- Designing Quantitative and Qualitative Studies
- Study Design Implementation
- Student Presentations

Module 6: Study Design II

- Types of Qualitative and Quantitative Studies
- Observational and Survey Study Designs
- Surveys and Focus Groups
- Applying Observational, Survey and Focus Group Study Designs
- Correlation and Causation
- Correlation Study Design
- Quasi-Experimental – Experimental Study Designs
- Applying Experimental Study Designs
- Designing Your Experiment

Module 7: Conducting Your Experiment

- Bias and Sample Sizes
- Designing Your Data Collection
- Materials Lists and Laboratory Safety
- Aseptic Technique and Sterile Workspaces
- Refining Your Procedure
- Carrying Out Your Procedure

Module 8: Data Analysis Using Descriptive Statistics

- Descriptive Statistics
- Applying Real World Data
- Analyzing Data Using Google Sheets
- Analyzing Real World Data Using Google Sheets

Module 9: Data Analysis Using Statistical Analysis

- Introduction to Statistical Analysis
- p Values
- Significance Testing, T-Tests
- Chi Square
- Linear Regression
- Analysis of Variance Test (Anova)
- Applying the Appropriate Tests
- What Bad Statistics Can Do

Module 10: Results & Conclusions

- Constructing Graphs
- Applying Data Organizational Skills
- Interpreting Graphs
- Developing A Conclusion And Discussion
- Developing Your Conclusion And Discussion

Module 11: Writing a Scientific Paper

- Parts of a Scientific Paper
- Writing a Scientific Paper
- Literature Review, Procedures, and Materials
- Results, Discussion, and Conclusion
- References and Apa Format
- Abstracts

Module 12: Presenting Results

- Creating Your Presentation or Demonstration
- Creating Your Speech
- Using Props and Visual Aids
- Speaking Techniques
- Practicing Your Speech
- Presenting Your Project Virtually

Module 13: Reflection

- Successes and Failures
- Future Goals
- Making a Plan to Continue this Project for Next Year's Research

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Since 2007, the Science Coach non-profit has been engaging 6th-12th grade students to experience completing a scientifically accurate research project that solves a problem important to them. We work through schools to intentionally upgrade the skills of research teachers, providing extensive professional development and a comprehensive support ecosystem that results in 89% of students choosing STEM careers. Complete our no-obligation application today and see if you qualify: <https://bit.ly/appllysciencecoach>