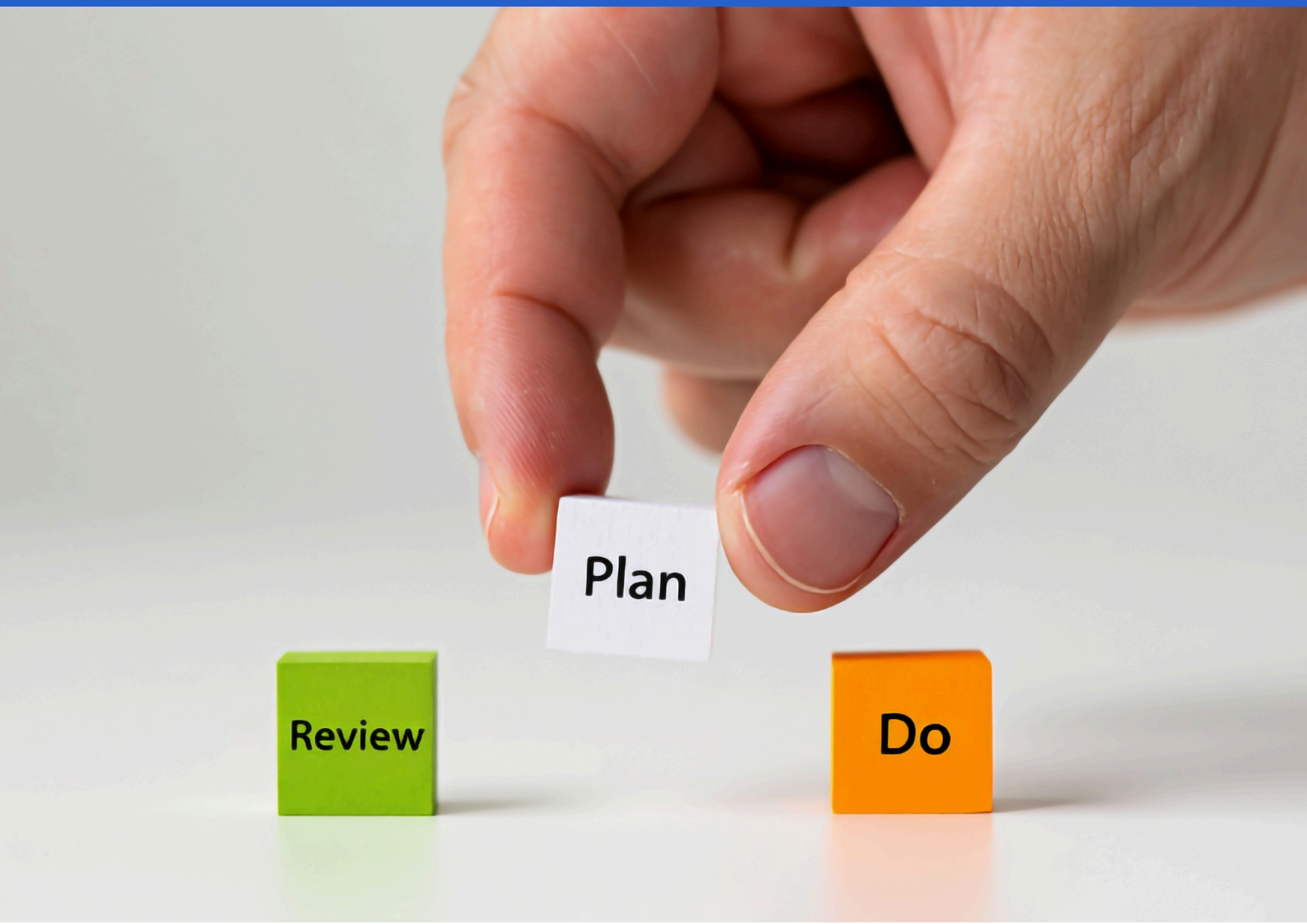
PRESENTED BY:
BDG LIFESCIENCES



RESEARCH METHODOLOGY

15-DAY PROGRAM

EVERY DAY 90–120 MIN LIVE SESSION

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INTRODUCTION

What separates a simple school project from real scientific research?
The answer is research methodology — the structured way scientists think, design experiments, analyze data, and communicate findings.

This 15-Day Research Methodology Program is designed specifically for high school students who want to:

- Participate in science fairs
- Conduct independent research projects
- Strengthen college applications
- Develop critical thinking skills
- Understand how real scientific investigations are conducted

Rather than focusing on one scientific subject, this course teaches students how to think and work like a researcher. It builds the foundation required for any serious academic or scientific pursuit.

TRAINERS

The training programs at BDG Lifesciences are conducted by highly experienced resource persons with strong academic and research backgrounds in bioinformatics, computational biology, drug discovery, molecular modeling, genomics, and artificial intelligence applications in life sciences. Our trainers include research professionals and subject-matter experts who have worked on real-world research projects, guided students for science fairs and publications, and delivered advanced workshops internationally. With over a decade of experience mentoring students—from high school to postgraduate levels—our team focuses on building strong conceptual foundations while providing hands-on exposure to industry-standard tools and research methodologies. The teaching approach emphasizes clarity, structured progression, practical application, and personalized guidance to ensure students not only understand the concepts but also gain confidence in applying them independently.

OVERVIEW

This 15-day structured program (90–120 minutes per session) systematically guides students through the complete research process — from curiosity to communication.

FOUNDATIONS OF RESEARCH & SCIENTIFIC THINKING

Students begin by understanding:

- What research truly means
- Scientific curiosity and empiricism
- Difference between theory and observation
- Types of research (descriptive, analytical, applied, fundamental, qualitative, quantitative)

They learn how research is categorized and why structure matters.

IDENTIFYING RESEARCH PROBLEMS & HYPOTHESIS BUILDING

Students learn:

- How to define a clear research problem
- Characteristics of a strong research question
- Feasibility and scope evaluation
- Null and alternative hypotheses
- Measurement principles

By the end of this stage, students can design a logically structured research question.

LITERATURE REVIEW & RESEARCH DESIGN

Students explore:

- How to conduct a proper literature review
- Difference between primary and secondary sources
- Identifying research gaps
- Inductive vs deductive reasoning
- Research design principles
- Difference between research methods and methodology

This ensures they understand how to plan investigations systematically.

DATA COLLECTION, SAMPLING & ANALYSIS

Students are introduced to:

- Observation, surveys, interviews, and experiments
- Basics of sampling (random, convenience, stratified – simplified)
- Avoiding bias
- Data recording techniques
- Types of data (categorical and numerical)
- Frequency tables and percentages

They then move into graphical representation:

- Bar charts
- Pie charts
- Line graphs
- Interpreting trends

Basic statistical concepts are introduced at a conceptual level:

- Mean, median, mode
- Range
- Simple group comparisons
- Introduction to Chi-square (conceptual understanding only)

SCIENTIFIC WRITING, ETHICS & COMMUNICATION

In the final phase, students learn:

- Structure of a scientific report (Title, Abstract, Introduction, Methodology, Results, Discussion, Conclusion)
- Referencing and citation basics
- Avoiding plagiarism and self-plagiarism
- Responsible conduct of research
- Basics of scientific publishing
- Difference between research articles and review papers
- Oral presentation skills and visual communication

This prepares students to confidently present their research findings.

SCHEDULE

Day	Session Title	Core Topics Covered	Expected Learning Outcome
Day 1	Introduction to Research & Scientific Thinking	Meaning of research; Objectives; Utility; Scientific curiosity; Empiricism; Theory vs Observation	Students understand research as systematic inquiry rather than casual curiosity
Day 2	Types of Research	Descriptive vs Analytical; Applied vs Fundamental; Quantitative vs Qualitative; Conceptual vs Empirical	Students differentiate major research categories
Day 3	Identifying Research Problems	Defining research problem; Characteristics of a good research question; Feasibility; Scope	Students formulate structured research questions
Day 4	Literature Review Fundamentals	Purpose of literature review; Primary & secondary sources; Books, journals, web sources; Identifying knowledge gaps	Students learn how to collect background information systematically
Day 5	Hypothesis Development	Working hypothesis; Null vs Alternative hypothesis; Qualities of good hypothesis; Measurement issues	Students construct testable hypotheses
Day 6	Research Design Principles	Meaning and need of research design; Features of good design; Induction vs Deduction; Models in research	Students understand structured planning of investigations
Day 7	Research Methods vs Methodology	Difference between method and methodology; Exploration, Description, Diagnosis, Experimentation	Students distinguish practical techniques from theoretical framework
Day 8	Data Collection Methods	Observation; Surveys; Interviews; Experiments; Sampling basics	Students identify appropriate data collection strategies

SCHEDULE

Day	Session Title	Core Topics Covered	Expected Learning Outcome
Day 9	Sampling & Data Handling	Types of sampling (random, convenience, stratified – simplified); Avoiding bias; Data recording	Students understand reliability and validity in data collection
Day 10	Introduction to Data Analysis	Types of data (categorical/numerical); Frequency tables; Percentages	Students organize and summarize data logically
Day 11	Graphical Representation of Data	Bar charts; Pie charts; Line graphs; Interpretation of trends	Students convert raw data into visual format
Day 12	Basic Statistical Concepts	Mean; Median; Mode; Range; Simple comparison between groups; Introduction to Chi-square (conceptual level only)	Students interpret simple statistical outcomes
Day 13	Structure of Scientific Reports	Components: Title, Abstract, Introduction, Methodology, Results, Discussion, Conclusion	Students understand the anatomy of a research report
Day 14	Referencing & Academic Ethics	Citation basics; Bibliography; Plagiarism; Self-plagiarism; Responsible conduct of research	Students develop awareness of academic integrity
Day 15	Scientific Communication & Publishing Basics	Oral presentation skills; Use of visual aids; Research articles vs reviews; Introduction to journals; Impact factor (conceptual); Ethics in publishing	Students gain confidence in communicating scientific findings

FEE- $ 240 US

In just this amount, students gain structured training in scientific thinking, research design, data analysis, and academic communication—skills that form the backbone of any successful research career. Compared to the long-term academic and competitive advantages it provides, this investment is minimal while offering a powerful foundation for students genuinely interested in pursuing research.

NOTE-

- All live sessions will be conducted via Zoom.
- A concise summary of each session will be provided to participants for revision and reinforcement.
- The recording of each session will be shared for future reference and review.
- A Certificate of Completion will be awarded by BDG Lifesciences upon successful completion of the program.

BENEFITS OF THIS COURSE

STRONG SCIENCE FAIR PREPARATION

Students gain structured knowledge on how to:

- Formulate research questions
- Design experiments
- Analyze results
- Present findings professionally

This significantly strengthens science fair performance.

COLLEGE APPLICATION ADVANTAGE

Universities value students who understand:

- Research structure
- Data interpretation
- Academic integrity
- Scientific communication

This program demonstrates intellectual maturity and academic initiative beyond the classroom.

DEVELOPMENT OF CRITICAL THINKING SKILLS

Students learn:

- Logical reasoning
- Evidence-based thinking
- Data-driven conclusions
- Ethical research practices

These skills benefit all future academic pathways — whether in STEM, social sciences, medicine, business, or law.

BENEFITS OF THIS COURSE

FOUNDATIONAL STATISTICAL & ANALYTICAL SKILLS

Students develop early comfort with:

- Data organization
- Graphical interpretation
- Basic statistical reasoning

This builds strong readiness for advanced STEM coursework.

FOUNDATION FOR ADVANCED RESEARCH PROGRAMS

This course serves as:

- A prerequisite foundation for mentored research projects
- Preparation for publication-oriented programs
- A structured pathway toward independent scientific investigation