

Science Research II: Grade 9

Goals of the 9th Grade Program: Students should become masters of the scientific method through both individual and group investigations. Students should initiate and carry out a thorough investigation of an unfamiliar situation.

Scientific Inquiry

Students should

- Identify needs and opportunities for scientific research
For example,
 - *read and investigate current science topics*
- hone ideas through reasoning, library research, and discussion with others, including experts
For example,
 - *arrange for guest speakers through local resources*
- refine their research ideas through library investigations, including online resources and reviews of the literature, and through peer feedback obtained from review and discussion and using the appropriate citation format
- understand the need to question the accuracy of information

Design

Students should

- Develop and present proposals including formal hypotheses to test their explanations
- Devise ways of making observations to safely test proposed explanations.
- Carry out their research, reporting observations and measurements in conventional and creative ways
For example,
 - *have students collect data using probeware*
 - *access real-time data on-line*
 - *have students organize data using spreadsheets*
- use models to study processes that cannot be studied directly
For example,
 - *Bridge building, water rockets, catapult, bottle biology, rubber band cars*

Analysis

Students should

- use various means of representing and organizing observations (e.g., diagrams, tables, charts, graphs, equations, matrices) and insightfully interpret the organized data
- Use spreadsheets and data-base software to collect, process, display and analyze information.
For example,
 - *have students use Excel to chart and graph data*
- show relationships and patterns in the data

- assess the validity of the hypothesis based on the actual result and reach a conclusion
- based on the results of the test and through public discussion, they revise the explanation and contemplate additional research
- describe how the solution might have been modified for different or better results
 - For example,*
 - *have students carry out modified experiments to better their results*
- develop a presentation of findings that describes their proposed explanation
 - For example,*
 - *use multimedia programs like Powerpoint to present findings*
 - *have students enter competitions such as Toshiba Exploravision, NASA Student Involvement Program, Long Island Science Congress, Brookhaven Bridge Building Contest*
 - *have students present finding to a board of peers and defend their results*

Assessments

During the course of the year, students should do the following:

- independent research project
- cooperative experiments/ activities
- independent presentations
- group presentations
- investigate and prepare a synopsis of current science topics

Grading Policy

30% participation

50% activities and projects

20% investigations of current science topics