Science Research Fundamentals: Writing and Speaking

Taught by the Illinois State Science Fair Winner for Best Research Paper.

BASIC INFORMATION
Time: Sundays — August 25 to December 15 with Labor Day and Thanksgiving exceptions
Location: Fenghua Academy in Lake Zurich High School

This course lays the groundwork for a student to be both an inquisitive scientist and an effective communicator.

ELIGIBILITY
- Any student in 5th-9th grade.
- No prior experience is needed.

Throughout the course, students will:
- Complete four pieces of scientific writing, including a literature review.
- Develop fundamental research skills.
- Gain a deep understanding of a science topic.
- Orally present and defend various positions with confidence and clarity.

Students will receive:
- Personalized guidance throughout each step of the research process.
- Handouts and lecture slides on common scientific processes and vocabulary.
- Equipment for two mini labs.

ABOUT THE INSTRUCTOR
Chloe Xu has won various research awards, including the Best in Category award at the Illinois state science fair, Illinois State Academy of Science nomination, the Exceptional Project in Category regional award, and best paper awards at the state and regional levels. She currently serves as a member of the Illinois Junior Academy of Science Student Board.

SYLLABUS
This course consists of three main sections:
- Science Communication — effective expression of opinion and analysis related to a scientific topic.

- Literature Review — a complete review of existing research on a scientific topic,
- Research Fundamentals — professional and critical thinking skills, including data analysis, research paper analysis, and identification of experimental components.

SCHEDULE

1. **Introduction to Research:** Falsifiability, experimental hypotheses, null hypotheses, essence of a literature review, purpose of research, and mini lab.
2. **Science Communication:** Experimental components, research paper analysis, and research paper summary.
3. **Science Communication:** Research paper analysis, research paper defense, and persuasive writing.
4. **Science Communication:** Graphical representations, peer review, and public speaking.
5. **Literature Review:** Idea generation.
6. **Literature Review:** Topic selection.
7. **Literature Review:** Databases and other scholarly sources, paraphrasing, and formatting.
8. **Research Fundamentals:** Source analysis, experimental components, and drafting.
9. **Research Fundamentals:** Source analysis, experimental components, revision, and introductions.
10. **Science Communication:** Conclusions, presentations, PowerPoint, and responding to inquiry.
11. **Literature Review:** Peer review, sources, and revision.
12. **Literature Review:** Peer review, sources, and revision.
13. **Research Fundamentals:** Statistical analysis and experimental research.
14. **Science Communication:** Purpose of research, future work, and persuasive writing.
15. **Science Communication:** Peer review, feedback, and oral presentation.