

Integration of ELA, Math and Science for Research Projects

Here are the California Standards that align with conducting research in **English Language Arts (ELA)**, **Mathematics**, and **Science**. These can help frame research-focused activities to meet state guidelines.

Integration of CA standards:

- **ELA and Science:** Students could conduct a literature review on a scientific topic, write a research paper, and present their findings.
- **Math and Science:** Design experiments to collect data and analyze it using statistical tools.
- **ELA and Math:** Create a persuasive presentation based on data findings to argue a solution to a real-world problem.

English Language Arts (ELA): California Common Core Standards (CCSS)

Research is explicitly addressed in the **Reading**, **Writing**, and **Speaking and Listening** strands:

- **Writing Standards (W)**
 - **Grades 4-12**
 - **W.4.7, W.5.7, W.6-8.7, W.9-12.7:** Conduct short research projects that build knowledge through investigation of different aspects of a topic.
 - **W.4.8, W.5.8, W.6-8.8, W.9-12.8:** Gather relevant information from multiple sources; assess credibility; integrate information avoiding plagiarism.
 - **W.4.9, W.5.9, W.6-8.9, W.9-12.9:** Draw evidence from literary or informational texts to support research.
 - **Speaking and Listening Standards (SL)**
 - **SL.4.4 to SL.12.4:** Report on a topic or text, presenting information logically with supporting evidence.

Mathematics: California Common Core Standards for Mathematics

Research in mathematics involves using math to analyze and interpret data.

- **Mathematical Practice Standards (MP)**

- **MP.1:** Make sense of problems and persevere in solving them.
- **MP.2:** Reason abstractly and quantitatively.
- **MP.4:** Model with mathematics—interpret research data, create models, or simulate experiments.
- **MP.5:** Use appropriate tools strategically, including software, graphs, and calculators for research.
- **Statistics and Probability Standards (Grades 6–12)**
 - **6.SP.1-6.SP.5:** Develop understanding of statistical variability and summarize distributions.
 - **7.SP.1-7.SP.8:** Use random sampling and draw inferences.
 - **HSS-ID.1-HSS-ID.9:** Summarize, represent, and interpret data for higher-level grades.

Science: Next Generation Science Standards (NGSS)

The NGSS emphasizes the **Science and Engineering Practices (SEPs)** that align with research activities:

- **Asking Questions and Defining Problems (SEP 1):** Formulate questions to clarify or define research topics.
- **Planning and Carrying Out Investigations (SEP 3):** Develop and conduct scientific research projects.
- **Analyzing and Interpreting Data (SEP 4):** Use statistical and mathematical techniques to analyze research data.
- **Constructing Explanations and Designing Solutions (SEP 6):** Develop and evaluate explanations or research findings.
- **Engaging in Argument from Evidence (SEP 7):** Use research data to support or refute claims.

Crosscutting Concepts (CCC):

- Recognize patterns, cause and effect, and systems thinking in research findings.