

# Unit 1: Science Research-Research Topic Development

Content Area: **Science**  
Course(s):  
Time Period: **Full Year**  
Length: **5 days**  
Status: **Published**

## General Overview, Course Description or Course Philosophy

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Science Research 8 provides students with the IQWST science program and an embedded science research experience in which students will learn how to research and develop an investigation for a regional Science Fair. Students will be expected to complete all laboratory work and additional research for the scientific research project outside of school hours. In both the IQWST and science research program, student engagement comes from actively *doing* and *making sense of* science and mathematics.

Students investigate and explain phenomena, gather and analyze data, develop and use visual models, and solve multi-step problems. They develop important life skills as they work collaboratively in groups and explore individually with technology supports. Our program helps students to articulate their thinking, critique the reasoning of others, and persevere in completing rich tasks and tackling complex problems.

## OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

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Personal interest and intellectual curiosity inspire investigation of a unique research topic within science and may not be clearly defined. A well crafted investigation explores the complexity of an issue or topic. This topic is explored using basic research methods and various sources.

## CONTENT AREA STANDARDS

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| SCI.MS-ETS1-1 | Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. |
| SCI.MS-ETS1-3 | Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.                                      |

## RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

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|---------------|---|
| LA.RST.6-8.8  | Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. |
| LA.RST.6-8.10 | By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text         |

|                 |   |
|-----------------|---|
|                 | complexity band independently and proficiently.   |
| LA.WHST.6-8.2.A | Introduce a topic and organize ideas, concepts, and information using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.                         |
| LA.WHST.6-8.2.B | Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.   |
| LA.WHST.6-8.2.D | Use precise language and domain-specific vocabulary to inform about or explain the topic.   |
| LA.WHST.6-8.7   | Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.   |
| LA.WHST.6-8.8   | Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |

## **STUDENT LEARNING TARGETS**

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### **Declarative Knowledge**

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Students will understand that:

1. Topics of inquiry may come from personal interest, passion for a discipline/field, desire to better understand a topic, or desire to address an issue in the world.
2. Inquiry begins by narrowing the scope of an interest, identifying the problem within its scope and situating it within a larger context.
3. A research question/goal emerges from the scholar's purpose.
4. A research question often requires multiple revisions to ensure that it is appropriate in terms of scope and feasibility (time, resources).
5. Online databases(EBSCO, JSTOR, ProQUEST) house many primary sources.
6. Advanced search tools, Boolean logic, and keywords allow scholars to refine, focus, and limit their searches based on a variety of factors (date, peer-reviewed status, type of publication)
7. Consulting the bibliographies of other sources may provide additional ideas and resources.
8. Software and online tools are used by Scholars to manage and catalog sources and produce bibliographies.
9. The scope and purpose of one's research and credibility of sources affects the generalizability and the reliability of the conclusions.
10. The way the problem is posed will guide the inquiry process.
11. The method data is collected in an inquiry should be aligned with the research question or goal.
12. Scholars have ethical and moral responsibilities when conducting research.

### **Procedural Knowledge**

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Students will be able to:

1. define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
2. analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
3. read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.
4. distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
5. introduce a topic and organize ideas, concepts, and information using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.
6. develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
7. use precise language and domain-specific vocabulary to inform about or explain the topic.
8. conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
9. gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

## **EVIDENCE OF LEARNING**

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### **Formative Assessments**

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Research article journals

Student self assessment

### **Summative Assessments**

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Research Article summaries

Topic Proposal

## **RESOURCES (Instructional, Supplemental, Intervention Materials)**

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1. <https://www.sciencenews.org/>
2. <https://www.discovery.com/>
3. <https://www.sciencejournalforkids.org/>
4. <https://www.usnews.com/science/news>
5. <https://time.com/section/health/>
6. <https://student.societyforscience.org/2019-broadcom-masters-project-showcase>
7. <https://student.societyforscience.org/broadcom-masters>
8. <https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2020/Rules/Book.pdf>

## **INTERDISCIPLINARY CONNECTIONS**

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Students will work with the media specialist to learn about proper research methods and the proper ways to cite sources used in the scientific research project. Students in this course will be picking topics from a wide range of categories and may be making interdisciplinary connections within their own research projects. <https://student.societyforscience.org/isef-categories-and-subcategories>

Researching based writing

Media Literacy

## **ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS**

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See link to Accommodations & Modifications document in course folder.