

The Research Cycle and MLOs

1. Questioning

A researcher identifies the decisions, issues and problems that surround a topic.

Language Arts

Research

- 3.8.2 Identify topics, **ask and evaluate questions, and develop ideas leading to inquiry, investigation and research.**

Social Studies

- 1.1 Students will use thinking processes and skills to gain knowledge of history, geography, economics, and political systems.

- 1.1.5.2 **Find**, apply and organize **information specific to social studies disciplines by reading, asking questions,** and observing.

- 1.1.5.12 **Develop effective questions to acquire information** about people, events, civilization, and other social studies concepts.

- 1.1.8.2 **Find**, apply and organize **information specific to social studies disciplines by reading, asking questions,** and observing.

- 1.1.8.12 **Identify topics, ask and evaluate questions, and develop ideas leading to inquiry, investigation, and research.**

Science

Science Processes

- 1.5.2 **Ask questions** that can be answered through a scientific investigation.

- 1.8.2 **Formulate questions which lead to the development of a testable hypotheses.**

Mathematics

Process of Communication

- Clarify meaning by asking questions,** supporting solutions with evidence, and explaining mathematical ideas in oral and written forms.

2. Planning

A researcher identifies sources of information likely to build understanding.

Language Arts

Research

- 3.5.2 **Understand and use the organizational features of printed texts such as the preface, afterword, table of contents, chapter headings, subtitles, index, glossary, and end notes to locate relevant information to accomplish writing tasks.**
- 3.8.2 **Understand and use the organizational features of printed texts such as the citations, bibliographic references, and appendices to locate relevant information.**

Use organizational features of electronic information and library and interlibrary computerized catalogs to research information for specific purposes.

Social Studies

- 1.1 Students will use thinking processes and skills to gain knowledge of history, geography, economics, and political systems.
 - 1.1.5.2 **Find, apply and organize information specific to social studies disciplines by reading, asking questions, and observing.**
 - 1.1.5.3 **Find, interpret and organize primary and secondary sources of information including pictures, graphics, maps, atlases, artifacts, timelines, political cartoons, videotapes, journals, and government documents.**
 - 1.1.8.2 **Find, apply and organize information specific to social studies disciplines by reading, asking questions, and observing.**
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Mathematics

Problem Solving

Make a plan and decide what information is needed or missing and steps needed to solve problem.

Select and use appropriate tools and technology.

3. Gathering

A researcher collects and stores information for later consideration.

Language Arts

Reading

- 1.5.5. **Know and use different focusing, monitoring and assessing reading strategies (e.g., skimming and scanning) to comprehend text.**

Summarize text in a manner that reflects the main ideas, significant details and its underlying meaning.

- 1.8.5 **Compare and contrast information from different articles or procedures on the same topic.**

Social Studies

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1.1.5.3 Find, **interpret** and organize **primary and secondary sources of information including pictures, graphics, maps, atlases, artifacts, timelines, political cartoons, videotapes, journals, and government documents.**

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Science

Scientific Inquiry

- 1.5.1 **Access and process information from readings, investigations and/or oral communications.**

- 1.8.1 **Access and process information from readings, investigations and/or oral communications.**

4. Sorting

A researcher reorganizes information so that the most valuable becomes readily available to support understanding.

Language Arts

Reading

- 1.5.6 **Distinguish relevant from irrelevant information** contained within text and identify possible points of confusion.

- 1.8.6 **Recognize instances of propaganda and persuasive techniques.**

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Science

Scientific Inquiry

- 1.5.8 **Analyze data to identify trends** and form conclusions.
- 1.8.8. **Analyze and summarize data to identify trends** and form a logical argument about a cause and effect relationship or a sequence of events.

Critical Thinking

- 1.5.11 **Classify objects, materials, concepts and actions based on similarities and differences.**
- 1.8.11 **Construct and use classification systems for grouping objects, materials, concepts and actions, organisms, etc.**

Mathematics

Problem Solving

Organize, interpret and use relevant information.

Process of Reasoning

Make and test generalizations based upon the investigation or observation.

Process of Communication

Organize, interpret and describe situations mathematically by providing mathematical ideas and evidence in oral and written form.

5. Synthesizing

A researcher recombines information to develop decisions and solutions.

Science

Science Inquiry

- 1.5.8 Analyze data to identify trends and **form conclusions**.
- 1.5.9 **Interpret** and communicate **findings** (i.e., speaking, writing and drawing) in a form suited to the purpose and audience, using developmentally appropriate methods including technology tools and telecommunications.
- 1.8.8 Analyze and summarize data to identify trends and **form a logical argument about a cause and effect relationship or a sequence of events**.
- 1.8.9 **Interpret** and communicate **findings** (i.e., speaking, writing and drawing) in a form suited to the purpose and audience, using developmentally appropriate methods including technology tools and telecommunications.

Critical Thinking

- 1.5.16 **Modify ideas based on new information** from developmentally appropriate readings, data and the ideas of others.
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Mathematics

Process of Reasoning

Make predictions or draw conclusions from available information.

Process of Communication

Clarify meaning by asking questions, **supporting solutions with evidence** and explaining mathematical ideas in oral or written form.

6. Evaluating

The researcher determines whether the information gathered is sufficient to support a conclusion

Language Arts

Reading

1.5.5 **Identify additional information needed.**

1.5.6 **Distinguish among facts, supported inferences and opinions.**

Evaluate the usefulness of information.

1.8.6 **Evaluate the usefulness, clarity and internal consistency of the text's organizational structure.**

Access the adequacy, accuracy, and appropriateness of an author's details to support claims and assertions, noting instances of bias and stereotyping.

Social Studies

1.1.8.12 Identify topics, ask and **evaluate questions** and develop ideas leading to inquiry, investigation and research.

Science

Critical Thinking

1.5.14 Provide **supporting evidence** when forming conclusions, devising a plan or solving a problem.

1.8.14 Provide **supporting evidence** when forming conclusions, devising a plan or solving a problem.

Mathematics

Problem Solving

Analyze multi-step problem solving situations.

Verify the conclusion based on the data and the processes used.

Process of Reasoning

Justify why an answer or approach to a problem is reasonable.

7. Producing

A researcher translates finding into a persuasive, instructive or effective product.

Language Arts

Writing

- 3.5.1 **Connect relevant descriptions, including sensory details, personal experiences, observations, and/or research-based information, linking paragraphs and ideas in ways that make a topic or message clear to the reader.**

- 3.5.3 **Prepare writing for publication by purposefully using electronic resources and graphics (e.g., drawings, charts, illustrations) to enhance the final product.**

- 3.5.6 **Write information reports for an intended audience and purpose that:**
 - **frame a key question**
 - **present a literal understanding of the topic**
 - **include facts and details that illuminate the main idea**

- 3.8.1 **Create an organizing structure that balances all aspects of the piece and makes effective transitions between sentences and descriptions to unify key ideas and make the message or theme clear to the reader.**

- 3.8.3 **Prepare writing for publication using electronic resources (e.g., word processing, database, spreadsheet software) to adopt an appropriate format and principles of design (e.g., headings, margins, spacing, columns, page orientation) that enhance the final product.**

- 3.8.6 **Write reports for an intended audience and purpose that:**
 - **convey a clear and accurate perspective on the subject**
 - **support the main ideas with facts, details, examples, and explanations**
 - **pose relevant and tightly drawn questions about the topic**

Science

Scientific Inquiry

- 1.5.9 Interpret and **communicate findings** (i.e., speaking, writing and drawing) **in a form suited to the purpose and audience, using developmentally appropriate methods including technology tools and telecommunications.**

- 1.8.9 Interpret and **communicate findings** (i.e., speaking, writing, and drawing) **in a form suited to the purpose and audience, using developmentally appropriate methods including technology tools and telecommunications.**

Mathematics

Problem Solving

Persevere through to a solution

Process of Communication

Organize, interpret and **describe situations mathematically by providing mathematical ideas and evidence in oral and written form.**