



A2 ACHIEVE RESEARCH PROJECT PROCESS

FROM TOPIC SELECTION THROUGH FINAL CONCLUSION

A strong research project does not begin with writing. It begins with choosing a question that is specific, realistic, and worth investigating.

The goal is not to select the most complicated topic possible. The goal is to complete a thoughtful, organized project that demonstrates curiosity, responsibility, independent thinking, and an honest understanding of the results.

This process can be used for a research paper, independent investigation, science project, survey-based study, community research project, or optional research submission for a college application.

STEP 1: IDENTIFY A GENERAL AREA OF INTEREST

The student should begin with a subject that genuinely interests them.

- A topic may come from:
- A class they enjoyed
- A question they have wondered about
- A problem they have noticed
- An activity, job, sport, or hobby
- A career field they are considering
- A behavior or pattern they want to understand
- A community issue
- A scientific, psychological, social, historical, environmental, or cultural question
- At this stage, the topic can remain broad.

Examples of broad topics include:

Sleep	Music	Nutrition
Exercise	Memory	Learning styles
Social media	Technology	Community service
Student stress	Environmental behavior	Artificial intelligence

The broad topic is only a starting point. “Sleep,” for example, is a subject, but it is not yet a research question.

STEP 2: COMPLETE PRELIMINARY RESEARCH

Before selecting a final question, the student should learn what is already known about the topic.

They should locate several credible introductory sources and consider:

- What do researchers already know?
- What questions have already been studied?
- What methods have other researchers used?
- What findings appear consistently?
- Where do researchers disagree?
- What limitations have previous studies identified?
- What questions remain unanswered?
- What part of the topic could realistically be studied by a student?

Preliminary research prevents the student from selecting a question that is too broad, impossible to measure, based on an incorrect assumption, or beyond the available time and resources.

The student should keep a working source list from the beginning. Each entry should include enough information to locate and cite the source later.

STEP 3: NARROW THE TOPIC

A manageable research project focuses on one specific part of a larger subject.

The student can narrow a topic by identifying:

- A specific population
- A specific age group
- A specific location
- A specific behavior
- A specific activity or intervention
- A specific amount of time
- A specific outcome to measure
- A specific comparison

A broad topic might be: ***Sleep***

A narrower topic might be: ***Sleep and student concentration***

A more specific topic might be: ***The relationship between the number of hours high school students sleep and their self-reported ability to concentrate during the school day***

A stronger comparative topic might be: ***A comparison of self-reported concentration among high school students who sleep fewer than seven hours, seven to eight hours, or more than eight hours per night***

The narrower the question becomes, the easier it will be to design a clear and manageable project.

STEP 4: TEST THE TOPIC FOR FEASIBILITY

Before committing to the project, the student should determine whether it can realistically be completed.

They should consider:

- Can the project be completed within the available time?
- Can enough participants, sources, materials, or data be accessed?
- Will the project require school approval?
- Will minors participate?
- Will parent or guardian permission be required?
- Is a teacher sponsor available?
- Can the question be studied without expensive or specialized equipment?
- Can the results be measured clearly?
- Can the project be completed safely?
- Can participant privacy be protected?
- Does the topic involve medical, mental health, legal, or other sensitive information?
- Does the project depend on information or resources that may not be available?

A smaller project completed carefully is stronger than an ambitious project that cannot be finished or supported.

STEP 5: SELECT A TEACHER SPONSOR

The student should choose a teacher or qualified adult who understands the subject, the research process, or both.

Depending on the topic, a sponsor might be a:

Science teacher	Environmental science teacher
Psychology teacher	Research or laboratory instructor
Statistics or mathematics teacher	Band, theatre, or art teacher
English teacher	Coach
Health teacher	School counselor
Social studies teacher	Community professional with relevant expertise

The student should approach the potential sponsor with more than a general idea. They should be prepared to explain:

- The broad topic
- The possible research question
- Why the topic interests them
- Who or what they plan to study
- How long the project may take
- What kind of guidance they are requesting

The sponsor's role is to guide, review, question, and supervise when necessary. The sponsor should not complete the project for the student.

STEP 6: WRITE THE RESEARCH QUESTION

The research question should clearly state what the student wants to learn.

A strong research question is:

- Specific
- Measurable or answerable
- Neutral
- Realistic
- Focused on one main issue
- Possible to investigate using available evidence

Weak question: ***Does social media affect students?***

Stronger question: ***How does daily social media use relate to high school students' self-reported ability to concentrate?***

Even stronger question: ***How do high school students who report fewer than two hours, two to four hours, or more than four hours of daily social media use compare in their self-reported ability to concentrate while completing homework?***

The research question should not assume the result before the study begins.

Biased question: ***Why does excessive social media use cause students to lose focus?***

Neutral question: ***What relationship, if any, exists between the amount of time students spend on social media and their self-reported ability to focus?***

STEP 7: DEFINE THE PURPOSE OF THE STUDY

The student should write a short explanation of why the project matters.

The purpose statement should address:

- What the project will investigate
- Why the topic is relevant
- Who may benefit from the information
- What the student hopes to understand

Example: ***The purpose of this study is to examine whether the amount of time high school students report spending on social media is related to their ability to concentrate while completing homework. The project will compare reported social media use with reported concentration to identify possible patterns and questions for future study.***

The purpose statement should explain the project without claiming that the student already knows what the results will show.

STEP 8: DEVELOP A HYPOTHESIS

A hypothesis is the student's informed prediction. It should be based on preliminary research rather than personal preference.

Example:

Students who report spending more than four hours per day on social media will report greater difficulty concentrating while completing homework than students who report spending fewer than two hours per day on social media.

The hypothesis does not need to be correct.

A project is not a failure when the results do not support the hypothesis. Unexpected findings often create the most interesting analysis and discussion.

Some research projects, such as historical analysis, literary research, interviews, or exploratory studies, may not require a formal hypothesis. In those cases, the student may begin with a research question and explain what they are attempting to understand.

STEP 9: IDENTIFY THE VARIABLES OR MAIN RESEARCH ELEMENTS

For an experimental or comparative project, the student should clearly identify what will change, what will be compared, and what will be measured.

Independent variable: The condition, factor, or category being changed or compared. Examples:

- Amount of sleep
- Type of study environment
- Length of exercise
- Teaching method
- Type of music
- Amount of screen time

Dependent variable: The result being measured. Examples:

- Test score
- Memory score
- Stress rating
- Focus rating
- Completion time
- Mood rating
- Accuracy
- Perceived effort

Controlled variables: Conditions that should remain as consistent as possible. Examples:

- Length of each session
- Instructions provided
- Room or location

- Time allowed for the task
- Testing materials
- Order of questions
- Equipment used

Outside variables: Factors that may influence the results but may be difficult to control. Examples:

- Sleep
- Caffeine
- Time of day
- Prior experience
- Interruptions
- Motivation
- Current stress
- Physical health
- An upcoming test or event

For a nonexperimental research project, the student should identify the main themes, sources, events, time periods, arguments, or perspectives they will examine.

STEP 10: CHOOSE THE RESEARCH METHOD

The research question should determine the method.

Possible methods include:

- Experiment
- Survey
- Questionnaire
- Interviews
- Observation
- Case study
- Content analysis
- Literature review
- Historical research
- Comparison of existing data
- Document analysis
- Mixed-method study using both numerical and written responses

The student should be able to explain why the chosen method is appropriate for the question.

A survey may measure opinions, behaviors, or experiences, but it usually cannot prove that one factor caused another.

An experiment may provide a stronger comparison, but it requires more careful controls and procedures. Interviews may provide detailed personal insight, but the smaller number of participants may limit how broadly the findings can be applied.

A literature review may examine a large body of existing evidence, but the student must evaluate and compare sources rather than simply summarize them one at a time.

STEP 11: DEFINE THE PARTICIPANT GROUP OR SOURCE MATERIAL

The student should clearly identify who or what will be studied.

For a participant-based project, they should determine:

- The target population
- The desired number of participants
- The age range
- How participants will be recruited
- Who may or may not participate
- Whether participants will be divided into groups
- Whether each participant will complete more than one condition
- Whether participation will be anonymous or confidential

For a source-based project, they should determine:

- What types of sources will be included
- What date range will be studied
- How many sources will be needed
- What standards will be used to judge credibility
- What information will be collected from each source
- Which perspectives should be represented
- What types of sources will be excluded

The participant group or source selection should connect directly to the research question.

STEP 12: REVIEW ETHICS, PERMISSIONS, AND PRIVACY

Any project involving people should be reviewed carefully before data collection begins.

The student and sponsor should determine:

- Whether school approval is required
- Whether parent or guardian permission is required for minors
- Whether participant consent is required
- Whether the project involves private or sensitive information
- How participant identities will be protected
- How the data will be stored
- Who will have access to the results
- Whether participants may withdraw
- How the project will be explained honestly
- Whether outside approval is required before the project begins

The student should not:

- Pressure anyone to participate
- Collect unnecessary personal information
- Ask for medical or mental health diagnoses without proper approval
- Ask participants to disclose private or traumatic experiences unnecessarily
- Promise a particular result
- Mislead participants about the purpose of the study
- Identify participants in the final report
- Change the procedure without documenting the change

Data should normally be assigned participant numbers or codes rather than names.

If the project will be entered into a science fair, competition, publication, research program, or formal college program, the student must review all approval requirements before collecting data. Approval may not be granted after the project has already begun.

STEP 13: WRITE THE PROCEDURE

The procedure should explain exactly how the project will be completed. Another person should be able to read the procedure and understand how to repeat the study.

The procedure should include:

- Where the project will take place
- Who or what will be studied
- How participants or sources will be selected
- What instructions will be provided
- What materials will be used
- How long each part will take
- What information will be collected
- What order the activities will follow
- How groups or conditions will be organized
- How results will be recorded
- How privacy will be protected
- The student should avoid vague descriptions.

Vague procedure: ***Participants listened to music and completed a test.***

More specific procedure: ***Participants listened to a five-minute instrumental recording at the same volume before completing a three-minute word-recall activity. Their scores were compared with scores from a separate session in which they completed the same process without music.***

The procedure should describe what will actually happen, not what the student hopes will happen.

STEP 14: CREATE THE RESEARCH MATERIALS

Depending on the project, the student may need to create:

- Participant instructions
- Consent forms
- Parent or guardian permission forms
- Surveys
- Interview questions
- Pre- and post-activity questionnaires
- Testing materials
- Observation checklists
- Scoring rubrics
- Data-recording sheets
- Recruitment messages
- Debriefing statements
- Source-analysis charts
- Research journal

Every participant should receive the same instructions unless a difference in instructions is part of the study. Survey and interview questions should be neutral.

Biased question: ***How much did studying with music improve the participant's focus?***

Neutral question: ***How would the participant rate their level of focus while studying with music?***

Questions should be clear, specific, and easy for participants to understand.

STEP 15: CREATE A DATA PLAN BEFORE COLLECTING DATA

The student should decide in advance how each result will be recorded and analyzed.

The data plan should identify:

- What information will be collected
- What measurement scale will be used
- How answers will be coded
- How incomplete responses will be handled
- What comparisons will be made
- What averages, percentages, or changes will be calculated
- What charts or graphs may be useful
- How written responses will be reviewed for common themes
- How excluded data will be documented

Planning the analysis before collecting data prevents the student from changing the project simply because the initial results are unexpected.

STEP 16: CONDUCT A SMALL PILOT TEST

Before beginning the full project, the student should test the complete procedure with a small number of people who will not be included in the final results.

The pilot test should determine:

- Whether the instructions are clear
- Whether the survey questions make sense
- Whether the activity takes the expected amount of time
- Whether a task is too easy or too difficult
- Whether the materials work properly
- Whether any important information is missing
- Whether the data spreadsheet records everything needed
- Whether the project creates any unexpected privacy or safety concerns

The student should revise the procedure based on the pilot test before beginning formal data collection.

STEP 17: FINALIZE THE PROJECT TIMELINE

The student should create a written schedule that includes:

- Topic selection
- Preliminary research
- Teacher sponsor approval
- Final research question
- Permission forms
- Material development
- Pilot testing
- Participant recruitment or source collection
- Data collection
- Data entry
- Data analysis
- First draft
- Sponsor review
- Revision
- Final paper
- Presentation or poster

A deadline should be established for each stage.

Data collection should not consume the entire project period. Enough time must remain to analyze the information, write the report, revise the work, and prepare the final submission.

STEP 18: COLLECT THE DATA OR EVIDENCE

During data collection, the student should follow the approved procedure consistently.

They should:

- Use the same instructions for each participant
- Keep timing and testing conditions as consistent as possible
- Use the same equipment or materials
- Record information promptly
- Document interruptions or unexpected events
- Avoid coaching participants toward a particular answer
- Keep the data secure
- Track participation using identification numbers
- Follow the same process even when the results appear surprising
- For a source-based project, the student should:
 - Apply the same source-selection standards throughout the project
 - Record complete citation information
 - Take organized notes
 - Separate direct quotations from paraphrased notes
 - Identify the main argument of each source
 - Note differences among sources
 - Record limitations, bias, or missing information

Avoid selecting only sources that support the student's original opinion

The student should maintain a research journal throughout the project.

The journal should document:

- Dates and times
- Number of participants or sources reviewed
- Changes or problems
- Questions that arise
- Decisions made with the sponsor
- Observations not captured by the formal data
- Ideas for future research

STEP 19: ORGANIZE AND CLEAN THE DATA

Before analyzing the results, the student should review the collected information carefully.

They should check for:

- Missing responses
- Duplicate entries
- Incorrect identification numbers
- Impossible values
- Unclear handwriting

- Participants who did not complete the full procedure
- Changes in testing conditions
- Data entered into the wrong category
- Incomplete source information
- Notes that do not clearly distinguish quotations from paraphrasing

The student should not remove results simply because they do not support the hypothesis. Any excluded information should be documented, along with the reason it was excluded.

STEP 20: ANALYZE THE RESULTS

The analysis should directly address the research question.

Depending on the project, the student may calculate or identify:

- Total number of participants
- Average scores
- Median scores
- Percentages
- Pre- and post-activity differences
- Differences among groups
- Differences among conditions
- Range of responses
- Frequency of particular answers
- Common themes in written responses
- Patterns among sources
- Areas of agreement or disagreement
- Changes across time periods
- Relationships among variables

The student should separate results from interpretation.

Result: ***Students who reported sleeping at least eight hours had an average concentration rating of 7.4, while students who reported sleeping fewer than six hours had an average rating of 5.8.***

Interpretation: ***Within this participant group, longer reported sleep was associated with higher reported concentration.***

The student should not claim that sleep caused the difference unless the research design supports that conclusion.

STEP 21: CREATE TABLES, CHARTS, AND GRAPHS

Visuals should make the findings easier to understand.

Possible visuals include:

- Participant summary tables
- Before-and-after comparison charts
- Average response graphs
- Age-group comparisons
- Condition comparisons
- Percentage charts
- Timelines
- Source-comparison tables
- Tables of common themes
- Each visual should include:
 - A clear title
 - Labeled categories
 - Correct units
 - An explanation of what is being shown

The student should not create a graph simply to make the project look more scientific. Every visual should help explain the findings or answer the research question.

STEP 22: INTERPRET THE FINDINGS

After presenting the results, the student should explain what they may mean.

They should consider:

- Did the results support the hypothesis?
- What was the clearest finding?
- Were any results unexpected?
- Did different groups respond differently?
- Did self-reported results match measured performance?
- Were the differences large or small?
- Could another factor explain the results?
- How do the findings compare with the preliminary research?
- Did the sources generally agree or disagree?
- What new questions did the project create?

The student should remain open to more than one possible explanation.

STEP 23: IDENTIFY LIMITATIONS

Every research project has limitations. Recognizing them demonstrates maturity and credibility.

Possible limitations include:

- Small number of participants
- Short study period
- Participants from only one school or community
- Unequal group sizes
- Reliance on self-reported information
- Lack of specialized equipment
- Differences in time of day
- Participant expectations
- Prior experience
- Inconsistent attendance
- Limited control over outside factors
- Possible survey bias
- Limited number of sources
- Lack of access to primary sources
- Sources representing only one perspective
- Missing or incomplete historical records

A limitation does not make the project worthless. It explains how confidently the findings can be interpreted and how broadly they can be applied.

STEP 24: WRITE THE CONCLUSION

The conclusion should answer the research question using the evidence collected.

A strong conclusion should include:

- A restatement of the research question
- A brief summary of the main finding
- Whether the hypothesis was supported, when applicable
- What the results may suggest
- The most important limitations
- A recommendation for future research

The conclusion should not introduce new data or make claims that were not supported by the project.

Weak conclusion: ***Social media causes students to perform poorly in school.***

Stronger conclusion: ***Students in this study who reported higher daily social media use also reported greater difficulty concentrating while completing homework. These results supported the original hypothesis within this participant group. However, the study relied on self-reported information and did not measure academic performance directly. The results show an association but do not prove that social media use caused the reported concentration difficulties.***

STEP 25: RECOMMEND FUTURE RESEARCH

The student should identify what could be studied next.

Future research may involve:

- A larger participant group
- A longer study period
- Different age groups
- Different locations
- Additional comparison groups
- More objective measurements
- A different research method
- Repeated activities instead of one session
- More controlled testing conditions
- Interviews to explore survey results in greater detail
- Additional historical periods or geographic regions
- A broader range of sources or perspectives

The future-research section shows that the student understands research as an ongoing process rather than a one-time answer.

STEP 26: WRITE THE FINAL REPORT

A standard research report may include:

- Title
- Abstract
- Introduction
- Background research or literature review
- Research question
- Purpose statement
- Hypothesis, when applicable
- Methods
- Participants or source selection
- Materials
- Procedure
- Results or findings
- Tables and graphs
- Discussion
- Limitations
- Conclusion
- Future research
- Personal reflection
- References
- Appendices

The appendices may include:

- Surveys
- Consent forms
- Parent or guardian permission forms
- Instructions
- Testing materials
- Interview questions
- Source-analysis charts
- Examples of anonymized raw data
- Scoring rubrics

The final organization may be adjusted based on the teacher sponsor's instructions, the type of project, or the college or competition submission requirements.

STEP 27: WRITE THE ABSTRACT LAST

The abstract is a brief overview of the completed project.

It should usually include:

- The research question
- The participant group, source material, or evidence studied
- The basic method
- The most important finding
- The primary conclusion

The abstract should be written after the entire project is complete because it summarizes what actually happened, not what the student originally planned.

STEP 28: INCLUDE A PERSONAL RESEARCH REFLECTION

When appropriate, the student should include a brief reflection explaining:

- Why they selected the topic
- What surprised them
- What part of the process was most difficult
- What mistake or obstacle required an adjustment
- How their thinking changed
- What they learned about conducting research
- What question they would study next
- What the experience taught them about their academic or career interests

The reflection should focus on the student's thinking, decisions, and growth rather than simply repeating the results.

STEP 29: REVIEW THE PROJECT FOR ACCURACY AND HONESTY

Before submitting the project, the student should confirm:

- All claims are supported by evidence.
- Every source is cited.
- Direct quotations are clearly identified.
- Paraphrased information is properly credited.
- No participant is named.
- Charts match the data.
- Calculations are correct.
- The method describes what actually occurred.
- Changes from the original plan are disclosed.
- Excluded information is explained.
- Limitations are acknowledged.
- The conclusion does not overstate the findings.
- The student can explain every part of the project in their own words.

The final report should accurately represent the student's work, decisions, mistakes, revisions, and conclusions.

STEP 30: PREPARE THE FINAL SUBMISSION

Depending on the opportunity, the student may prepare:

- A complete research paper
- A one-page abstract
- A research poster
- A slide presentation
- An oral presentation
- A project portfolio
- A research journal
- An anonymized data table
- A teacher-sponsor verification statement

The student should review all submission instructions carefully.

They should confirm:

- Deadline
- Page or word limit
- File type
- Required sections
- Citation style
- Formatting requirements
- Whether supporting materials may be included
- Whether the teacher sponsor must submit a separate statement
- Whether the student may submit a project completed for a class

- Whether the project must be entirely independent

FINAL A2 ACHIEVE REMINDER

The purpose of an independent research project is not to produce a groundbreaking discovery in a few weeks. The purpose is to show that the student can take an interest, turn it into a focused question, study it responsibly, analyze the evidence, acknowledge what the project cannot prove, and communicate what they learned.

A thoughtful project with a clear method and an honest conclusion will always be stronger than a complicated project designed only to sound impressive.