

Rubric for homework/project on finding, interpreting and evaluating scientific evidence						
Title	Authors lack suitable expertise, and any assumptions or biases present.	Discipline specific critical thinking goals	Accomplished	Proficient	Developing	Beginning
Question and information search	Identifying the type of information needed and putting it into context for a successful info search: What is my question? What is the scope of my question? What kind of information do I need? Where can I get trustworthy information of this type? What search terms are needed?	Students understand the context of a research question and can determine type and depth of information needed as evidence. Students apply appropriate information search strategies and can discuss rationale for the type and quantity of information needed.	Information gathered is clearly related to research question and evidence has been examined/chosen from at least a few sources. Depth of information is sufficient to answer question and it is clear that the information in the source is understood (w/ additional research to understand source as needed). Student can logically explain rationale for quantity and quality of information provided for the thoroughly researched question.	Information gathered is clearly related to research question and evidence has been examined/chosen from at least a few sources. A few sources were likely considered in source selection. Depth of information is sufficient to answer/support question and source seems to be understood by student. Quantity and quality of information suggests topic has been well researched.	Information gathered is related to research question. Evidence has been examined/chosen from at least a few sources. Information includes most details to answer/support question and source seems to be partially understood. Quantity and quality of information meets minimum expectations.	Information gathered is partially related to research question, and may not be at an ideal level of depth/detail. Understanding of article is limited and additional research or explanations are needed to demonstrate understanding of evidence. Additional quality research would significantly improve work.
Authors	Analyzing and evaluating the authors: What is authors background? Any biases or conflicts of interests? Are there assumptions about the audience that have impacted the presentation of evidence?	Students consider the author's background. Students evaluate background for bias, conflicts, and expertise of the author(s). Students evaluate article for contextual information that may provide evidence of assumptions.	Clearly, logically, and comprehensively considers the author's background and any assumptions or biases present. Sources are written by experts that are often cited and define the field.	Carefully considers the author's background and any assumptions or biases present, resulting in a reasonable assessment. Sources chosen are clearly written by experts.	Considers the author's background and any assumptions or biases present, minor inaccuracies or gaps in analysis may be present but don't interfere with the general assessment of the article. Sources chosen are written by authors with a strong background in the field.	Incomplete consideration of author's background and any assumptions or biases present. Authors credibility is weak or cannot be established.
Source(s)	Analyzing and evaluating the source(s): What is the quality of this source based on source's type, reputation of the source, age and/or other contextual clues (the author's use of citations, images, data). Additional research on the source, including times the source is cited, journal quality metrics, etc. are completed if appropriate. Students choose an appropriate number of sources to address their question.	Students can explain advantages and disadvantages of the source related to the articles type, differentiating primary research, review articles, research summaries, and popular press articles. Students research the quality of their article source and consider the use of citations within the article. Students choose an appropriate number of sources based on the evidence they find and their specific question.	Fully considers the advantages and disadvantages of the source type. Comprehensively seeks and considers additional factors that collectively give information about article quality and its influence in the scientific community (factors may include times cited, author's use of citations, article age, journal quality metrics, context of research).	Appropriately considers the advantages and disadvantages of the source type. Considers additional factors that add clues to article quality and its influence in the scientific community (factors may include times cited, article age, journal quality metrics, context of research).	Some advantages and disadvantages of the source type are considered. Considers additional factors that add clues to article quality, when obvious and/or given (article age, author's use of citations, context of research).	May be some confusion about source type. Additional factors that add clues to article quality are misinterpreted or overlooked.
Scientific process	Identifying elements of the scientific process and evaluating the study: How does this information align w/ my understanding of the scientific process? What type of study is this and can it be described using appropriate scientific terms? Which part is what step of the scientific process and what type of study is this?	Students understand how the information/evidence relates to the scientific process. Students apply scientific terms to discuss research and identify or deduce components of the scientific process (for example the authors hypothesis, experimental design, results, conclusions). Students can identify independent vs dependent variables and experimental vs. observational approaches. Students can differentiate study findings, opinions, and suggestions for future work.	A clear and accurate explanation is provided for how the information/evidence relates to the scientific process. Scientific vocabulary is used to fully explain the aspects of research process that resulted in this evidence/article (for example hypothesis, methods, results, conclusions). Description of research and data collected is accurate, focused, and insightful. Even with complex research designs, correct descriptions of independent vs. dependent variables and data collection approaches are used. No errors are made in differentiating experimental findings, opinions, and future work.	A complete explanation is provided for how the information/evidence relates to the scientific process. Scientific vocabulary is used to explain the aspects of research process that resulted in this evidence/article (for example a hypothesis or the methods). Minor inaccuracies or omissions may be present, but do not interfere with meaning. Description of research and data collected are accurate and complete. With basic research designs, correct descriptions of independent vs. dependent variables and data collection approaches are used. No errors are made in differentiating experimental findings, opinions, and future work.	A basic explanation is provided for how the information/evidence relates to the scientific process. Some scientific vocabulary is used to provide some details of aspects of research process that resulted in this evidence/article (for example a hypothesis or the methods). Description of research and data collected provide some relevant details. There may be gaps in explanation or minor misinterpretations. With basic research designs, descriptions of independent vs. dependent variables and data collection approaches suggest limited understanding. Only minor errors are made in differentiating experimental findings, opinions, and future work.	A limited explanation is provided for how the information/evidence relates to the scientific process. An overview of research process that resulted in this evidence/article is provided, but major inaccuracies or missing details make the understanding incomplete. Description of research and data collected is limited or incorrect. With basic research designs, descriptions of independent vs. dependent variables and data collection approaches aren't correct.
Data Analysis	Analyzing and evaluating scientific data: What information is here, and what does it mean? How good is this information based on my basic understanding of experimental design? Have I considered sample size, controls, potentially confounding variables, correlations and the placebo effect? Do I understand the results presented, including tables, figures, and images? Do the tables, figures and images represent the data well and are they accurately made? How convincing are the statistics?	Students evaluate experimental details such as sample size, controls, potentially confounding variables, correlations and the placebo effects. Students understand and critically evaluate the tables, figures, and images provided in the source. Students consider whether the author follows best practices and presents data in a way that does not mislead the audience. Students use their understanding of p-values, types of statistical tests, etc. to evaluate the statistics.	A clear, accurate and comprehensive explanation is provided for any figures, images and/or data provided in the source. Evaluations of experimental details and results (based on sample size, controls, confounding variables, correlations, the placebo effect, methods) are accurate, relevant, and insightful. Tables, figures, and images are critically assessed and even minor inaccuracies are noted. Statistics are clearly understood by the student and the student's evaluation of the strength of the statistical tests is detailed and accurate.	An appropriate explanation is provided for any figures, images and/or data provided in the source. Evaluations of experimental details and results (based on sample size, controls, confounding variables, correlations, the placebo effect, methods) suggest a general understanding, but there may be minor omissions in analysis. Tables, figures, and images are critically assessed and major inaccuracies are noted. Student demonstrates a basic understanding of the statistics and the student's evaluation of the strength of the statistical tests is generally appropriate.	Some explanation is provided for any figures, images and/or data provided in the source, but there may be gaps in the explanation or minor misinterpretations. Evaluations of experimental details and results (based on sample size, controls, confounding variables, correlations, the placebo effect, methods) suggest a partial understanding, with major omissions or inaccuracies present. Tables, figures, and images are critically assessed, but there may be gaps in analysis that do not interfere with evaluation of the data's overall quality. Student demonstrates a partial understanding of the statistics and the student's evaluation of the strength of the statistical tests may contain inaccuracies or omissions.	Explanation is provided for any figures, images and/or data provided in the source, is limited. Evaluations of experimental details and results (based on sample size, controls, confounding variables, correlations, the placebo effect, methods) may not all be accurate. Tables, figures, and images are not critically assessed. Understanding of statistics is at a beginning level, which doesn't allow a complete analysis of the strength of statistical tests.
Conclusions	Analyzing and evaluating the author's conclusions: Are the conclusions appropriate based on the evidence provided?	Students consider whether conclusions presented are appropriate based on evidence provided.	Discussion of quality of author's conclusions is logical and sophisticated.	Discussion of quality of author's conclusions is reasonable and well supported.	Discussion of quality of authors conclusions lacks detail or thorough reasoning.	Key details were overlooked or misinterpreted in any discussion of the quality of the author's conclusions.
Context	Contextualizing within a set of resources: Were sufficient sources selected? Did sources represent multiple angles? How does this work compare to other related work? What are the implications of this work in a multidisciplinary context (other sciences, ethics, economics)?	Students can provide rationale for the strength of findings in an article or set of articles based on comparisons among articles and to established views. Students consider alternate approaches and perspectives in the field. Students consider ideas in a multidisciplinary context including ethics, economics and/or other sciences.	Clearly, logically, and comprehensively compares an articles methods or findings to those of other very relevant articles and/or established views in the field. Implications of research are considered in a multidisciplinary context, and suggestions are detailed and well reasoned, and may be creative or unique.	Thoughtfully compares an article's methods or findings to those of other clearly related articles and/or established views in the field, resulting in a reasonable assessment. Implications of research are considered in a multidisciplinary context, and suggestions are basic but appropriate.	Compares an article's methods or findings to those of other articles and/or established views in the field, but there may be minor inaccuracies or omissions. Parts of articles compared, and/or groups of articles compared are partially relevant. Implications of research are considered in a multidisciplinary context, and suggestions may be a mix of possible and unlikely ideas.	Comparison of an article's methods or findings to other articles and/or established views in the field is incomplete. Parts of articles compared, and/or groups of articles may not be related. Implications of research are considered in a multidisciplinary context, but the majority of ideas aren't plausible and/or there are major oversights.

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Application	Applying the evidence to solve a problem or answer a question: How can I apply evidence to sufficiently, and possibly creatively answer a question or solve a problem? What specific details are needed in supporting my point? How can this evidence be presented in a way that is consistent with how scientists communicate (paraphrasing vs. quoting, using concise language, being careful w/ words such as prove and theory)? Did I use appropriate citations?	Students can clearly summarize relevant details and consider relevant evidence in answering a question or solving a problem. Students use discipline specific practices in their communication, paraphrasing vs. quoting, using concise language, and using appropriate word choice (being careful w/ words such as prove and theory). Information is cited correctly.	Clearly and concisely applies highly relevant and convincing evidence to sufficiently, and possibly creatively answer a question or solve a problem. Details are carefully selected and summarized using scientific communication practices (paraphrasing vs. quoting, using concise language, using appropriate word choice, following style guidelines). Citations are complete and in the appropriate format.	Appropriately applies pieces of evidence to support or answer a question or solve a problem. Most details are relevant and are summarized using scientific communication practices (paraphrasing vs. quoting, using concise language, using appropriate word choice, following style guidelines). Citations are complete.	Applies some evidence to support or answer a question or solve a problem. There may be minor gaps in the explanation or minor misinterpretations. Information is clearly summarized using good general communication practices. Source information is present, but there may be errors in citation format and/or a few details may be missing.	Evidence used to support or answer a question or solve a problem is incomplete and/or not clearly relevant. Errors in communication make ideas somewhat unclear. Major gaps in source information are present, and errors in format make interpretation of citation information difficult.