

Research Project Rubric

1) Identifies and summarizes the problem/question to be investigated			
<i>Inadequate</i>	<i>Minimally Developed</i>	<i>Moderately Developed</i>	<i>Substantially Developed</i>
Question identified is too broad or vague to provide a coherent thesis	Has identified an appropriate topic but be studied, but lacks a clearly stated hypothesis. Organized as a catalogue of information about the topic rather than pointing toward a hypothesis.	Uses prior knowledge to identify a question to be studied. Has a clearly stated hypothesis. Breaks questions down into smaller steps, but has not identified all the complexities and nuances inherent in the question.	Uses prior knowledge to identify a question to be studied. Has a clearly stated hypothesis. Breaks question down into a series of steps that will lead to the questions to be addressed in the study. Identifies complexities and nuances in the question.
2) Identifies existing, relevant knowledge and views			
<i>Inadequate</i>	<i>Minimally Developed</i>	<i>Moderately Developed</i>	<i>Substantially Developed</i>
Review of relevant knowledge is seriously incomplete. Inadequate variety of sources. Major issues are ignored. Many factual errors or inconsistencies	Uses some appropriate sources to discover what is already known about the system/problem, but discussion omits important aspects of the problem.	Uses appropriate sources to discover what is already known about the system/problem, but does not make clear connections between this information and the question to be investigated. Adequate variety of sources. Most information is factually correct.	Provides a thorough and relevant literature review. Excellent variety of sources. There are clear linkages among the information and to the question under consideration. All information is factually correct.
3) Analysis/Synthesis			
<i>Inadequate</i>	<i>Minimally developed</i>	<i>Moderately developed</i>	<i>Substantially developed</i>
Vague discussion of detail. Lack of insight/analysis	Vague discussion of detail. Little insight/analysis; that which is provided is conventional or underdeveloped.	Adequate discussion of detail Adequate depth of insight/analysis	Excellent discussion of detail. Impressive depth of insight/analysis
4) Draws sound inferences from previous research that lead clearly to the hypothesis/research question.			
<i>Inadequate</i>	<i>Minimally Developed</i>	<i>Moderately Developed</i>	<i>Substantially Developed</i>
Draws inferences which are not justified.	Draws reasonable conclusions from the previous research, but does not convincingly connect the hypothesis to the previous research.	Draws sound conclusions from the previous research and communicates a logical path from the data to the hypothesis.	Draws sound conclusions from the previous research and communicates a logical path from the data to the hypothesis.

5) Designs appropriate equipment and investigations to collect data			
<i>Inadequate</i>	<i>Minimally Developed</i>	<i>Moderately Developed</i>	<i>Substantially Developed</i>
<p>Research plan provided will not answer the question, does not control relevant variables, or uses other inappropriate methodology.</p> <p>Experiments are designed without sufficient care, so that the accuracy of the data is in doubt.</p> <p>Serious safety/ethical issues are ignored.</p> <p>Does not recognize the limits or implications of the method to be employed.</p>	<p>Study is designed with appropriate methodology and safety/ethical measures, but the design contains some obvious and remediable flaws, e.g.,</p> <p>Quantity of data collected is insufficient for statistical significance, or there is no check for interrater reliability of coding.</p>	<p>Designs controlled investigation using equipment to the experiment and using appropriate safety /ethical measures. Identifies relevant constraints.</p> <p>Data collection is planned carefully and with appropriate precision and adequate statistical power. Any flaws are relatively minor/excusable due to practical constraints.</p> <p>Consideration of the consequences and limits of the method to be employed are incomplete.</p>	<p>Designs controlled investigation using equipment appropriate to the study and using appropriate safety /ethical measures. Identifies relevant constraints.</p> <p>Data is collected carefully and with appropriate precision and adequate statistical power. Flaws are not readily apparent.</p> <p>Plans pilot work or other methods to refine the study. .</p> <p>Considers possible criticisms of the experimental plan and addresses them.</p>
6) Analyzes data in an appropriate manner			
<i>Inadequate</i>	<i>Minimally Developed</i>	<i>Moderately Developed</i>	<i>Substantially Developed</i>
<p>Analysis of data is incomplete/inappropriate.</p> <p>Does not identify assumptions made in the analysis, or alternative interpretations.</p>	<p>Analysis of data is incomplete/inappropriate. A minimal effort is made to link between analyses and the research question/design.</p> <p>Does not identify assumptions or consider alternative interpretations</p>	<p>Analyzes data via graphs, statistics, and curve fitting as appropriate. Linkage between analyses and the research question/design is underdeveloped.</p> <p>Does not identify assumptions or consider alternative interpretations.</p>	<p>Analyzes data via graphs, statistics, and curve fitting as appropriate.</p> <p>Identifies assumptions. Considers alternative interpretations of the data and , if possible, carries out additional experiments/supplemental analyses that will allow distinction between these interpretations.</p>

7) Draws sound inferences and conclusions from data			
<i>Inadequate</i>	<i>Minimally Developed</i>	<i>Moderately Developed</i>	<i>Substantially Developed</i>
<p>Draws conclusions which are not justified.</p> <p>Does not demonstrate an appropriate understanding of the relationship between theory and experiment.</p> <p>Does not recognize the limits or implications of their conclusions.</p>	<p>Draws reasonable conclusions from the data, but does not convincingly connect the conclusions to the data.</p> <p>Does not demonstrate an appropriate understanding of the relationship between theory and experiment.</p> <p>Considers consequences of the conclusions but only in a narrow regime.</p>	<p>Draws sound conclusions from the data and communicates a logical path from the data to the conclusion.</p> <p>Demonstrates understanding of the relationship between experiment and theory.</p> <p>Consideration of the consequences and limits of the conclusions are incomplete.</p>	<p>Draws sound conclusions from the data and communicates a logical path from the data to the conclusion.</p> <p>Demonstrates understanding of the relationship between experiment and theory.</p> <p>Recognizes the limits of the conclusion and considers the consequences of the conclusions.</p> <p>Identifies how the assumptions may influence the conclusions.</p>
8) Reflects on own work to assure that conclusions are justified			
<i>Inadequate</i>	<i>Minimally Developed</i>	<i>Moderately Developed</i>	<i>Substantially Developed</i>
<p>Lacks an error analysis.</p> <p>Has not considered alternative approaches to the experiment or alternative conclusions.</p> <p>Has not considered possible criticisms of the methodology used.</p>	<p>Prepares an error analysis as appropriate.</p> <p>Has, otherwise, not considered possible criticisms of their work.</p>	<p>Prepares an error analysis as appropriate.</p> <p>Critiques the process of data gathering and analysis.</p>	<p>Prepares an error analysis as appropriate.</p> <p>Critiques the process of data gathering and analysis.</p> <p>Explains why alternative approaches to the experiment or alternative interpretations of the data were rejected.</p>
9) Suggests steps for further inquiry			
<i>Inadequate</i>	<i>Minimally Developed</i>	<i>Moderately Developed</i>	<i>Substantially Developed</i>
<p>Has not considered implications of the current work for future investigations.</p>	<p>Has proposed some logical steps for further investigation, but this is clearly incomplete.</p>	<p>Identifies questions remaining unanswered.</p> <p>Proposes next logical steps for continued inquiry into this system.</p>	<p>Identifies questions remaining unanswered.</p> <p>Proposes next logical steps for continued inquiry into this system.</p> <p>Identifies how the conclusions might apply to new or different situations.</p>

This rubric is based on the Washington State Critical Thinking Rubric, with modifications made by Cecilia Shore with the help of Beverley Taylor.