Rubric for research papers:
1000-1500 words
Structure:

1. A brief introduction
   a. Why should we care?
   b. What were you trying to do, and why?
2. Data/observations
3. A brief conclusion/discussion
4. References: Include at least five peer-reviewed journal article, cited within the text.

For your grade on the paper, you will receive a numeric score from 0 to 5 for each competency (each row in the matrix below). The things listed under Exemplary ("5"), or at least competent ("3") are what you're striving for, and what you should try to demonstrate with the assignment. The sum of these 8 scores will dictate your grade for the assignment. For an A, I expect you to be 'competent' in all of them, and exemplary in at least 3. Thus, for an A, you will need 30 points or better.

Competency	Exemplary 5	4	Competent 3	2	Does Not Meet 1	0
Introduction:						
Analysis: Clarity of Research Question	• Clearly identifies the research question and its inherent complexities • Clearly and accurately provides background information relative to the research question.		• Identifies a research question • Provides reasonable background information		• Does not clearly identify a research question or line of study • Background information is not provided, is irrelevant, or is insufficient	
Conclusion/Discussion:						
Synthesis: Conclusions	• Clearly addresses the research question(s). • Draws inferences that are highly consistent with the data and scientific reasoning • Identifies well-reasoned directions for future research. • Explicitly discusses limitations of the study.		• Addresses the research question(s). • Identifies conclusions based on observation. • Attempts to identify directions for future research • Defines limitations		• Conclusions do not address the research question(s). • Conclusions not evaluated for accuracy and precision. • Does not identify limitations.	
Evaluation: Relevance/ And the Social and Cultural nature of science	• Clearly articulates scientific and societal relevance of the study.		• Identifies a general relevance of the study.		• Does not identify the relevance of the study.	
Throughout the paper:						
Writing	• Level "A" quality of writing on *EMU UG Writing Rubric*		Level "C" quality of writing on *EMU UG Writing Rubric*		Level "F" quality of writing on *EMU UG Writing Rubric*	

Competency	Exemplary 5	4	Competent 3	2	Does Not Meet 1	0
Content Knowledge: Scientific understanding	· Reflects well-developed understanding of current scientific theory and concepts.		· Reflects understanding of current scientific theory and concepts.		· Reflects inaccuracies or large gaps in understanding of current scientific theory and concepts.	
The Empirical Nature of science: Scientific knowledge is based on and/or derived from observations of the natural world (data)	***Permeated with*** the concept that scientific knowledge is based on and/or derived from observations of the natural world. ***Example:*** - Empirical observations are presented and serve as the primary basis for any conclusions		***Expresses*** the understanding that scientific knowledge is based on observations of the natural world. ***Example:*** - Empirical observations are presented and support the conclusions		***Does not express*** the understanding that scientific knowledge is based on observations of the natural world. ***Examples:*** - Empirical observations not presented and/or may not support conclusions. - Conclusions may only recite prior theory or note experimental expectations based on that theory.	
The tentative nature of science: Scientific knowledge is subject to change with new observations and with the reinterpretations of existing observations.	***Clearly acknowledges*** the principle that scientific knowledge <u>is</u> subject to change. ***Examples:*** - Introduction and/or conclusions note gaps or misunderstandings in current scientific knowledge-base (e.g. "It is currently unknown whether…"); Notes that there are varied interpretations of data; Notes that there are controversies/alternative theories in science		***Acknowledges*** the principle that scientific knowledge <u>is</u> subject to change.		***Expresses the naïve view*** that scientific knowledge <u>is not</u> subject to change. ***Examples:*** - Fails to acknowledge gaps or misunderstandings, varied interpretations , or controversies - States the purpose of research as confirming rigid theory or reproducing prior findings ***- Uses naïve language*** by stating non-tentative conclusions: e.g. "***prove***"	
The Inferential Nature of science: Scientific knowledge is based on both observation and inference.	***Inferences are made appropriately and well-justified:*** Conclusions are formed after the evidence is critically evaluated in relation to, <u>and</u> synthesized with - accepted theory(ies), AND - published data		***Inferences are made appropriately but not well-justified:*** Conclusions are formed after the evidence is evaluated relative to - accepted theory, OR - published data		***Inferences are not made, are not made appropriately, or are not justified:*** Evidence is not evaluated in relation to prior theory, NOR synthesized with other evidence.	