

**Historical Geology
Fieldtrip “Lab” Part I
50 points**

Name: _____

Why we are doing this: A major part of scientific literacy involves understanding the Nature of Science—how science is done, and how it is a human endeavor to understand the natural world. Scientists do not work in a vacuum—they are part of a discourse or interpretive community of meaning-makers and knowledge builders. The other major reason we are doing this is to make you more familiar with our field trip sites, and thus make for a more meaningful trip. During this and the rest of the field trip lab and field trip, we will be enacting many of the activities of the scientific community such as research, writing, working with peers, and building knowledge as a community.

What to do before lab:

Read The Story Behind the Science article, “Characteristics of Science: Understanding Scientists and their Work”:

- 1) Print out the article and underline or highlight important points and make notes in the margins, focusing on characteristics of science that surprise you and that you think are particularly related to Historical Geology. Bring this to lab on _____. (5 points)
- 2) Type or NEATLY print answers to the two discussion questions at the end of the article (page 5). You should spend at least 10 minutes writing about each one. The point is to get you to reflect, deepen your thinking, and find connections. Turn these in at the beginning of lab on _____. (15 points)
- 3) Take the Characteristics of Science extra credit quiz on Canvas (Optional, but why wouldn't you??). (possible 10 points extra credit)

Choose a scientific journal article related to one of our field trip sites that you want to focus on:

- 4) The article should be at least 5 pages long, not including references, and be published after 1950. It can be about Big Bone Lick or the Cincinnati Series. I have included potential articles on Canvas under Week 7. Each student needs a different article, so post your choice in the Discussion, also under week 7, with the title in the subject of your thread. Check these before making your selection. The paper can be about:
 - a. The geology, paleontology, archeology, anthropology, or history of science of Big Bone Lick State Park in Kentucky.
 - b. The stratigraphy, paleontology, or history of one of these sciences of the Cincinnati Series of Ordovician Strata exposed in the tri-state area around Cincinnati, OH.
- 5) Print out or make a copy of this article and underline or highlight and make notes in the margins, focusing on concepts that you think are particularly related to Historical Geology and the nature of science. Bring this to lab on _____. (10 points)

What to do during lab:

Get in a group of 3 or 4 (no more and no fewer):

- 1) Choose two historical figures from our discussions of the history of Historical Geology and describe their work below in terms of how it can be related to the characteristics of science you learned about in the SBTS article. Record your key connections below. Your group will be asked to share these connections with the rest of the class. If you don't have room, write on a separate sheet of paper! (5 points)

- 2) Skim through your paper and record (below) connections you can make with the characteristics of science. If you don't have room, write on a separate sheet of paper! (5 points)

3) Discuss the connections you have made with the rest of your group and record their suggestions for deeper or different connections here (each person should give you at least one suggestion/comment). Write the name of the student next to their suggestion for you. (10 points)

4) Go back and circle the two characteristics of science (exemplified by the article you chose) that you would like to focus on in your field trip paper.

GEOL 162
Field Trip Lab Part 2 (50 points)
Polished Draft of Paper
Due _____

What to do before lab: Using your chosen article, write a synthesis (bringing together parts into a cohesive whole) integrating a summary/synopsis of the article's main arguments and methods, how the article fits in with what you have been learning in GEOL 162 lab and lecture, and analysis of the characteristics of science as a way of knowing that are exemplified and/or masked in the article. Your audience is your fellow classmates (and me). Explain/define any unfamiliar terms so that your peers can understand. Throughout this synthesis, I encourage you to explore the implications of the characteristics of science for your own continued study of geology, and/or life after college. The draft should be typed, 5-10 pages (1500-2500 words) double-spaced, 12-pt Times New Roman font, and include proper MLA citations (Works Cited and parenthetical/in-text). Print a copy and bring it to class. **(35 points)**

Examples of citations:

Works Cited

Author(s). "Title of Article." *Title of Journal* Volume.Issue (Year): pages. Medium of publication. If an online article, Web. *Database*. Date of access.

Wright, Carrie. "Spectroscopic Study of Fluorite from New Mexico." *Mineralogy* 43.5 (2003): 253-277. Web. *JSTOR*. 23 February 2013.

Example of in-text citation: (Wright 263), last name and page number.

<https://owl.english.purdue.edu/owl/resource/747/01/> for more information on MLA citation style.

Your draft should be polished, meaning you should read it through (aloud, if possible), and try to fix basic errors that might interfere with your meaning before lab. The required length of this paper is meant to give you room to explain your meaning. Don't just state something and run away from it—substantiate your assertions/claims/ideas with evidence from the articles, from class, from your life as a science student.

What we will do in lab:

1. Some sort of peer review, I haven't quite settled on this yet. You'll get into pairs, or groups of three, and read each others' papers, or each student will read her/his paper aloud, and the others will give constructive feedback related to the structure, clarity, and meaning of the overall paper and individual sections of the paper (suggestions for deep, global revision rather

than surface revision of grammatical errors—unless a specific request is made for this by the author). **10 points**

2. Figure out stuff related to the field presentations you will all make during our field trip. **5 points**

The final draft of your paper is due _____. along with your annotated scientific article. The final version of your paper should show evidence of improvement (and of taking into account feedback on your first draft). **50 points**

Requirements for your draft:

1500-2500 words/5-7 pages: 5

Written for appropriate audience (classmates): 5

Contains a clear structure: 5

Clarity of meaning: 5

Synthesis of the following into a cohesive argument/thesis/point/meaning:

--Summary of article (concise, correct, unfamiliar terms are described/defined): 5

--Connections between the article and the knowledge gained in class: 5

--Characteristics of science revealed in (and concealed by) the scientific article: 5

Proper MLA citations (Works Cited and In-text/parenthetical): If you don't do this, you won't get any points, because not citing your sources constitutes plagiarism, and we are not writing in the medieval period of history when such shenanigans were okay.

4. Which Characteristics of science are exemplified by this student's article? Does the student present sufficient evidence to support each connection? Which other characteristics of science might the student consider discussing, if any?

5. Length (5-7 pages, not including Works Cited): If your peer's paper is too short, suggest where they might expand or give more detail. If it is longer than this, suggest how they might condense, or cut.

6. Written for appropriate audience (classmates): Does the paper contain any unfamiliar terminology? If so, is it clearly explained so that you can understand it? If not, which words would you suggest the author consider explaining more fully?

7. Clear structure of the overall paper: These do not have to be the stereotypical 5-paragraph essays of high school English classes, but they do need to have distinct introductions, bodies, and conclusions. Can you follow the paper? Do you feel that it is supporting a clear argument/claim/assertion?

8. Clear structure of each paragraph: To make meaning clear, each paragraph should have a clear topic sentence/claim in support of the overall thesis of the paper, along with evidence to support that claim, and an explication of the evidence (why it supports the claim). Please indicate specific page #s/ paragraphs that have a good structure (and why) and/or those that could use improvement.

9. Proper MLA citations (Works Cited and In-text/parenthetical)? Do you think they need more or fewer in-text citations?

10. What interested you most about this paper?

11. Any additional constructive criticism should be written here:

Scientific Reasoning in Writing—the Argumentation Process

Purpose: To improve your scientific reasoning in your writing, and to encourage you to improve/deepen your analysis of the connections between your chosen article and characteristics of science in your field trip paper.

How can you emulate scientific reasoning (academic reasoning, really—it works in all academic disciplines) in your writing? How can you persuade others in the scientific (or any academic) community? A good scientific argument tends to contain four essential elements: a claim, data, a warrant, and backing.

These four essential elements are as follows: claim (what you propose), data (information gathered that supports the claim), warrant (link between the data and the claim), backing (basic assumptions agreed upon within the question).

In scientific articles related to well-established theories like Plate Tectonics and Evolution, the backing may be left out because it is understood that the majority of the scientific community has the same basic assumptions.

Sometimes scientific and other arguments also contain these two elements, a rebuttal (challenge to your claim which you must defend with evidence or an example that supports your claim), and a qualifier (a statement of the conditions which the claim is true).

Example: Argumentation involving Plate Tectonics.

1. Claim-South America and Africa were once a united landmass
2. Data-evidence of identical fossils and rock types found on matching coastlines
3. Warrant-identical fossilized organisms are almost always of similar geologic age
4. Backing-organic evolution, fossil preservation, formation of sedimentary strata
5. Rebuttal-land bridges and shallow seas existed between these continents that may have not moved in relation to each other (counter this with evidence that supports your claim)
6. Qualifier-refinement of original claim, a variation of the possible speeds of continental separation over geologic time

Example: Argumentation involving a scientific article and a characteristic of science.

1. Claim-The article exemplifies collaboration, a characteristic of science

2. Data-The authors of the article worked together on the science, they cite many sources of previous work, and describe selections of that work in their introduction; the article was published in a peer-reviewed journal.
3. Warrant-The authors of the article I am analyzing collaborated directly with each other to do their research and write the article, and they worked indirectly with previous researchers' work as a framework or stepping-off-point for their own research. Peers within the discipline of geology/paleontology/stratigraphy reviewed this article and the research therein before agreeing to publish it.
4. Backing- Published science is peer-reviewed in order to limit biases. Science is done on the foundation built by previous science, and cannot be done completely in isolation if it is to be communicated to the rest of the scientific community, or accepted. Few scientists would read their article if they ignored previous work, or if they failed to cite important previous work.

Choose a claim you made in your field trip paper about a connection between your chosen article and a characteristic of science (OTHER than collaboration) and state that claim, the data from your chosen article, the warrant, and the backing.

1. Claim-
2. Data-
3. Warrant-
4. Backing-

Reflection Questions

1. Were you able to find each of these elements in your draft of your paper? If so, which ones?
2. Do any of the first four elements of the argumentation process confuse you? If so, which ones?
3. Briefly describe any of the student peer or teacher feedback on your paper draft that were particularly helpful.
4. Briefly describe any of the student peer or teacher feedback on your paper draft that were confusing or unhelpful.

5. In the remaining space, write a global/deep revision plan for the final draft of your paper, taking into consideration the most helpful feedback from your peers and/or your teacher, and this argumentation exercise.

Requirements for your final draft:

Evidence of global/deep revision: 5

1500-2500 words/5-7 pages: 5

Written for appropriate audience (classmates): 5

Contains a clear structure (introduction, body, conclusions): 5

Contains a clear thesis statement/argument (Main purpose of your chosen article and the characteristics of science you will examine/analyze in your paper): 5

Clarity of meaning (I suggest reading the paper out loud to make sure sentences make sense): 5

Synthesis/integration of the following:

--Summary of article (concise, correct, unfamiliar terms are described/defined): 5

--Connections between the article and the knowledge gained in class: 5

--Characteristics of science revealed in (and concealed by) the scientific article: 10

Proper MLA citations (Works Cited and In-text/parenthetical): If you don't do this, you won't get any points, because not citing your sources constitutes plagiarism, and we are not writing in the medieval period of history when such shenanigans were okay.