

UNIV 103 Scientific Revolutions

Group Paper and Presentation

Rationale:

The primary reason I teach this course is so that students gain a better understanding of what exactly science is, so that they can make more informed decisions about many of the issues confronting society. Throughout the course of the semester, we have (and will) use scientific revolutions to better understand the scientific process. The end of the semester is devoted to applying that knowledge to today's societal issues. The topics chosen this year include Global Warming, Energy Resources, Vaccines, and Food Production.

Each of these issues has a distinctive science component as well as a distinctive ethical or moral component. For example, one of the hot button issues in the Commonwealth of PA right now is the drilling of the Marcellus Shale. The following questions are all scientific questions about the Marcellus Shale:

- what is the Marcellus Shale,
- why does the Marcellus shale contain natural gas,
- how much natural gas is within the Marcellus shale, where can we find the Marcellus Shale,
- how do we drill the Marcellus,
- what are the environmental costs of drilling such as water consumption and usage,
- how are aquatic organisms affected by drilling,
- how is forest biodiversity affected by forest clear cutting.

These questions are distinctly different from the ethical and moral questions associated with drilling such as:

- does the economic growth associated with drilling outweigh the environmental costs,
- who should be responsible for environmental clean-up,
- should the Commonwealth lease their lands,
- do landowners have the right to lease their mineral rights if neighbors do not,
- is continued drilling the right way to achieve energy independence?

Science provides the foundation for the moral/ethical debate on the issue. After all, how can you weigh economic versus environmental costs if you don't understand what those environmental costs might be? However, the science is independent of the moral questions. The science provides a status report for the natural system. The science may and should provide some type of prediction for the future. However, while two different scientists may draw the same conclusions about the environmental impact on aquatic organisms, they might very well have two very different responses as to whether drilling should proceed or not.

Your job in this group project is to divide your issue. Half of the group will provide a status report of the science. In essence, the science group will provide the necessary scientific background so that one can make an informed decision. The other half of the group will frame the moral or ethical debate within today's society. In essence, this group will provide the necessary background to debate the pros and cons of a particular ethical question.

What you must Submit:

Presentation: The science group will make a coherent 20 minute presentation on the background science. The ethic group will then make two 10 minute presentations: one presentation will frame the pro side and the second

presentation will frame the con. The remaining class time (approx. 30 minutes) will be a class debate about the issue ending with either an up or down vote on the issue or a consensus decision.

Paper: In addition to the group presentation, each member of the group will write their own 6-8 page appropriately researched and referenced paper on their particular subset of the topic. Each submitted paper will be different.

As a group in Class:

Step 1: Identify potential questions you will answer. Brainstorm a list of questions. They need not be in any particular order. They need not be immediately defined as good or bad. There should be at least 10 scientific questions and 10 ethical questions.

Step 2: Identify which group members will focus on science and which group members will focus on the ethical issues. The teams should be evenly divided.

Step 3: Identify a common theme among your questions and define your debate question. Ideally, many of your questions will focus on the same set of problems or ideas. Do many of the questions focus on the environment? Do many questions focus on the economy? Do they focus on health effects? After you look at the common themes identify what your final debate will be about. Using the Marcellus example described above, the debate question might be does the energy independence associated with hydrofracking the Marcellus Shale outweigh the environmental costs?

Individually and As a group Outside of Class:

Step 4: Refine questions. Once you've decided on your debate question, individually review your list of questions again. Remove any questions that you think do not relate to your chosen theme. Now that you have identified your theme, you may want to write a few more questions relevant to the topic.

Step 5: Come back together as a group and meet outside of class. Review and pool your questions and identify 4-8 questions from each group that provide all of the necessary background information for an informed debate. **Each person should choose 1-2 questions for which they are responsible.** The defined science questions should provide enough information to inform debate. Once again, using the Marcellus as an example, the science questions should focus on the amount of natural gas within the Marcellus Shale and the environmental impacts associated with drilling. The pro drilling side should focus on questions about how long the natural gas would last, where the natural gas would be used, the costs of drilling, and economic benefits. The con drilling questions should focus on the environmental costs associated with drilling both locally and regionally as well as any potential economic downsides for the community. In all of the topics chosen you will want to consider long term and short term effects.

Step 6: As a group fill out the proposal form below.

Due Dates:

10/23	At the End of Class – List of Questions and Identified Theme and Debate Question
10/25	At the Beginning of Class - Project Proposal Due
11/3	List of 15 potential references with a short description of each and how it relates to your topic.
11/29	Rough Draft of Paper
12/1-12/8	Presentation
12/16	Final Paper Due

UNIV 103 Scientific Revolutions

Group Project/Debate

Topic:

Debate Question:

Scientific Background Required for Informed Debate:

<i>Person In Charge</i>	<i>Scientific Questions</i>

Societal/Ethical Background Required for Informed Debate:

<i>Person In Charge</i>	<i>Societal/Ethical Questions</i>

