

Conduct Unbecoming

A Science Ethics Activity Using the Socratic Seminar Method

Summer Draft

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Learning Objectives: Students should be able to

- ❖ Describe the ethical practices and guidelines in which science operates.
- ❖ Explain how ethical considerations shape scientific endeavors.
- ❖ Participate in an informed discussion during which they evaluate options and make decisions.

Teacher Background

Do a google search on scientific fraud Schoen to familiarize yourself with the incident that occurred at Bell Labs. If you have not used the Socratic Seminar method for class discussion, you will find wonderful help at these websites:

- <http://curriculumfutures.org/instruction/a06-07.html> This site provides a thorough background on how to conduct the seminar, a description of the teacher's role, observation forms, a seminar rubric, and assessment discussion.
- <http://www.middleweb.com/Socratic.html> This site helps the teacher to develop a clearer picture of her role as facilitator and participant in a Socratic seminar.

Instructions to the Teacher

The day before the activity:

1. Hand out copies of the six-page article entitled "Big Trouble in the World of Big Physics" obtained from the website:
<http://www.salon.com/tech/feature/2002/09/16/physics/print.html>
2. Assign, as homework, the students to both read the article and reflect on the "Things to Ponder" items. Encourage them to use a highlighter and to write margin notes.
3. Explain the format of the Socratic Seminar.

The day of the seminar:

1. Review the important "rules of conduct" for the seminar.
2. Initiate the seminar with a question such as, "To what extent do you agree with the action to with the dismissal of Shoen from Bell Labs and the stripping of his doctoral degree – totally, mostly, some, not at all?" and record their votes.
3. To support their votes, the students will now cite evidence from the text and engage in a structured discourse that allows them to disagree with one another's reasoning, pose questions to one another, draw comparisons to their own experiences with fraud or deception, and perhaps change their minds based on their classmates' ideas.

Extensions

1. Have the students research the case of cold fusion. In what ways is this case the same as or different from the Schoen case?
2. What are the molecular structures of tetracene, pentacene, anthracene, and the buckyball (buckminsterfullerene), the organic structures investigated by Schoen?

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Student Handout

In preparation for your participation in tomorrow's Socratic Seminar, read the accompanying article entitled "Big Trouble in the World of Big Physics" with these things to ponder in mind:

1. What terms are unfamiliar to you? Highlight them as you read. How seriously do the unfamiliar terms impede your understanding of the article?
2. What do you think the components of the "scientific honor code" are?
3. What methods for preventing fraud are practiced in universities and companies? Which of these practices failed at Bell Labs during Schoen's employment?
4. How do these kinds of incidents damage the scientific community?
5. Is there any upside to this scandal?

Note: The article was written in 2002. You will notice that an additional article written in 2004 has been added to your packet. This one-page article updates the actions taken against Schoen by his university.