

CASE TEACHING NOTES

for

“The Evolution of Creationism: Critically Appraising Intelligent Design”

by

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INTRODUCTION / BACKGROUND

This case was written for freshman biology majors at a Christian liberal arts college. Over the past few years, I have observed increasing numbers of students coming to the biology major at the college where I teach with the idea that Intelligent Design (ID) is the “solution” to reconciling perceived difficulties between science and their (rather conservative) Christian faith. This group of students almost always also includes a few young-earth creationists, but I have found that it is not difficult to easily and expeditiously handle their questions about humans living at the same time as dinosaurs or Noah’s flood forming the Grand Canyon since these things are not even remotely close to being consistent with our observations of the world around us. However, because the Intelligent Design arguments are more theoretical and philosophical, I found that addressing students’ questions concerning it was taking too much time away from teaching evolutionary biology. Thus, this case study was born. An optional assignment analyzing the “irreducible complexity” of bacterial flagella has been added so that more advanced biology courses can also make use of this case, reminding students of the nature of science and giving them practice evaluating popular claims about the field of evolutionary biology.

In light of recent developments in school districts and state education boards across the country, this case would also be very useful for education majors. Any education student who is aiming to teach middle school or high school science should be aware of the Intelligent Design movement and the strong, nearly unanimous scientific objections to including these ideas in science curricula.

A few comments about audiences for whom this case would be inappropriate. Students must have an understanding of the methods, philosophical boundaries, and history of science in general and evolutionary biology in particular in order to benefit from this case study. Thus, this case is not appropriate for high school audiences. High school students will almost certainly be confused into accepting a “scientific” status for the religious ID viewpoint if ID is presented as part of the science curriculum. The case is especially inappropriate in a public high school science class, where it would be impossible to remain religiously neutral about the subject since ID is a religious principle and the educator will either support that sectarian viewpoint (by teaching that ID is valid) or oppose this particular sectarian viewpoint (by teaching the case as it is written).

Even in a college biology classroom, this case has the potential to do more harm than good. The risks may be reduced by scheduling the case for late in the semester, after students have learned about the methods of science and about the multiplicities of evidence supporting evolutionary biology, and after they have (hopefully) experienced the process of scientific discovery for themselves in well-designed investigative laboratory exercises.

Objectives

By working through this case study students will:

- Investigate and report the claims and criticisms of Intelligent Design.
- Read about the actions of ID proponents as they work for inclusion of ID in high school science curricula.
- Review the nature and limits of science.
- Describe the importance of evolution in the field of biology.
- (Advanced option) Critically evaluate one specific ID claim: that the irreducible complexity of the bacterial flagellum suggests that it cannot be the product of evolution.

CLASSROOM MANAGEMENT

The case is set up as a problem-based learning exercise. Students receive information, define what they need to learn to answer questions, go away from the classroom to gather information, and come back to report their findings and receive another set of questions. The case is designed to be completed in small groups.

Day 1

At the end of a class meeting, distribute Part I of the case and review the questions and the assignment for the next meeting, taking 10 minutes or so to do this.

Day 2

Note: This should not be the next calendar day. Students will need time to research and consider the answers to the assigned questions. I have assigned this on a Thursday and reconvened the class on this topic the following Tuesday, which gave the students a weekend to work on their answers and meet with their groups if they so chose.

Student groups report their answers to Part I. This should take about 20 minutes.

Question 2 is quite important. Spend some time dealing with the “fairness” issue—would “fairness” require us to teach in a history course that some believe the Holocaust never happened? When should ideas that are out of line with their discipline be included in a curriculum?

Distribute Part II to the groups. If the instructor has limited the discussion of Part I to about half the meeting time, students may be able to complete their answers to Principal Skinner’s questions. If the discussion has taken more time, the questions in Part II may be assigned as homework.

Day 3

Spend 20 minutes discussing Nicole’s answers to Principal Skinner’s questions. The first questions about evolution as a “theory” and a definition of science should be straightforward. The most important issue to discuss in Part II is why evolution is so important to biology.

Distribute Part III to the students. This part of the case is an assessment of individual learning. Each student should independently write a formal policy statement for the school district on Intelligent Design, supported by good arguments. I suggest three to five pages for the length of this assignment. Some students will write far more than this.

Advanced Biology Option

If advanced students are assigned Part IV, they will need a few days to read and evaluate the material. I place the chapter by Michael Behe on reserve at the library so all students can easily access the material. Students

give a 10-minute PowerPoint presentation on the argument. One could use part of a laboratory period when there is an incubation for an hour or two for the student presentations. Next time I teach the case I plan on inviting back students from the freshman biology class that previously completed Parts I–III to hear the advanced discussion of Part IV.

BLOCKS OF ANALYSIS

The Intelligent Design Movement

The ID movement centers around the idea that some biological structures are too complex to have evolved by the processes of variation and natural selection. These complex structures are best explained by the action (design) of an intelligent agent. The intelligent agent may be God, or may be something else; ID does not define the identity of the agent. However, ID does propose that there can be empirical evidence supporting design over evolution. William Dembski in particular has put forward mathematical arguments describing a process for detecting design.

A related philosophical idea that follows from the action of an intelligent agent is that limiting science to naturalistic explanations is inappropriate. Many ID writers propose extending the definition of science to include super-natural explanations; once again, not necessarily God, but explanations that include agents other than forces, events, and processes within the natural world.

The Seattle-based Discovery Institute's Center for Science and Culture supports the majority of important writers in the ID movement. A few years ago an internal memo from the CSC was posted to the Internet. A copy can be found at: <http://www.antievolution.org/features/wedge.html>. The memo appears to date from the late 1990s. In this document the CSC described short-term (5-year) goals, which include:

- Solid scholarship into ID, including peer-reviewed publication of scientific papers.
- Popular communication of ideas through books, seminars, TV programs, and teacher education materials.
- Curriculum changes at the state level, correcting imbalance in treatment of evolution vs. ID.
- Convincing mainline Protestant denominations to embrace ID instead of accepting evolution (“Darwinism”).

Long-term, the CSC goal has been to see supporters of ID gain faculty appointments at major research universities in the United States, with the eventual acceptance of ID as a better description of the history of life than evolution.

Is ID the Same as Creation Science?

In essence, yes. ID is mostly promoted by Protestant Christians, and the movement is such a large umbrella that young-earth creationists are welcome to contribute to the effort. As a movement ID has not found a coherent way to engage scientific observations if young-earth creationists and folks who accept an ancient earth with a long history of speciation and extinction events work side by side; both histories cannot be true. Importantly, ID uses the same simplistic dualism as creation science—if natural selection is insufficient to explain something, then evolution is defunct and the intelligent agent (God, for creation science) is the cause. Many of the common arguments used by ID proponents have been used by the creation science movement for many years.

To conservative Christians, however, ID differs significantly from the creation science movement that was especially active in the 1970s and 1980s. While creation science began with the book of Genesis from the Jewish/Christian scripture and tried to bend science to fit a strictly literal interpretation of those passages, ID

makes no overt use of scripture and in fact many proponents of the ID movement accept some of the current scientific description of the history of life on earth. These different uses of scripture are important and divisive to some Christians, a point that is useful to note when interacting with students on this issue.

The scientific community has wholeheartedly rejected the idea of including ID in school curricula. The National Academy of Science (NAS), the American Association for the Advancement of Science (AAAS), and a host of other scientific societies are on the record as opposed to ID. Further analysis along with some of the criticisms of ID are discussed in the Answer Key below.

ANSWER KEY

Answers to the questions posed in the case study are provided in a separate answer key to the case. Those answers are password-protected. To access the answers for this case, go to [the key](#). You will be prompted for a username and password. If you have not yet registered with us, you can see whether you are eligible for an account by reviewing our [password policy](#) and then [apply online](#) or write to answerkey@sciencecases.org.

FURTHER RESOURCES

Books

- Alters, Brian J. and Sandra M. Alters. 2001. *Defending Evolution: A Guide to the Creation / Evolution Controversy*. Sudbury, MA: Jones and Bartlett.
- Behe, Michael. 1996. *Darwin's Black Box*. New York: Touchstone.
- Dembski, William. 1999. *Intelligent Design*. Downers Grove, IL: Intervarsity Press.
- Futuyma, Douglas J. 2005. *Evolution*. Sunderland, MA: Sinauer Associates.
- Miller, Kenneth. 1999. *Finding Darwin's God*. New York: Harper-Collins.
- Pennock, Robert T., ed. 2001. *Intelligent Design Creationism and Its Critics*. Cambridge, MA: The MIT Press.
- Scott, Eugenie. 2004. *Evolution vs. Creationism*. Westport, CT: Greenwood Press.
- Wright, Richard T. 2003. *Biology: Through the Eyes of Faith*. San Francisco: HarperCollins.

Articles

- Brumfiel, Geoff. April 28, 2005. "Intelligent Design: Who Has Designs on Your Students' Minds?" *Nature* 434:1062–65. *Note*: Letters to the editor of *Nature* were published in the May 19, 2005 issue.
- Orr, H. Allen. May 30, 2005. "Why Intelligent Design Isn't." *The New Yorker*.
http://www.newyorker.com/printables/fact/050530fa_fact

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