Improving Science in Classical Christian Schools

by Lory Hundt

"We're not alone!" This sounds like a line from a science fiction movie, but it has current application to the state of science education in our classical Christian schools. It is no surprise to hear from many administrators that we need to improve our science courses in the classical Christian schools, as this is the case across our country, in both public and private schools. We are not unique in that sense. What is unique is how we answer the question, "How do we improve science in our classical Christian schools?" The answer is simple: we teach classically and "Christianly." But what does that look like?

Once you put words down on paper, you open yourself up for criticism, like Pandora's box that unleashed sickness, trials, and finally hope. Opening this can of worms is potentially volatile. I'm willing to open up on the topic of teaching science if that helps to stimulate discussion.

Though simple, the answer is not easy since science as a particular subject has been placed on a worldwide pedestal. Our challenge is to live up to the preconceived ideas of just what science is and then determine what it should look like. As classical Christian teachers, we have to teach all subjects with classical pedagogy under the authority of Christ.

Although most Christian schools claim to teach all subjects under the authority of Christ, many schools, perhaps under pressure from parents or professionals, adopt the view that science can only be good if taught like the government schools. After all, the Bible and other courses will cover the Christian worldview. I remain amazed at the number of science teachers that still separate, in their minds and practice, science from the rest of the liberal arts. I would posit that the government schools have been the ones to dummy down the sciences by teaching a reductionist viewpoint.

In teaching science classically we need also to remember that science is part of the liberal arts, to be taught as such and not treated as the unwanted "step-child."

I am not suggesting that we totally divorce ourselves from current modern science education as we do have some goals in common. We do not have to reinvent the wheel, but we certainly need to realign it.

Let me address three points for the reformation of science instruction. We need to be more classical in our methods and have less of a "current science" orientation. We need to be more Christian in our study of science, rather than secular. And we need to be responsible to make it happen in our science classrooms.

The National Research Council (NRC) in their National Science Education Standards (1996) began with the statement, "This nation has established as a goal that all students should achieve scientific literacy." For the NRC that literacy revolves around two key elements: that students develop the abilities necessary to do scientific inquiry and that they develop understandings about scientific inquiry. Those are good, but not good enough. With classical education we know it is more than acquiring a set of technical skills.

We must consider carefully our curriculum and our sources, which ought to be distinct. When looking at some classical Christian schools' curriculum for science, I've found that the objectives for the course followed the table of contents straight from a science textbook—verbatim. We need to recognize that we should not be slaves to a textbook and the textbook writer's agenda. Textbooks are tools.

The comprehensiveness of textbooks is an illusion that can never be accomplished. The book *America's Lab Report: Investigations in High School Science*[1] points out, "In the ongoing debate about the coverage of science content, the American Association for the Advancement of Science (AAAS) took the position that curricula must be changed to reduce the sheer amount of material covered." This is a statement similar to what we hear in classical pedagogy, "teach less, but deeper."

The New Atlantis: A Journal of Technology and Society[2] (Spring 2005) published an article entitled "Science Education and Liberal Education" by Matthew B. Crawford. He points out that when it comes to textbooks "from a publisher's perspective, the important thing is that every conceivable topic be mentioned." This is a good selling point for the

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publisher. He also stated, "The Third International Mathematics and Science Study found that the average U.S. middle school textbook covers 50 to 65 topics, while texts in Japan include only five to 15 topics and German textbooks cover an average of seven topics. The superficial treatment of dozens of topics comes at the expense of students' conceptual understanding." We're the country that thinks more is better. Take time to consider fewer topics.

Our pedagogy for teaching classically should differ from the current science practices of simply a "transmission of information" to students. Where the secondary goal for the government schools is to prepare a future scientific and technical workforce, we should work to develop students who can think, reason, and articulate well. This requires student engagement in a variety of ways. I don't mean in the sense that we employ salesmen-type tactics, as Crawford puts it, "assimilating science to their untutored priorities," but that we engage students either through Socratic dialogue or through the old Hebrew method—of which the headmaster of the school where I teach has been training our faculty and has termed this the "parabolic method." This means engaging in conversation where the students start with concrete ideas, carry the ideas into more abstract concepts, then bring it back to concrete, practical application. Students ask questions and help to answer their own questions, which makes it clear that the students actually understand the material.

It is important that we continually incorporate logic in the science class. Our students must learn to recognize foolish reasoning, recognize the fallibility of common sense, discover hidden premises, and discern unsound conclusions. Darwinian subtleties are to be found everywhere! Students find the hunt for the subtleties a fun challenge.

In teaching science classically we need also to remember that science is part of the liberal arts, to be taught as such and not treated as the unwanted "step-child." We must be deliberate in our selection of and creation of our curriculum—not slaves to a textbook (you really need to read Michael Crawford's article). And we must engage our students in a way that they are able to apply logic and articulate their understanding of the material. We can not afford to be clones of the government school curriculum. I taught science for almost 20 years in the government schools; often times it led more to trivial pursuit, standardized test prep, or lab tech school than it did to lifelong learning and providing the tools for learning and understanding.

It is obvious that we need to teach Christianly, as this isn't in our name just to haul in the crowds; however, this may be deeper and richer than we realize. It's not about using a Christian textbook or throwing in a good scripture verse here and there just to make it different from government school. No, I would say that we are even to be distinguished from other Christian schools that rely strictly on Christian textbooks.

Of course, we should take the non-reductionist view of science and help students to recognize truth, beauty, and goodness in the particulars and the whole. There is something noble in scientific intellectual pursuit. It is not about being pragmatic, mastering nature, or determining functionality, but about the discovery of order and beauty and stewardship. There is intellectual gratification to be had, although this is not necessarily a universal motivation. As Crawford points out, some are not susceptible to such pleasures. Nevertheless, it should be pursued.

Although there are some scientists who would say that worldview should not influence science, we are Christians and therefore, worldview instruction must be integrated into the sciences. If science is nothing but unbiased, empirical facts that stand on their own, why are there so many arguments among scientists? It is because many scientists are aware of the unspoken inclusion of philosophy, but most don't admit it. However, Charles Darwin wrote, "I am quite conscious that my speculations run beyond the bounds of true science." With so many people believing in neo-Darwinism, materialism, rationalism, atheism, the list could go on, we cannot run and hide. We should be reading the secular writings of Poincaré, Darwin, Draper, Singer, Einstein, Kuhn, Hawking, Dawkins and many others. Students need to see, confront, and critique these thoughts. My school has implemented Philosophy of Science as the senior capstone course in the science track after biology, chemistry, and physics.

The University of Notre Dame has an excellent degree program which few schools have, although it is beginning to spread across the country, in the area of the History and Philosophy of Science (HPS). Worldwide research through the International History and Philosophy of Science Teachers Group based out of New South Wales (predominantly university level) has shown empirically over several decades that a greater

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understanding of science is gained when science is taught in context including the history and philosophy of the time period. This should be integrated into all science classes at every level including the grammar stage.

In teaching Christianly, we must point to goodness, truth, and beauty in the created order, determine what is good stewardship and totally immerse students in the epistemology, philosophy, history, and worldview of science.

As for practical application, there is one major dilemma that classical Christian teachers share. Do we adopt a "good" secular textbook and supplement it with worldview and continually point out presuppositions, or do we adopt a "weak" Christian textbook and supplement it with additional "science?" Your curriculum committee and headmaster should assist in that decision. Teachers who have a good mastery of their subject usually depart from the textbook anyway. (I'll say this again—you need to read Crawford's article in the *New Atlantis*.)

Active student participation in laboratory investigation is vital to any science program. Students need the experience in order to help them understand concepts. Connections will be made that might not otherwise with strictly textbook encounters. A laboratory is not necessary as long as they use cognitive and manipulative skills associated with the formulation of scientific explanations and theories.

Teachers can supplement curriculum with DVDs from the Discovery Channel Store (http://shopping.discovery.com), Answers in Genesis (http://www.answersingenesis.org/), The Teaching Company (http://www.teach12.com), and the Access Research Network (http://www.arn.org/). At the Access Research Network you will find an excellent resource, a DVD titled the "Darwin Bicentennial Celebration: A Retrospective Look at the Origin of Species" (formerly titled "The Rhetoric of Charles Darwin") by John Angus Campbell—an agnostic, but a leading authority on Darwin. Every Christian should watch this interview. Often, we watch DVDs during lunch in order to fit them into the curriculum.

Another practical method is taking students to debates and lectures in the area. One of my colleagues and I took the students to the Dawkins/Lennox debate (http://www.dawkinslennoxdebate.com) last year...only an 18-hour round trip. It was worth it to hear the students say, "We thought the best part of this trip was going to be the van ride, but it wasn't, it was the debate! That was amazing!" They recognized they had the ability to argue against Dawkins. We also attended a series of lectures on Pascal at The Christian Study Center of Gainesville which caters to students at the University of Florida.

In order to improve science in our classical Christian schools, we must recognize the need is real; recognize what it means to be classical with science which requires going above and beyond the "normal" scope of science; and teach Christianly, purposely experiencing the joy in the pursuit of understanding. We need to teach clearly and cogently the application of a Christian worldview as well as discerning the worldviews of others. We need to do all of this without letting up on the rigor of scientific pursuit. It's that simple.

Now that I'm finished with this article, I'm taking my class fishing for planaria. If I've given you hope, you may contact me at lory.hundt@bereanacademy.org. to answer any questions.You are not alone.

ENDNOTES

[1]National Research Council of the National Academies, *America's Lab Report: Investigations in High School Science*, ed. Susan Singer, Margaret Hilton, and Heidi Schweingruber (Washington, DC: National Academies Press, 2006).

[2] Matthew Crawford, "Science Education and Liberal Education," *The New Atlantis: A Journal of Technology and Soceity*, (Spring 2005), http://www.thenewatlantis.com/publications/science-education-and-liberal-education