

What Schaeffer Academy Is Doing in Upper School Science

by Philip Arant

The Need for Excellence in Science

A physics student in a classical and Christian school sits down to take a mechanics test. After completing the typical grammar

the regularities inherent in our physical environment. With a Christian and classical approach to education, we naturally provide our students with both the ideological and historical foundations to

must trump human testimonial. In this we guard against error pressed upon us by manipulative rhetoric. Have you ever been urged to try a certain remedy as a consequence of listening to several glowing reports? “After just two applications my rash was gone!” These testimonials may be true, yet we can test them against a close approximation to God’s testimonial of creation by utilizing inductive reasoning. Students need to understand what an adequate study looks like. They need to recognize good science.

*“Great are the works of the Lord;
they are studied by all who
delight in them.” Psalm 111:2*

questions of recalling certain terms and equations, and the typical logic questions of applying those equations in solving word problems, he then encounters the following rhetoric test question:

“You are seated in a gathering of somewhat sophisticated adults watching a World Series baseball game on TV. In response to a batter hitting the ball over the outfield fence for a home run, one of the people in the group wonders out loud how fast the ball must have been going right after the bat hit it in order to barely make it over the fence such a far distance away. Another person in the group, knowing that you are trained well in mechanics, turns to you and asks you to explain the physics involved in the baseball’s travel. Write a detailed response, clarifying all the factors involved.”

Not only must the student express exceptional understanding of the phenomenon in question, he must also now clearly, concisely, and persuasively communicate this understanding in terminology his audience can grasp. Learning is pushed towards fruition.

Science utilizes observation and measurement to uncover

science. Ideologically, we begin with understanding the creational basis of uniformity revealed in the Scriptures. No other foundation remotely justifies a science class. Historically, we realize that most of the recent and rapid advances in scientific discovery blossomed within the biblical context of Western culture—particularly in Europe. Individuals such as Copernicus, Galileo, Kepler, Newton, Faraday, and Maxwell all operated from an understanding of created order. Because an intention for creation was presupposed, uniformities could be anticipated.

Often with an emphasis on the humanities, many classical and Christian schools lightly esteem the equally potent value of science in their curriculum. The discipline of science carries a wonderful fit for the teacher to apply classical methodology as well as disclose the necessity of Christian truth. Students not only need to be taught formal deductive skills of proper rational reasoning in logic class, but also formal inductive skills of proper observational reasoning in science class. Because of the predictability inherent in created design, properly organized studies

Facility and Curriculum at Schaeffer Academy

The commitment to pursue excellence in science at Schaeffer Academy (in Rochester, Minnesota) has prompted many developments over the past several years. Both the school board and many parents have communicated expectations that the school should display a noticeable community footprint in scientific disciplines. Along with the challenges that these expectations bring, the school’s development director has worked to secure an exceptional level of donated resources to begin building a program capable of providing the facilities and the hands-on experiences so desirable for instruction.

Schaeffer Academy currently has a 7th through 12th grade enrollment of 144 students. We utilize two science labs: one a wet lab for 7th grade life science, 9th grade biology, and 10th grade chemistry; the other a dry lab for 8th grade physical/earth science, 11th grade Physics I, 12th grade Physics II and Advanced Placement (AP[®]) physics. Each lab has a floor space of about 1270 square feet and both utilize six lab stations,

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each seating four students to put our class maximum at 24.

Choice of science curricula has been a painstaking process at Schaeffer Academy. Though an overtly Christian textbook would be preferred, most of our upper school science courses do not utilize this avenue due to insufficiencies in meeting our academic criteria. As a result we depend upon the teacher as the primary resource for biblical integration. The student must merely be brought to the place of its constant recognition. I often make annotations in my lesson notes when a noteworthy convergence of divine handiwork should be recognized in class. Otherwise it is assumed to be the air we breathe. The teacher constantly gestures toward that assumption (Acts 17:28).

Within the various programs available on the market for high school curriculum augmentation, Schaeffer Academy has decided to utilize the AP[®] Program offered by the College Board. With one goal of providing AP[®] in at least physics and chemistry, we have been gradually upgrading our lab equipment and curricula to an introductory college level. Thus far we have begun using *Chemistry, 6th Edition* by Zumdahl & Zumdahl¹ for our chemistry textbook and *College Physics, 6th Edition* by Serway & Faughn² for our physics textbook. Both curricula have been found to be excellent resources and include nice multimedia offerings that provide students with many visuals to help understand the phenomenon of creation being studied. The textbooks are then used as an organizing entity for the teacher to “lean upon” in nurturing a love for learning in the students.

Because the AP[®] effort in

physics has already been launched, efforts have been made to provide students with the laboratory equipment necessary to construct more sophisticated hands-on inquiries that are required for our AP[®] status. We currently use hand-held computer dataloggers provided by PASCO Scientific that can print out graphs and accommodate sensors capable of measuring just about every imaginable physical phenomenon. In this way the student has the tools to venture out into discovery rather than only mimicking phenomena. A rather sophisticated lab portfolio can subsequently be produced.

Though the current goal to upgrade the chemistry labs to an AP[®] level will not be attempted for another two years, various add-on chemistry sensors that are compatible with the PASCO datalogger can be purchased at that time at a minimal cost.

There are currently no plans in place to augment our biology program to the AP[®] level because of the need to address the myriad of issues presented by the macro-evolutionary commitment of AP[®] level textbooks. We are currently using a Bob Jones curriculum and hope to expand the opportunities in biology further within the next few years. One opportunity we have offered that allows students to advance in their academic life-science applications is our participation in local research mentorship programs. Here a student is required to accomplish 60 hours of work alongside a medical technician and regularly present a log of work and the accomplishments.

Classical Methodology

At Schaeffer Academy we attempt to create a dialectic

dynamic in the classroom while utilizing the seven laws of learning in order to broaden the grammar, logic, and rhetoric capabilities of the students. The notes I have established for every daily lesson include as many thought-provoking questions as I can creatively produce. This is a reservoir I have—always searching how and when to deliver. I try never to launch into a new topic unless a student has answered some targeted question that would provide a springboard for that topic. This insistence helps create a healthy give-and-take dialectic, which lends wonderfully to the joy of learning. For example, in order to introduce Coulomb’s law of electrostatic force, I first ask the students about the nature of Newton’s law of gravitational force. The striking parallels of God’s designed order help create a familiar “launch pad” for understanding the new concept. If a student draws a blank, I solicit a little help from a friend and then come back to see if the initial blank now can give pursuit to thinking. No one can hide in my class. Everyone is required to think.

Another emphasis within our science effort is participation in Rochester’s regional science fair. Here the student is required to exercise good rhetorical skills before an audience in explaining their project. The spectators then are asked to question various features of the project to which the presenter must respond. Each year a handful of students have advanced to the state level for Minnesota. Enthusiasm increases due to the testimony of those who have succeeded.

The effort expended in growing our science program has benefited our students greatly at Schaeffer

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Academy. This is a “science-heavy” world we live in that has lost touch from an ideological justification for such. We want to give our students the tools and the backbone to influence our culture back toward the Biblical context from which it has so profited. I encourage more classical and Christian schools to investigate ways to commit resources for such an endeavor.

ENDNOTES

¹Steven Zumdahl & Susan Zumdahl, *Chemistry*, 6th ed. (Boston: Houghton Mifflin Co., 2003).

²Raymond Serway & Jerry Faughn, *College Physics*, 6th ed. (Thomas Learning, 2003).

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