

Pilgrim Christian School Science

Great are the works of the Lord, studied by all who delight in them. – Psalms 111:2, ESV

Philosophy Statement

July 8, 2015

The natural world was created by God in perfect balance and diversity. As such, it has purpose and value and reflects many of God's attributes, especially creativity, beauty, and orderliness. Science seeks to discover patterns and purposes present in the created world. Ideally, studying science results in appreciating and valuing God's creation. It prompts gratitude to and worship of the Creator, and provides a basis for living joyfully and purposefully.

God designed both the human and non-human creation primarily to bring glory to himself. He has further designed humans to manage the non-human creation, and the non-human world to provide for the needs of humans. As stewards of the non-human creation, we first must honor both God's primary and secondary purposes for all creation. Secondly, we recognize that Adam and Eve's sin marred the perfection of the creation. As stewards of a fallen physical world, we seek to creatively solve problems caused by the fall, reaching for the productivity, beauty and diversity, balance and orderliness present in the original creation. Thirdly, we recognize that even man's best creation-care efforts cannot sustain life on earth indefinitely. The present earth will be destroyed (2 Pet. 3:7), but while it exists, man's efforts can make a difference in assuring that it functions well and remains productive.

God is Creator of both our finite natural world and an infinite spiritual world. We have been created with a deep desire to pursue truth in order to understand these worlds. Science by definition deals only with the realities of the physical world. Because of the orderliness of the creation, scientific laws and principles give reasonable definition to many of these realities (God can, of course, intervene supernaturally at any time and in any way, momentarily setting aside natural patterns to accomplish His purposes.). As stewards of creation and students of science who answer to the Creator, we not only seek to utilize what has already been discovered, but we also pursue further explanation, definition, and utilization of these observable realities. We further commit to honoring the inherent limits of science. Scientific study has integrity only to the extent that scientific inquiry is restricted to observable realities.

Many of these observable realities, however, are not readily understood or easily explained. Both Christians and non-Christians have sometimes mistakenly assigned the origins and functions of such phenomena. This underscores the need for deep humility in considering the mysteries of life. Here especially, as a first and ongoing response, we must seek the Holy Spirit's illumination and guidance. We should view observable phenomena, anecdotal evidence, personal experience, and use of the scientific method as steps in the process of discovering truth—not the end of the search. From these steps we derive propositions, but these propositions will stand only to the degree that they align with God's revealed truth, for God is the beginning and end of truth.

Purpose Statement

We seek to equip students to become:

- A. Worshipers of the Creator (appreciating his creation)
 - 1. Recognizing the beauty in creation
 - 2. Trusting the Creator (being at peace with mystery; recognizing the boundaries of the knowable)
 - 3. Relaxing and being rejuvenated by the creation (there is a time to "sit and smell the flowers")
 - 4. Enjoying our roles as managers of the creation
- B. Observers/identifiers (alertness to his creation)
 - 1. Of patterns (predictions)
 - 2. Of diversity
- C. Objective Researchers (expanding our knowledge of his creation)
 - 1. Investigating the unknown (utilizing the scientific method)
 - 2. Evaluating claims (e.g, health, wellness, and disease; technology; climate)
- D. Managers (living out our appreciation of his creation)
 - 1. Maintainers of personal physical health
 - 2. Problem-solvers
 - a. Meeting people's practical needs
 - (1) Finding resources in nature
 - (2) Recognizing the limits of natural resources
 - b. Dealing with pollution and toxins
 - 3. Producers (with our vocations)
 - a. In homemaking
 - b. In earning a living
 - c. In ministry
 - 4. Preservers
 - a. Of the earth and its resources
 - b. Of non-human living things
 - 5. Protectors (handling the creation ethically)
 - a. Of human life
 - (1) Considering the effect on human life when solving problems
 - (2) Thoughtfully using science to save or improve human life (Genetic modifications? How far should we go?)
 - b. Of the quality of human life ("Is this decision/development really going to make my/our/your life better?")
- E. Apologists (promoting and articulating the truth humbly and graciously)
 - 1. Distinguishing between the observable/unobservable and the knowable/unknowable (picture a 4-part 'window')
 - 2. Discerning between good and bad science (science driven by agenda)
 - a. Meddling with the unobservable and unknowable
 - b. Drawing conclusions inconsistent with the data
 - c. Discussing origins (Science cannot ultimately answer the question of origins)
 - 3. Crafting and embracing a thoroughly Biblical worldview

Implementation Guidelines

- A. In pursuing the ideal science program, we wrestle with several tensions:
 - 1. While a publisher's material shouldn't rule the class, overworked teachers do need structure in the form of some ready-made materials.
 - 2. While teachers need to be open to new teaching approaches, these approaches should be 'doable.'
 - 3. While we recognize the realities of classroom (group learning) constraints, we endeavor to foster students' delight in direct observation and hands-on learning, both within and outside the classroom.
- B. General Methodology by Grade:
 - 1. Grades 1 & 2: A priority at this level is to build an awareness in these students of their foundational role as worshipers (appreciators) and observers. Because people value more what they can name, we will focus on identification and record-keeping from direct observation, both as a class and as individuals. We will do this mostly as group projects encouraging individual student input, limiting the amount of individual writing required.
 - 2. Grades 3 & 4: Move toward more individual responsibility for identifying things in nature, keeping records, noting interrelations and patterns, performing experiments, making collections, constructing and explaining models, and maintaining of long-term classroom projects (e.g., keeping small animals and experimenting with plants, etc.).
 - 3. Grades 5 & 6: More construction of models; more design and demonstration of projects; begin work on problem-solving in practical matters; begin work on predictions; do reading in history of science; introduce creation care ideas.
 - 4. Grades 7 & 8: In addition to the above, apply ethics to problems, deal with observability and "unknowability," address origins, delve more deeply into human responsibility before God (conservation, health/medicine), train students to become gracious and humble practitioners, teachers, writers, and apologists in matters of science.
- C. Assessment
 - 1. Minimize formal assessment in Grades 1 & 2
 - 2. Utilize journals, short essays, and projects for assessment wherever possible.
 - 3. Use objective assessments primarily when other forms don't work well.
- D. Other
 - 1. Begin with that which is most readily observable and in immediate proximity; help students to "become native¹" in their local natural environs.
 - 2. Incorporate living books² at all levels; transition gradually to individual reading at the upper levels.
 - 3. Utilize some recess time for exploration.

1. Wes Jackson, The Land Institute, Salina, KS

2. A Charlotte Mason term: "Living books are usually written by one person who has a passion for the subject and writes in conversational or narrative style. The books pull you into the subject and involve your emotions, so it's easy to remember the events and facts. Living books make the subject 'come alive.'" (www.simplycharlottesmason.com) Mason was a British Christian educator who died in 1923.

Curriculum Choices

Track One (Grades 1-8): Expotitions³

- To encourage appreciation/valuing of God's creation, we will plan weekly exploration activities, usually to nature areas on or adjacent to the school campus. Occasional (perhaps monthly) trips to homes or other off-campus sites will be arranged by the teacher with the help of a volunteer (parent or high school student?).
- Each month, we will have a new focus area (e.g., fall flowers, insects, migratory birds), with a rotating schedule for classes to visit the nature sites to explore that month's focus area.
- Teachers will prepare the students by introducing them to the specimens they might see, by reading engaging books/articles pertaining to the focus area, showing drawings/photos, etc.
- Each class will follow up by keeping journals (class and/or individual) with drawings, descriptions, and other details of interest.
- Complementary activities could include:
 - Hosting live specimen in terrariums or cages
 - Growing plants, both inside and outside
 - Displaying collections on posters, in albums and display cases
 - Charting or listing observations over time
- Student assessment will be limited to a weekly evaluation of attitude and participation.

Track Two: Science Classes

- Grades 1-2: Expotition expansion, A Reason for Science
Because of the effort required to get first-graders off to a good start on classroom procedures and phonics, science class will not begin until late in the first quarter, and will run for the balance of the first semester (History will replace it in the second semester.). To ensure solid implementation of the expotition track and to emphasize the elements of observation and identification, the majority of science class time will be spent on complementary activities (see Track One). With the remaining time, we will implement hands-on activities from A Reason for Science and possibly other publishers.
- Grades 3-6: God's Design for Science (Answers in Genesis)
This material seems to most closely fit the curriculum approach we have adopted for the entire study of science: putting hands-on activities and direct observation at the center of the course of study, particularly in the younger grades. A bonus is that AiG introduces all the major science study areas within four years—exactly what we needed after deciding that Grades 1 & 2 and 7 & 8 should use a curriculum that more specifically meets the needs of those age levels. By using a single curriculum supplier for the middle grades, we provide students with needed continuity and completeness.

Each AiG “curriculum year” consists of three separate smaller texts, each relating to the same general theme. For example, under the general theme of God's Design for Life are three subtopics: The World of Animals, The World of Plants, and The Human Body. Separate texts for each subtopic add a great deal of flexibility to the program, since the smaller texts do not need to be studied in a particular order or at a specific grade level.

3. For the origin of this term, see *Winnie the Pooh* (A. A. Milne), Chapter 8, "In which Christopher Robin Leads an Expotition to the North Pole."

Materials purchased from the supplier are completely non-consumable. Student worksheets can be freely printed in exactly the needed numbers, making this curriculum overall quite cost-effective.

AiG's material is concise and written in accessible language, and the lessons are of manageable length. We hope these factors will help make science a pleasurable study for the majority of the students, and will not overburden them with work outside of school. We will provide teachers with some science study helps from other curriculum suppliers to compensate for limited teacher resources from AiG. In AiG's weakest areas, teachers will also introduce and reinforce concepts from the school's written documents on science study. Although a bit inconvenient, pulling in external material avoids the opposite problem: having to sift through a great quantity of material in order to decide what can safely be skipped for both teachers and students. The latter task seems to be the more problematic.

- **Grades 7-8: Life Science and Earth/Space Science (Christian Schools International)**
Of all the publishers we reviewed, CSI's philosophy most closely aligns with our philosophy. The middle school texts give heavy emphasis to our objectives for the upper level students (managers, protectors, apologists). CSI provides a teacher's guide that is virtually unrivaled in its expansiveness. It offers myriad suggestions for helping student reach these objectives. Most lessons have hands-on activities to engage a broader range of learning styles. Reproducible student materials are an additional benefit. To balance and round out CSI's curriculum, we will reference Apologia's middle school texts as needed.

One point to note is that CSI, unlike most of the other publishers that we reviewed, has a third category for the origins debate. Whereas the others have only the categories of "godless evolutionists" and "Bible-believing creationists," CSI divides the "Bible-believing" group into those who believe that God created the earth less than 10,000 years ago, and those who believe that he created it more than 10,000 years ago. The Life Science text offers arguments for both a young earth and an old earth creation. It then summarizes this discussion thus: "We will probably never know with certainty the exact timeframe of creation, but as we study the work of an orderly God, we will continue to unearth amazing surprises that will enhance our understanding of our Creator's power."

For those who find this problematic, we remind them that, as Jay Wile (author of the Apologia texts) says, science cannot prove anything. Evolutionary scientists cannot disprove God's existence, nor can creation scientists prove his existence. For Christians, that is not our starting point. Our starting point is our faith in God and his inspired Word. We do well to watch for ways in which science aligns with Scripture--and there are many. We may profitably point these out to skeptics.⁴ But scientific theories can change, and if we look to scientific theories for the basis of our belief that the Bible is true, we will at some point be disappointed. If one of these theories is disproven, what then? If our understanding of the natural record (science) conflicts with our understanding of divine revelation (Scripture), we can be sure that the flaw is in our understanding, because the natural record perfectly aligns with the divine revelation.

4. Some notable Christians have passionately and effectively engaged in this. For an example, review the work of Reasons To Believe (www.reasons.org).

Honorable Mention

Apologia's elementary offering has great content, and the student notebooks facilitate great engagement, but it lacks significant teacher helps, and doesn't seem to fit readily into a classroom framework. It also is too text-heavy for our lower grades. Given the scope (one area of study per year), this also doesn't integrate well with the scopes of other curricula; it's a little more 'all or none.' The middle school texts are excellent reads, and with an adequate set of teacher helps and a greater focus on the aspects of managing and protecting, these would have been an easy win.

Ken Kauffman, our CLE representative, doesn't recommend using CLE science. In their own school, they use Apologia. If CLE ever revises their science to the quality of their 2nd edition Sunrise materials, this will certainly be worthy of consideration.

As with language arts, Rod and Staff has done a solid job of putting together a science program. The most recent revisions (Grades 7 and 8) have incorporated some pleasing color graphics and photos. They do include a few teacher helps in the teacher's manual. If the material would have more closely aligned with our objectives, we would have found it a compelling option.

Memoria Press has done some excellent work with a classical approach to teaching science, but it wasn't structured suitably for our context. Some of their books might eventually find a home in our library.

We didn't find anything particularly wrong with BJU and Abeka's materials; we didn't consider them more because we didn't find anything particularly remarkable about them.

Presented by the Curriculum Committee, July 13, 2015

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