Science and theology within Lutheran school communities

Lutheran Education Australia*

Preamble

Science and theology share a receptive spirit. Both disciplines seek to receive, digest, interpret and even proclaim the world around us and in us. Unlike magic and technology which seek to manipulate the world according to human ideas, science and theology both seek to discover the world as it already is. Rather than stand over the world, they seek to 'under stand' the world. That process of discovery is not purely neutral, and both science and theology find that certain paradigms arise which provide frameworks in which to observe and process reality. Newtonian physics and the Lutheran Reformation are both examples of paradigms that have helped people apprehend reality, even if the former paradigm has since given way to a different paradigm.

Because science and theology share this spirit, their relationship is an important one, not least within the context of Lutheran schools. Teachers and students of goodwill in Lutheran schools, who are seeking to grow in their understanding of the world, will soon become interested in the relationship between science and theology. If both disciplines seek the truth, how are they different? If each discipline has seemingly different methodologies, how can they be integrated? Need they be integrated?

Key guiding principles

1. Lutheran schools as part of the mission and ministry of the Lutheran Church of Australia have as core to their identity the Lutheran confession of faith. This involves both the confession that

   a. the Holy Scriptures are 'the divinely inspired, written and inerrant word of God, and the only infallible source and norm for all matters of faith, doctrine and life' (LCA Rite of Ordination), including in the Lutheran school; and the confession that

   b. these scriptures proclaim at their heart that the one Lord Jesus Christ is both fully God and fully human, and that by His suffering, death, resurrection and ascension people are justified by grace through faith.

2. Lutheran schools do not determine their own theological position on issues such as the relationship between science and faith but work under the publicly stated theological positions of the LCA. The most prominent statement the LCA has officially adopted relating to a science and theology issue is the 1972 statement 'The Theses of

* This paper has been developed by a series of authors commissioned by Lutheran Education Australia over years and multiple iterations. As such, it does not wholly reflect the views of any one author and is therefore attributed to Lutheran Education Australia.

Agreement and Inerrancy' which has a concluding section on 'evolution' [see Appendix 1]. The 2015 statement *Human Sexuality: Three Key Issues* also has some bearing on science and theology.

3. The Lutheran school serves both the church and the state as it carries out God's work in the world. God works both through the church ('right hand kingdom') and the secular order ('left hand kingdom') and the Christian lives and works within both.

4. The Lutheran school serving God through the 'left hand kingdom' recognises the right of the state to set benchmarks concerning the teaching of key learning areas such as foundational areas of history, literature, literacy, maths and the natural sciences, while also recognising that all truth is subject to God.

Ways of relating theology and science

There are four primary ways of relating science and faith which have been identified in recent literature.[2] Educational leaders need to be sensitive to these different ways of relating science and faith as these approaches, or assumptions, often have more bearing on the potential for conflict and misunderstanding than the specific view taken with regard to any particular issue that may arise in the science and theology discussion.

1. Science and theology are fused so that they cannot be meaningfully distinguished. This view was common in the ancient world among the Egyptians, Persians, Greeks and others. It is still to be found in cultures such as India, which are dominated by polytheistic religious views, and also among many proponents of New Age thinking. In this view there is little to distinguish mathematics and magic, astronomy and astrology, physics and metaphysics. Nature is all that there is, and yet nature itself is magical, mysterious, divine. In the educational context, where this view arises, there is the risk of confusion between disciplines as well as the tendency toward views that may be seen as superstitious or incoherent.

2. Science and theology are separated so that they ultimately have nothing to do with each other. This perspective arose in the early modern era and was influenced, among others, by the work of Francis Bacon. He argued in his 1695 book *The Advancement of Learning* that there are two books in the world: the book of God's word and the book of nature. These two should not be mingled together or confused. In many ways this was a reaction to the ancient unitary worldview which was reflected in Bacon's time with astronomers (including even Galileo) doing astrological readings. Bacon's two books, or two worlds solution was intended to give each discipline, theology and natural science, its own identity and space and avoid any potential for conflict. Practitioners of both disciplines, then and now, have found this independence tempting and alluring. In the school context the apparent advantage of this view is that it creates a barrier of separation between theology and science that seeks to maintain peace

2 Cf. Ian Barbour, *Religion in an Age of Science* (United Kingdom: SCM Press, 1990), 3–30; Mark Worthing, 'Science and theology: a brief history,' in *God and Science and Classroom and Pulpit*, ed. G. Buxton, C. Mulherin and M. Worthing (Melbourne, VIC: Mosaic Press, 2012), 86–99; Paul Tyson, *Seven Brief Lessons on Magic* (Eugene, OR: Cascade Books, 2019), 8–18.

through denial of any common ground of interest. The problem is that this way creates a disconnection between God and the world. God is no longer the God who created and continually creates the heavens and the earth. Christianity is reduced to 'feelings'. And science is no longer concerned with the created world, but rather with a kind of 'pure nature', or raw materialism devoid of any origin, meaning, or purpose. It also renders meaningful dialogue between science and theology pointless,[3] and has led historically to our third model.

3. Science and theology are in fundamental conflict. If science and theology have nothing to do with each other, God becomes functionally superfluous to the world. And if superfluous, then any discussion of God the Creator becomes a threat to the independence of science. This is in some ways a logical and historical step from the previous position of separation. In the words of one contemporary writer: 'It is no surprise, then, that a culturally maturing science could decide it was time to leave home, renounce its theological mother and kill its divine father.'[4]

   Historically, this view emerged in 19th-century anti-Christian writers like Draper and White. They produced histories of science and faith that argued that the two had always been at war with one another.[5] Between them they invented the still popular, but false myths that the church once believed the earth was flat, that Copernicus delayed publication of his theory about the Sun being the centre of the solar system until after his death out of fear of the church, and that the main issue in the case of Galileo was the church's desire to supress his support of the Copernican theory. In this context, the rise of the theory of evolution led some like T.H. Huxley to argue that this new theory gave an explanation for life that replaced the need for God. Some Christians then and now felt that Huxley was right, and that only a rejection of Darwin's theory could save Christianity. Both sides considered the claims of science and theology to be in conflict.

   Within Lutheran schools this issue plays out most often, but not exclusively, in the debate about evolution. A science teacher who does not believe in God, for instance, might believe that the theory of evolution demonstrates irrefutable proof of God's superfluity to the world and teach accordingly. This is clearly problematic within the context of a faith-based school. By the same token, a science teacher who believes all evidence of an old earth must be rejected if Christian faith is to be maintained, might express hostility to readily observable data out of a fear that it will undermine faith. This is clearly problematic within the context of a curriculum of genuine scientific enquiry.

4. Science and theology are necessarily reconcilable as the heavens and the earth are created by the one God. This model has ancient pedigree in the early and medieval

3 On the theological side Karl Barth, in the mid-20th century, was a supporter of this view. Among scientists the view has been advocated by Gould. See: Stephen J. Gould, *Rocks of Ages: Science and Religion in the Fullness of Life* (New York: Ballantine Books, 1999).

4 Tyson, *Seven Brief Lessons on Magic*, 14.

5 John Draper, *History of the Conflict between Religion and Science* (Cambridge, GB: Cambridge University Press, 1875); and Andrew Dickson White, *A History of the Warfare of Science with Theology in Christendom* (Cambridge, GB: Cambridge University Press, 1896).

church. But again, in recent decades an increasing number of theologians and scientists have been engaging in active dialogue about matters of common interest to science and faith, starting from an assumption that both theology and science are concerned with the truth about human beings and the world, in a way that is ultimately complementary without being subject to homogenisation. The rationale behind this way of thinking comes from our confession of faith in the first article of the creed. Lutheran theologian Wolfhart Pannenberg explained it well when he wrote:

> If the God of the bible is creator of the universe, then it is not possible to understand fully or even appropriately the processes of nature without any reference to that God. If, on the contrary, nature can be appropriately understood without reference to the God of the bible, then that God cannot be the creator of the universe, and consequently He could not be truly God…[6]

This final perspective has much appeal for Lutheran schools, which seek to do pedagogical justice to science-based aspects of their curriculum within the faith commitment of the schools that the scriptures do not lie. Without determining beforehand what the answer or solution is to any particular question, it assumes that both theology and science are concerned with receiving the truth, and that the truth of the world is not ultimately fragmentary or contradictory, but unified in Christ Jesus 'by whom all things were created, in heaven and on earth, visible and invisible, whether thrones or rulers or authorities—all things were created through him and for him' (Col 1:16). So, this model also sees that the conversation between theology and science is not only possible, but necessary.

To take one example, hormones are certainly involved in love, but love cannot be understood fully by scientific processes alone, just as love in theology cannot be fully understood without reference to biological processes. The same could be said about beauty, friendship, justice, evil, and truth, to saying nothing of God Himself. This approach can require more effort, given how common it is to separate or bring into conflict the disciplines of theology and science. Thus, it requires wider reading and thinking on the part of both teachers and students. It also requires a humility, and an attentiveness to mystery, for we don't create the truth of the world, but rather stand under it and receive it.

In a 1988 letter to the director of the Vatican Observatory, Pope John Paul II wrote: 'Science can purify religion from error and superstition; religion can purify science from idolatry and false absolutes. Each can draw the other into a wider world, a world in which both can flourish.'[7] Students and teachers in Lutheran schools might do well to unpack and interpret this remark, as they consider how science and theology can work together, without becoming indistinguishable.

6 A. Peacocke, ed., *The Sciences and Theology in the Twentieth Century* (Notre Dame, IN: University of Notre Dame Press, 1981), 4.

7 John Paul II, 'Letter of His Holiness John Paul II to Reverend George V. Coyne, S.J. Director of the Vatican Observatory' (Vatican, 1 June 1988), http://www.vatican.va/content/john-paul-ii/en/letters/1988/documents/hf_jp-ii_let_19880601_padre-coyne.html.

In order to assist this conversation, some remarks on creation and evolution are in order, recognising that while this issue is not the only point of conversation between science and theology, it is the most common one to arise in the school context.

Creation and evolution in science and theology

1. For Martin Luther, biblical interpretation centred on Jesus Christ and the gospel. Luther's lecture on Genesis 1 does not treat the chapter as a modern scientific account of the origins of the world and life, but focuses on the Holy Trinity, the power of God's Word, and the creation of the world. At one level a 'plain reading' of the Genesis creation story provides a straightforward account of the relationship between the creator and creation. At another level, reading Genesis in light of its historical context with an awareness of the temporal knowledge held by the people at the time of its writing, draws attention to the theological realities of the creation story—that the earth is God's temple, that heaven and earth are full of the glory of God, and that the primary truth about humankind is that we are created in the image of God. It is this gift of relationship to God, given to us through scripture, that is primary for Lutherans for it is through faith that we understand scripture and receive God's grace. A genuinely literal interpretation of God's word, therefore, refers to God's activity in the heart of the hearer through the work of the Holy Spirit.[8] In this example, science can perhaps be protected from idolatry and false absolutes by seeing that the most foundational truth about humans and the world is that we are created.

2. The doctrine of creation is drawn from various parts of Scripture—Genesis, the psalms, Proverbs, Job, the prophets, the gospels and the epistles. God has both created the world out of nothing (*creatio ex nihilo*) and is continually creating and upholding the entire cosmos (*creatio continua*). Thus God is both beyond creation (transcendent), and present within creation, preserving and redeeming (immanent). So the world that we can touch and see is ultimately derived from and dependant on a higher reality. In the previous section, the first model we looked at considered God to be only immanent to creation, never beyond. The second model considered God to be only transcendent to creation, never relevant to creation. While the third model is hard to pinpoint, only the fourth model of harmony sees God as both immanent in creation, yet also transcendent, with creation having its origin and ongoing life from beyond itself. In this way, Christ stands at the centre of creation, He who is both truly God, eternally begotten of the Father, and truly human, born of the Virgin Mary in a stable in Bethlehem.

3. Some have given the analogy of characters on a stage. Just as characters on a stage interact to create drama, so too science is often concerned with the interaction of different substances, including elementary particles, and the effects they produce. In a somewhat similar way, some creation myths concern the interaction of gods and the resulting effects on the world. The Christian doctrine of creation, by contrast, is fundamentally concerned not with the interaction of the characters, but with how

8 See Gene E. Veith Jr., *The Spirituality of the Cross: The Way of the First Evangelicals* (St Louis, MO: Concordia, 2010).

the stage and characters came to be there in the first place. The atheist scientist Richard Dawkins is thus correct to dismiss the idea of a flying spaghetti monster as incomprehensible. That would simply be adding one more being to the cast. Dawkins is incorrect, however, when he likens this to Christian belief,[9] which is not in one more being, however great, but rather in being itself—God who is the ground of all being. In this example, religion can perhaps be protected from error and superstition by the help of science.

4. Since the 1972 statement on evolution [see Appendix 1] the LCA has made it clear that it will neither endorse nor reject the scientific theory of evolution, nor will it declare that those Christians who accept that God may have created through some process of evolution are in fundamental error. At the same time, it does clearly reject interpretations of evolution that are anti-Christian or attempt to make the theory into an all-embracing world-view, which regards the universe as self-existing and self-explanatory, that is to say, which leaves no room for God. In coming to this position, there is an acknowledgment in the LCA statement that while all of life has a dimension of mystery, the beginning of creation, like the end of creation, is mysterious, and that all the treasures of wisdom and knowledge are 'hidden' in Christ (Col 2:3). Whether Christians take a young earth or old earth position, with differing degrees of evolution, questions will remain. For example, if Adam and Eve were the only human family, how could Cain marry a wife and found a city (Gen 4:17)? On the other hand, as death came into the world through sin (Rom 5:12), how can theistic evolutionists consider death arising before sin? While people have posited responses to these questions, a spirit of humility before the mystery of creation ought to remain.

5. Given this position with regard to the specific question of evolution, it is inappropriate to purposely exclude any person (teacher, student or parent) from a Lutheran school community on the basis of their views on whether or not God made use of evolution in the process of creation. It is also inappropriate to exclude from the teaching curriculum positions which may vary from that of other teachers and school leaders solely on the basis of their acceptance or rejection of evolution and the science that lies behind it. Some behaviours and positions, however, are inappropriate, and need to be avoided:

   - Making evolution or any scientific theory a self-sufficient explanation of reality, pretending that it comprehends the whole of reality in all its dimensions.
   - Assuming that if we understand how something works or how it came to be formed, that this leaves no room for God.
   - Belief that science and faith are not compatible and putting students in a situation where they feel they must choose one and reject the other.
   - Misrepresenting data or disparaging those with whom one disagrees in an effort to build up one's own case.
   - Teaching that Christians must hold to one view of the age of creation, whether long or short.
   - Teaching the key science curriculum areas because it is required, but then telling

9 Richard Dawkins, *The God Delusion* (London, UK: Bantam Press, 2006), 53–54

students it is wrong and that they can simply ignore this information and these theories.

6. As the issue of creation and evolution can be a sensitive one, teachers should ensure that no stumbling block to faith is placed before students. Ignoring or rejecting the scientific record can lead students to falsely imagine there is a choice between scientific observation and the confession that Christ is Lord. Teaching the theory of evolution as an account of the origin of reality and life can do likewise. Sound teaching in this matter will pay attention to the dynamic of the quotation mentioned earlier. Believers wary of science may fruitfully consider how science can help free their faith from error and superstition. Those interested in science while wary of faith may fruitfully consider how Christianity can help free their scientific studies from idolatry and false absolutes.

7. Ultimately teachers do well not to impose that which sits outside the bounds of what we believe and confess as a church. While individual Lutheran educators may hold more detailed specific beliefs about the 'how' of creation at a personal level, working within a Lutheran School should inform their responsibility as they teach within the framework of a confessional Lutheran church. The challenge for educational leaders within Lutheran schools is to moderate fairly these disputes, to see that all voices are heard, to discourage misrepresentations, and to ensure that all parties are helped to identify and build on the points they share in common under the framework of theology and science both seeking to receive the truth of the world, albeit in different ways. In this light, teachers may wish to present the four ways or models of relating theology and science, as a way for students to work with both science and faith content, as well as for the avoidance of conflict among staff, between staff and students, and between staff and parents.

Appendix 1: LCA statement on evolution

The 1972 LCA statement on evolution distinguished between (1) evolutionism, which is an all-embracing philosophical worldview that seeks to find an explanation for everything apart from God, (2) evolution itself, which refers to the 'development, by natural processes, of all forms of life,' including humans, and (3) micro-evolution, which refers to genetic changes and development within species. The statement makes it clear that there is no issue with the existence of micro-evolution, as it deals with 'indisputable facts and poses no problem for Christian faith.' Evolutionism, which seeks to find an interpretation for all existence that leaves no room for the Christian confession of the first article of the creed, 'I believe in God the father almighty, maker of heaven and earth,' is clearly to be rejected by Christians.

The issue, then, as the statement says, concerns the concept of evolution itself, understood as the theory explaining the development, by natural processes, of all forms of life. The statement recognises that this can easily morph into an anti-theistic form of evolutionism and warns against this. Yet, significantly, the document recognises that many Christians do not find difficulties with the fact that God may have created all things through some sort of process of evolution and that these views cannot simply be rejected by the church, nor regarded as a basis for not working together in Christian fellowship.

Significantly, the statement advises:

> Scripture says very little about the mystery of the 'how' of creation, and where scripture is silent the church cannot dogmatize. If in such areas Christian thinkers suggest the possibility of some forms of aspects of evolution as God's means of creating, then differences of opinion about such views should be treated as non-doctrinal and therefore not divisive of church fellowship.

Appendix 2: Luther's understanding of God as Creator from the *Small* and *Large Catechisms*

The *Small* and *Large Catechisms* are particularly important for educators in Lutheran schools because it is in these documents that Luther sought not only to express the faith, but to indicate also how it should be taught. Luther's focus was not on how God created. Instead, Luther saw in the confession of the first article of the *Apostles' Creed* the expression of a relationship with God and a relationship with all the many good things God created. The physical world is valued because of who made it just as we are valued because of who made us. These are the central pedagogical points of Luther's *Small* and *Large Catechism* teachings on God as creator.

In his *Small Catechism*, with regard to the question 'What does it mean to believe in God, the father almighty, maker of heaven and earth,' Luther answers simply:

> I believe that God has created me together with all that exists. God has given me and still preserves my body and soul: eyes, ears, and all limbs and senses; reason and all mental faculties. In addition, God daily and abundantly provides shoes and clothing, food and drink, house and farm, spouse and children, fields, livestock, and all property—along with all the necessities and nourishment for this body and life.

> God protects me against all danger and shields and preserves me from all evil. And all this is done out of pure, fatherly, and divine goodness and mercy, without any merit or worthiness of mine at all! For all of this I owe it to God to thank and praise, serve and obey him. This is most certainly true.'[10]

Similarly, in the *Large Catechism* Luther writes:

> 'I believe in God, the Father almighty, Creator of heaven and earth…' This is the shortest possible way of describing and illustrating the nature, will, acts, and work of God the Father…What is meant by these words or what do you mean when you say 'I believe in God, the Father almighty, creator, etc?' Answer: I hold and believe that I am God's creature, that is, that he has given me and constantly sustains my body, soul and life, my members great and small, all my senses, my reason and understanding, and the like; my food and drink, clothing, nourishment, spouse and children, servants, house and farm, etc. Besides, he makes all creation help provide the benefits and necessities of life—sun, moon, and the stars in the heavens; day and night; air, fire, water, the earth and all that it yields and brings forth; birds, fish, animals, grain, and all sorts of produce. Moreover, he gives all physical and temporal blessings—good government, peace, security. Thus we learn from this article that none of us has life—or anything else that has been mentioned here or can be mentioned—from ourselves, nor can we by ourselves preserve any of them, however small and unimportant. All this is comprehended in the word 'Creator'.[11]

Both the *Small* and *Large Catechisms* provide excellent boundaries in how we present a Christian perspective that surrounds such a complex topic. In his *Large Catechism* Martin Luther states simply yet profoundly:

> If you were to ask a young child: 'My dear, what kind of God do you have? What do you know about him?' he or she could say: 'First, my God is the Father who made heaven and earth…' [F]or the young pupils it is now enough to indicate the most necessary points, namely, as we have said, that this article deals with creation. We should emphasize the words 'creator of heaven and earth'.[12]

Given that Luther lived five hundred years ago when creation science was still at its infancy, his words take new shape today. The importance of Luther's theology, however, that restrains itself from making scientific judgment, serves as an excellent guide on how to approach teaching on creation today, especially when science has such a greater influence in the development of young people than it did in the 16th century. Keeping the focus on the '*who'* and not on the '*how'* allows for the scope needed for young people to hear what is most important. In a 2012 publication, *God and Science: In Classroom and Pulpit* Mark Worthing states the following:

> I think sometimes we run through confessions of faith like 'I believe in…the maker

10 Robert Kolb and Timothy J. Wengert, eds., *The Book of Concord: the Confessions of the Evangelical Lutheran Church* (Minneapolis, MN: Fortress Press, 2000), 354–355.

11 Ibid., 432–433.

12 Ibid., 432.

> of heaven and earth' without really thinking about them. If we take our confession of God seriously, then we should not be afraid of studying the natural world or of what we might learn about it…The fact that we do not understand or agree how God created is a minor point. The major point is that everything that exists is dependent for its existence upon God and nothing exists apart from God. If God did it in six days, or six day ages or over a process of billions of years, it is no less remarkable and no less God's world.[13]

Appendix 3: Science and faith and the Australian national science curriculum

Curricula and textbooks have long been on the front line of science and religion debates. From the perspective of questions relating to science and faith the following observations can be made about the Australian science curriculum.

1. It has a strong focus on inquiry. This is built into the curriculum from the earliest primary years and can be seen as aligning with the Lutheran tradition of critical questioning. A science curriculum structured around asking questions and finding things out should also be open to asking wider questions about the world and whether there is more to the world than simply the material reality with which science deals.
2. There has been a reasonable amount of attention given to the history of science. Some of this would appear to be included especially to make room for discussions of contributions of groups often overlooked in the history of science, e.g. Islamic, Chinese, aboriginal, etc. This is meant to demonstrate that science as inquiry about the physical world is more than just a western, European phenomenon. As much of the impact that Christianity has had upon science (and vice versa) is generally looked at under the history of science, the curriculum's forays into this field present positive opportunities to mention contributions to science by those arising out of a strong Christian context (for example Nicolaus Copernicus, Johannes Kepler, Maria Cunitz, Isaac Newton and Caroline Herschel).
3. There is no formal recognition of science and faith issues within the curriculum. This area has been fairly carefully avoided. Bringing these issues into the curriculum needs to be well thought through so as to justify where and how this is done. Within a Lutheran school context this would be fairly easy to accomplish so long as an explanation can be given for why it has been included where it has been done. One possibility is talking about the nature of belief and its role in scientific thinking. Chiappetta and Koballa, in *Science Instruction in the Middle and Secondary Schools*,[14] include a discussion of beliefs and whether or not scientists have them as part of the understanding of what science is. There would certainly be room here to talk about such issues as what is a religious belief versus what is a scientific belief, whether these are really always different, and also to challenge the idea that science is only about facts while religion is

13 Mark Worthing, *God and Science: In Classroom and Pulpit* (Eugene, OR: Wipf & Stock, 2013), 37.

14 Eugene Chiappetta and Thomas Koballa, *Science Instruction in the Middle and Secondary Schools*, 6th ed. (Houston, TX: Pearson Merrill Prentice Hall, 2006).

only about beliefs. Australian editors Grady Venille and Vailee Dawson, in their widely used *The Art of Teaching Science*[15] talk about the importance of bringing controversial issues into science teaching, focusing mainly on ethical issues in a chapter by Van Rooy. There is a lot of scope for inclusion of ethical concerns that arise out of the Christian tradition. Also, a chapter by Venville on integrating science and other learning areas demonstrates a need to connect science to other areas, and ethical and religion studies should be included in this.

4. While the national curriculum writers have steered away from obvious science and faith issues, they actually do occur within the curriculum. This happens with the focus on Aboriginal and Torres Strait Islander cultures. It is positive that the world views of these peoples are integrated into the curriculum, with a focus on ways in which they understood and worked with the natural world. But in arguing for the importance of recognising cultural and even religious worldviews, the ground is broken for pointing out the significance that other worldviews, including Christian, have played in the development of science.

5. Major scientific theories like evolution and big bang cosmology only appear in comprehensive form from Year Ten. We must recognise that whatever our own views, these two theories traditionally have raised most concerns among some segments of the Christian community and are the most likely points at which students may raise these concerns. The fact that they appear when they do should relieve pressure to confront these topics earlier (though from a science perspective alone one might wonder whether it is good to leave such foundational theories until so late in the curriculum). It also suggests, however, particularly within the Lutheran school context, that Year Ten is the time when these issues will likely arise and we should have a plan as to how to deal with the possible controversy among Christians. It is probably unwise simply to wait and see whether the questions arise within the classroom and then respond off the cuff. It is advised to be prepared, having thought through strategies to address the issues, keeping in mind the requirements of the curriculum, the teacher's own perspective, the official stance of the LCA (cf. Appendix 1), the likely range of views that exist among students and their parents, and the desired outcome of such discussions.

Appendix 4: Science and faith in the *Christian Studies Curriculum Framework*

The *CSCF* (2005)[16] identifies Christian Studies as a key learning area within Lutheran schools at all year levels. Within the *CSCF* students are encouraged to explore faith in the context of their lives and various worldviews. Within the four strands of the *CSCF* the strands of 'Christian Beliefs' and of 'Christianity in the World' are the ones in which science and faith issues arise most clearly, across all six bands, representing all age levels.

15 Grady Venille and Vailee Dawson, *The Art of Teaching Science* (Melbourne, VIC: Allen & Unwin, 2004).

16 Lutheran Education Australia, *Christian Studies Curriculum Framework* (Adelaide, SA: Lutheran Education Australia, 2015), https://www.lutheran.edu.au/download/cscf-2015/.

The Christian Beliefs strand:

- Key idea 1: 'Christians believe that God is one God: father, son and Holy Spirit.' Concerning the nature and existence of God we see that traditional arguments for the existence of God are closely connected to our understanding of the physical world, and the nature of God is understood also in part through God's connection to the physical world. Also within this key idea is the teaching about creation. Especially in the later bands (D and E) there is a strong focus on questions relating to evolution and big bang cosmology and how these may impact upon our understanding of God as creator.
- Key idea 2: 'The person and work of Jesus the Christ is central to Christianity.' In this area the incarnation and the full humanity of Jesus are discussed. The incarnation is a key doctrine showing God's concern and link to the physical world.[17]
- Key idea 3: 'A Christian worldview is shaped by the biblical teaching of sin and grace.' Here the creation of human beings and issues such as free will and human sinfulness are addressed. All of these areas have clear links to scientific understandings of human origins and human nature.

The Christian Living strand:

- Key idea 3: 'Christians have a responsibility in and for the world.' Here questions of ecology, sustainability and environmental stewardship arise.

The Christianity in the World strand:

- Key idea 1: 'Religious beliefs and ideas shape people's thinking and actions.' Especially in the later strands questions about the nature of truth, the connection between faith and reason, and philosophies of science arise.
- Key idea 3: 'People make decisions using a range of religious perspectives and ethical frameworks.' With the discussions of ethics and decision-making making, issues related to bio-ethical issues and issues arising from science-based technology arise.

Appendix 5: Advice for classroom teachers concerning science and faith issues

1. Teachers need to be willing to talk about controversial issues at the science-theology interface, even though this may potentially generate controversy and disagreements. The teacher must be willing to support those who come under attack within discussion, whatever point of view they advocate. Teachers need to be well aware that speaking openly about science and faith issues—especially if they are seen to touch upon the creation and evolution debate—will produce opposition, whatever the viewpoint or approach taken. Teachers can take some comfort in the fact that at the very least many students (as well as their parents and other staff) have a genuine interest and passion in this topic!

17 Cf. Mark Worthing, 'Some brief reflections on Christology and the natural sciences,' *Lutheran Theological Journal* 47, no. 1 (May 2013): 4–9.

2. Questions posed by the natural sciences provide some of the best possibilities for talking with young people about faith and values. Advances in genetic engineering, stem cell research, cloning, etc. provide very fertile discussions about values and decision-making, and that for Christians moral absolutes come from God alone. Evolutionary theory can raise questions about human origins, what is unique about humans, and what Christians actually mean by 'creation'. Big Bang cosmology, along with the obvious beginning of the world questions, raises interesting questions about the possible end of the world. These theories can often lead to discussions about meaning and purpose as well as Christian (and other religions) visions of the end of the world. Atheist conceptions of science such as that of Hobbes, for instance, have rejected any purpose to nature, and that our desires are subject to no demands other than what we choose. Search for extra-terrestrial intelligence (SETI) projects raise questions about the place of humanity in the universe and provide some great hypotheticals about the role of Christ and just how far this might extend. The mysterious world of quantum mechanics raises questions about determinism, and chaos theory and the second law of thermodynamics are great springboards for discussions about the nature of evil. Recent discussions in neuroscience raise issues about what is mind and spirit, where does will and belief come from, etc. In short, the sciences are brimming with opportunities to talk about realities that transcend the material world. Educators, especially those involved in religious and values education, should not avoid discussion of these issues out of fear of controversy and opposition.

3. Teachers are advised to identify areas in their curriculum in which controversy is most likely to occur and to tread wisely. Awareness and appreciation are to be shown as to why some students may have negative views of organised religion, or of why others may have negative views of science. Students who feel that the teacher has some understanding and appreciation of their own views and concerns are much more likely to be willing to listen to what that teacher and others have to say.

4. When dealing with hard-line points-of-view, from whatever perspective, it should not be the goal of the teacher to try to convert the student to a different perspective. Ways can be found to challenge students (or parents) to see value in other perspectives. In the case of anti-evolutionist Christians, for instance, rather than trying to convince them that evolutionary theory is correct, they could be challenged to consider that there are those who accept the basic tenets of this theory and still are genuine Christians who believe God created everything that exists, as is the official position of the LCA (cf. Appendix 1). Similarly, in the case of the atheist or agnostic student who views evolution as a counter to the truth claims of Christianity, a tit for tat dispute is unlikely to produce positive results. Instead, such students can be challenged with the existence of a number of leading scientists who support the theory of evolution but are also strongly committed to the Christian faith, or that how something could come from nothing is a question beyond the understanding available to scientific inquiry.

5. When faced with a specific controversial issue, the teacher could consider taking an historical approach. Rather than immediately presenting the arguments from each side, students can be given some 'neutral' background information about how and why

the controversy began and how it may have shifted focus over time. There are usually enough surprises in easily confirmable historical facts to cause many to rethink their own perspectives on the issue.

6. Try to avoid coming across as superior or arrogant. It can be frustrating as an educator to be presented year after year with what is perceived to be the same weak or misinformed arguments: for instance, God cannot exist because there is evil in the world, or religion is responsible for all the world's wars and suffering, or scientists or God are rigging the data to make the earth look old. Young people often believe what they have heard from sources they trust as credible. It is important not to give the impression that someone is naïve or uneducated simply for disagreeing with one's own position. If a student senses this attitude they will in most instances harden their own stance and make the learning process even more difficult.
7. Finally, at the senior school level, consider allowing students with very strong views on a particular issue to make their own presentation to the class. This prevents them from claiming no other view but that of the teacher or textbook was allowed to be heard. If the question and task is framed well, it can require the student to look at more than one side of the issue in order to make a credible presentation. The ensuing discussion, however, may have to be heavily moderated.
8. It is important to address issues of science and religion when they arise and not to avoid dealing with them. Do not assume or hope that someone else further down the track will deal with these issues. In all likelihood, as the teacher in the classroom, you will be the best hope your students will have of getting a specific and healthy discussion on how science and faith can constructively inform one another and live together.