



FAITHFUL SCIENCE:

INTEGRATING
SCIENCE
& FAITH



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Introduction

In his now famous letter to the Director of the Vatican Observatory, written in 1988, St. John Paul II explained why bringing science and faith into a relational unity is an important task for all believers. In words that resonate with the unbounding hope and insight which he seemed to bring to every situation, he wrote the following: “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.”

His words seem as startling today as they must have seemed then. When I first read them fifteen years ago, they seemed almost too bold, promising too much. Our ordinary experience is not encouraging in this regard. All of us have friends and family members who are convinced of a conflict between the two, as if they are irreconcilable. Many Catholic educators feel that, because of this, they must keep them apart, not allowing any connection between them. At other times catechists, untrained in science and unaware of the Church’s openness, will settle for defending the faith and, consciously or unconsciously, calling modern science into question. Often Catholics feel unable to respond to the questions posed about how to “reconcile” the two, as if they are waving a small white flag in the midst of a raging battle.

But quickly I began to see that the pope’s words must be true. In matters of the mind and of the heart, we always seek to discover how things fit together, looking for a way to unite them. Science is good, the fruit of God-given talents and human ingenuity. And faith concerns the essential, the deepest meaning of human life and the possibility of human happiness. They are both paths to truth, and this means that they must relate to each other in significant ways that are honest, authentic and enlightening. And in our scientifically literate culture, seeing this harmony is essential for proclaiming the faith.

In this short guide, I address four questions that must be asked and answered in order to move beyond the conflict model of science and faith. These are the questions people rarely, if ever, ask because they often think they already know the answers. And yet these reveal the deeply entrenched assumptions in our culture that are the real problem, that show how deeply rooted the conflict

mentality is even in the minds of believers. Any effective catechesis has to get at these, and help uproot them.

The first is an historical question—when did science and faith begin to conflict? Many think that the answer is “always,” because they accept a certain account of historical events that has little or no factual basis. Understanding the historical background helps one to realize the flaws and falsehoods that underlie notions of conflict even today. The second is a question about the difference between faith and science. When properly understood, both science and faith introduce us to reality from different perspectives. Grasping that distinction, St. John Paul II said that science and faith are called to become one, but are not called to become one another. The third question addresses whether science and faith have anything in common. Some simply wish to separate them, thinking that no relationship is better than a bad relationship. And yet we believe that one and the same God reveals himself through two “books”: The Book of Nature and the Book of Scripture. So we ought to expect some shared patterns that unite them even while remaining aware of their differences. If so, we ought to expect some shared patterns that show that their differences come not from incompatibility, but a deeper connection. The final question is the most important because its answer involves divinely revealed truths—what do Christians mean when they call God the Creator? As Joseph Ratzinger said about 25 years before he became Pope Benedict XVI, “[F]aith in the Creator God... forms the pivot, as it were, about which all the other Christian truths turn.” The importance of this question goes far beyond the relationship between faith and science, and the answer to it touches the heart of Christian spirituality.

In conclusion, it is my hope that this guide is helpful to you as you guide others to better understand their faith, and how to unite it to the noble enterprise of modern science.



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When did faith and science become enemies?

The 19th century brought shifts in language and perception, widespread misconceptions, and new scientific discoveries that deeply divided faith and science in the minds of modern persons. In reality, faith and science are not enemies. The Christian faith has long been the friend of science, and has significantly helped to bring modern science to birth.

Hostility between faith and science emerged when three historical developments were unfolding at the same time in Europe and the United States. First, the various areas of study to which we now refer with the umbrella term “science,” such as physics, chemistry, biology, etc., were being professionalized, taking on a whole new level of respectability and exciting popular enthusiasm through the benefits they were producing in the new technologies of the Industrial Revolution, such as steam engines and textile machines. The methodical study of the natural world through observation and experimentation was gaining its reputation as the cutting edge of human knowledge, which it has kept ever since. As a result, science, as we define it today, began to stand out as a specific and separate pursuit, a status it had never enjoyed in previous centuries. This change in perception even involved a change in vocabulary. Before the nineteenth century, the word “science” referred to any knowledge demonstrated logically, including theological knowledge. The words “philosophy” and “science” were treated as synonyms, as in the title of a book published in 1821: *Elements of the Philosophy of Plants Containing the Scientific Principles of Botany*¹. But by the late nineteenth century the terms “science” and “scientific method” began to be associated exclusively with the study of the physical universe through observation and experimentation. This change in perception added new words to the English vocabulary, terms such as “scientist” and “physicist,” which were coined in 1833 by the Anglican theologian and natural philosopher William Whewell (1794-1866)². Sadly, the restriction of the word “science” to one kind of human knowledge left open the possibility that other areas of knowledge such as philosophy, art, morality, poetry,

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and theology could be considered as unfruitful, subjective flights of fancy by comparison.

Once this shift in perception and language occurred, the notion of possible conflict between science and faith could emerge. In previous centuries, many of the greatest minds in history produced works of both science and theology; both were considered “scientific” (meaning rational, founded on sound principles). Sir Isaac Newton (1643-1727), the genius who discovered the law of gravity, was a deeply religious man who studied the Bible almost as intensely as he studied the natural world. St. Thomas Aquinas (1224/25-1274), perhaps the greatest theologian in the history of the Church, wrote numerous works of theology and long commentaries on books of the Bible, but he also wrote a treatise on the physical motions of the human heart, as well as a commentary on Aristotle’s (384-322 BC) *Meteorology*. Both would have been puzzled by the claim that science and religion are opposed to each other. They saw both as necessary for the attainment of wisdom.

The second development occurred exclusively in the United States: the rise of anti-Catholic bias in American society as a response to the influx of Irish and other Catholic immigrants beginning

in the mid-1840's. While this phenomenon had nothing to do with the change in perceptions about science, it did create an intellectual environment in which bigotry and prejudice against Catholics were ripe to be exploited for social and political change. The majority of Catholic immigrants were poor and illiterate, which gave their religion an air of ignorance and superstition to non-Catholics. A largely successful attempt to forbid public aid to Catholic schools drew upon fears that Catholics secretly wanted to bring the entire nation under the control of the Pope by corrupting education. Therefore, a bias against the possibility of Catholics being open to the progress of knowledge ruled the day. False claims about the history of the Church and science could draw upon the fuel of anti-Catholic fears and hatred to promote the greatness of science to the detriment of religion.

The final development was a new suspicion of any Christian doctrines other than moral teachings. Terms such as “dogma” and “articles of faith” began to be used pejoratively to characterize foolishness and fear of progress. By the late nineteenth century, dogmas had begun to be seen by many as antirational, the products of blind faith. The belief that religion must be confined only to rules about behavior became a cherished ideal. Many thought that science should replace dogmas in a crusade to rescue religion from irrational ideas. [A widespread misconception stated that] dogmas, because they involve the paradoxical and mysterious and go beyond scientific demonstration, must be rejected as absurd and even as the work of tricksters who wished to control the uneducated. The recognition that dogmas have to do with realities that are by nature unable to be fully comprehended, realities that are not in any way assertions about the universe and its laws but are the self-Revelation of God, was lost to view. Science is the true savior of humanity, the Catholic Church is the enemy of progress, and divinely revealed truths are obstacles to free scientific investigation. With these assumptions, the situation was ripe for claims of conflict between science and faith, and they would not be long in appearing.

One example can be seen in John William Draper (1811-1882), an American chemist who published a book entitled *History of the Conflict between Religion and Science*. In it, Draper argues that the history of science has always been a story of “conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from [traditional] faith.” The true religious enemy of science, Draper claims, is the Roman Catholic Church, which he indicts for rejecting science and engaging in violent means to gain total political supremacy over all peoples. He supports his arguments with falsified facts and devious inconsistencies. Draper's book was an instant success. It has

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since been reprinted fifty times and translated into ten languages, readily available to the masses even today. Draper's many errors were echoed and perpetuated by Andrew Dickson White (1832-1918), an American historian and the co-founder of Cornell University, who published a two-volume work entitled *History of the Warfare of Science with Theology in Christendom*. The book also used false historical claims to show that both religion and science would be better off once “dogmatic theology” was fully overcome. The “one-two punch” of Draper and White has had a remarkable, long-standing effect on popular opinion. The errors and misrepresentations they foisted upon their readers are now routinely repeated as historical facts by people who are not historians.

With such powerful misconceptions abounding within popular opinion, it is important to move beyond these unfounded claims to take a closer look at the reality of the relationship between faith and science. As we have seen, the nineteenth century brought a growing number of thinkers to the conclusion that groundbreaking new scientific discoveries had seemed to undermine the credibility of the Christian faith, including belief in God. The answers to those challenges were not very clear at the time. In the twentieth century, however, the situation began to change. Theologians began to reconsider certain assumptions and to reflect upon the Christian faith in the light of new discoveries. Also, some of the conclusions of earlier scientific inquiry that had seemed difficult to reconcile with Christian belief were called into question and were even overturned by newer discoveries.

These newer discoveries, far from undermining Christian doctrines, actually began to point in a direction that made those doctrines more credible. In the twentieth century the story of science did not go in the direction that some had expected; developments in science such as in modern physics and the Big Bang Theory, for example, helped to overcome some of the challenges to the credibility of the Christian faith that had once seemed so formidable. These new discoveries of science began to change the minds of some people, and the notion of warfare between science and faith has begun to recede among scholars who have become more aware of the biased perspective from which it emerged.

Over the course of the twentieth and twenty-first centuries, theologians began to incorporate scientific insights directly into their reflections upon the teachings of faith and to clarify the distinction between the two perspectives and the harmony between them. Also, among members of the scientific community, more and more believing scientists began to feel confident in the intellectual respectability of their faith. A powerful example can be seen in the Society of Catholic Scientists, which was founded by particle physicist Stephen Barr in June 2016. In the span of just three years, the total membership grew to over 1000 members and includes scientists from respected institutions across the United States, including Harvard University and the National Academy of the Sciences³.

The misconception that science and religion are enemies is also contradicted by the historical record, which shows that revealed religion, especially the Christian faith, has fostered the development of modern science. Of all the world's cultures and civilizations, only the Christian culture of Western Europe made the breakthrough to a total, lasting, and far-reaching scientific approach. It was from there that modern science spread to the rest of the world. This is well-documented in recent books such as Edwards Grant's *God and Reason in the Middle Ages* (2001) and James Hannam's (1970-) *The Genesis of Science: How the Christian Middle Ages Launched the Scientific Revolution* (2011).

Why would a society based upon the Christian faith, a faith so many assume to be science's enemy, be the very society that formed the cradle for the natural sciences? It was the centrality of the Christian faith to European culture and learning which

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offered the right kind of cultural environment for modern science to emerge. Sacred Scripture insists that the universe reflects the wisdom and goodness of its Creator. Indeed, it was created by a God who, according to Christian belief, is himself Wisdom, Goodness, and the Source of all that is. Because of this, Christian cultures had confidence that the world could be understood and was worthy of understanding on its own terms. The world was the product of a Mind, and so could be understood by minds. God, according to Scripture, had given laws to the universe “which cannot be passed” (Ps 148:6). Since other civilizations lacked a strong notion of a personal, perfectly good, wise, and creative God, they also lacked a firm religious and cultural stimulus in their search for natural principles and laws in the universe⁴. The scriptural and Christian belief that the universe is created by an all-good, all-powerful, and perfectly wise Creator implies that it can be understood, that it has an order which can be marveled at and a goodness that makes it valuable. It is this outlook which gave and still gives affirmation to science, and which nurtures it and encourages it to begin and continue its quest for more knowledge⁵. Not only has the Christian faith been the friend of science, it actually helped to bring modern science to birth.

Questions for Reflection

- 1 | In your mind, is faith in God compatible with science? Why? How would you explain your view to a colleague or peer?
- 2 | From the information above, what was new or surprising to you?
- 3 | What misconceptions exist among the people you serve? From the information above, what do you think most needs to be communicated to them?

How are faith and science different?

Science tells us how the physical universe works while faith tells us what it means: why it exists and by Whom it was made. Together they provide a fuller picture, a deeper understanding of reality.

Both science and faith involve encountering and understanding the same universe, but they do so in unique ways. In the words of Rabbi Jonathan Sacks (1948-), “Science takes things apart to see how they work; religion brings things together to see what they mean.”⁶

As an analogy, imagine being at the New Orleans Jazz and Heritage Festival, enjoying the finale of an incredible set from a favorite band on a sunny afternoon. Afterwards an alien spacecraft lands and an alien (who strangely can understand and speak English) approaches you and asks about the noise that had been coming from the stage. You begin by explaining what the music being played is called (blues, folk, zydeco, rock n’ roll), and you go through the type of music it is, the instruments it involves, a little music theory about harmony, keys and octaves, etc. Once you have said enough for the alien to understand, he responds: “Now I understand how the music is played. But I don’t understand why everyone here is so excited about it.” At that moment you realize that the alien still has no idea about why music is composed and performed and what meaning it has to you and the other fans. Now you have an entirely different task of explanation. You might say that people love music because it moves them by putting the experience of being human into beautiful sounds—music is

about experiencing your ordinary life from a new perspective. Or you might say that it unites the music fans into a common experience—music is about relationships. Or you might say that, through the poetry and musical artistry, you are drawn out of ordinary life and your own experience for a moment—music is about transcendence.

Notice that, in order to explain the music festival, you have two choices. You can explain the internal logic of the music, describing how it is composed and played. But in order to explain the meaning of music to those who play it or enjoy it, you have to go beyond how it is played and answer why questions about it. This fanciful story offers a helpful way of thinking about science and faith. Science approaches the physical universe according to its internal rules and patterns, telling us how it all works, like your first explanation of music. Faith approaches the universe according to what the whole system of the universe means: why it exists, its role in human happiness, and questions about its Creator and his intentions for it, like your second explanation of music. Just as they are in understanding music, why questions and how questions about the universe—science and faith—are very different, but taken together they can provide a fuller picture, a deeper understanding of reality.

Questions for Reflection

- 1 Spend some time thinking about the creation you encounter on a daily basis. What can faith tell us about those things? What can science tell us? What value can thinking about faith and science together bring to your knowledge of creation?
- 2 If you are already providing science instruction (via teaching, ministry, etc.) in some way, how can you encourage those you serve to see the natural world from both a perspective of science (how the physical universe works) and faith (why it exists and by Whom it was made)?

Do faith and science have anything in common?

Faith and science both involve paradox and mystery. Faith affirms the complexity of the spiritual reality, and science, when truth requires it, reveals the complexity of physical reality: its paradoxes and mysteries.

Different though they may be, science and religion are both perspectives on the same universe; therefore, there are some commonalities between them. The first is beautifully described by Pope St. John Paul II in what was to be his final address to scientists:

Contemporary scientists, faced with the explosion of new knowledge and discoveries, frequently feel that they are standing before a vast and infinite horizon. Indeed, the inexhaustible bounty of nature, with its promise of ever new discoveries, can be seen as pointing beyond itself to the Creator who has given it to us as a gift whose secrets remain to be explored... May your patient and humble dialogue with the world of nature bear fruit in ever new discoveries and in a reverent appreciation of its untold marvels.⁷

Science, in its study of the inexhaustible bounty of nature points us towards the inexhaustible bounty of God. The study of both science and religion inspires wonder and awe in those who seek to uncover their mysteries.

In the same vein, faith and science also involve ideas of paradox and mystery. For our secular counterparts, faith mystifies and science clarifies. This perception is wonderfully captured in a quote from Thomas Jefferson about the doctrine of the Trinity. In a letter to a friend which he wrote in 1816, Jefferson claims: "Ridicule is the only weapon which can be used against unintelligible propositions. Ideas must be distinct before reason can act upon them; and no man ever had a distinct idea of the trinity. It is the mere Abracadabra of the [tricksters] calling themselves the priests of Jesus." Jefferson's logic was that, since we cannot comprehend how God is both one and three, it simply cannot be true. In other

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words, he rejected this article of faith because of its paradoxical nature. If something cannot be resolved into distinct ideas in the human mind, then it must be a trick, an “Abracadabra.”

If you think about the teachings of Christianity, you will see that paradoxes abound. Jesus Christ, we believe, is both fully God and fully man; the Eucharist is really the Body, Blood, Soul, and Divinity of Christ although it has all the chemical properties of bread and wine; salvation is a pure gift of grace, but we must work it out “in fear and trembling” (Phil 2:12). None of these can be easily resolved into distinct ideas; in each case, two seemingly irreconcilable assertions are being made. Again and again traditional Christianity failed Jefferson's personal “smell test” of truth and falsehood; it is not surprising that he rejected many of Christianity's central doctrines, such as the miracles of Jesus (which he actually cut out of his Bible). What is surprising is that much of what science has discovered about the universe fails Jefferson's test also. It turns out that the material universe contains its own paradoxes.

For example, consider the science of light. Over centuries many scientists developed distinct ideas about light, ideas that would have passed Jefferson's truth test. Sir Isaac Newton (1642-1727), following the position of the Catholic priest and astronomer Pierre Gassendi (1592-1655), thought that light was a particle, which would explain why light can knock electrons off of metal plates. But light also flows around objects and reforms its patterns

by “diffraction”, an effect discovered by the Jesuit priest and scientist Francesco Grimaldi (1618-1663) and which led to the hypothesis that light is a wave. The debate lasted for centuries until, in 1905, Albert Einstein resolved the issue by demonstrating that light is a “wavelike particle” called a *photon*. Later he explained the “wave-particle” paradox of light this way:

But what is light really? Is it a wave or a shower of photons?... It seems as though we must use sometimes the one theory and sometimes the other, while at times we may use either. We are faced with a new kind of difficulty. *We have two contradictory pictures of reality; separately neither of them fully explains the phenomena of light, but together they do.*⁸

Light cannot be fully imagined; it presents us with a natural paradox. But this is because the nature of light is richer than our minds can handle. The same is true of the Trinity, the Incarnation, the Eucharist and many other articles of faith. Notice that Einstein’s explanation of light would not satisfy Thomas Jefferson, but considering that Einstein’s insight is foundational to all modern physics shows that Jefferson had a far too simplistic “smell-test” for truth. Reality, even physical reality, is bigger than the human mind, even a mind as great as Jefferson’s. Both the wave and particle models of light are necessary to explain what light is, in a way similar to how we must hold in faith that God

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is both one and three, Jesus is both human and divine, etc. In the words of Joseph Ratzinger:

We can only speak rightly about [God] if we renounce the attempt to comprehend and leave him as the uncomprehended... What is true [of light... in the physical realm as the result of the deficiencies in our vision is true in an incomparably greater degree of the spiritual realities and of God... Only by circling around, by looking and describing from different, apparently contrary angles can we succeed in alluding to the truth, which is never visible to us in its totality.⁹

Science not only clarifies and makes the complex simple. When the truth requires it, it also reveals the complexity of physical reality, its paradoxes and mysteries. This is not so different than faith that, by recognizing the mysteries of God, clarifies the meaning of life. In the words of C.S. Lewis (1898-1963), “I believe in Christianity as I believe that the sun has risen: not only because I see it, but because by it I see everything else.”¹⁰

Questions for Reflection

- 1 | In your personal life and work, in what way does science draw you to greater faith in God? Or, how might it be able to do so?
- 2 | How might you be able to explain science or nature to those you serve in a way that could open them to a greater faith in God?

What do you mean when you call God the *Creator*?

God creates the universe from nothing, with time, freely, and as Trinity, revealing that creation is an overwhelming display of God's mercy and love for humanity.

An understanding of the congruence of faith and science is primarily wrapped up in one's perception of God and His work of creation. Both sceptics and believers seem to assume that God is part magician, part mechanic, and part micromanager of complex processes and that creation is some kind of engineering via infinite powers. This is why so many believers get excited about God of the Gaps arguments like Intelligent Design Theory, making God a "how" explanation for natural phenomena that they think science can't explain. The idea that love is the driving force behind the universe—its reason for being as well as its meaning, never enters their minds. To show them the true Christian doctrine of creation is to show them that, just as God causes us to come to life in Christ through mercy, causing goodness in us precisely where we have carved holes of nothingness into our lives through sin, the doctrine of creation out of nothing means that every moment is an overwhelming display of the same kind of love. Creation itself is an act of mercy, of God causing goodness where it has no claim, where it is absent. The freedom that we find in the natural development of the universe is something we should expect if we see it in the light of Christ.

Creation Ex Nihilo

Foundational to the Christian doctrine of creation is that God is beyond the ordinary meaning of the term "being." For Christians, God is not a being, nor is He the Supreme Being. Rather, God is the source of being, the Giver of Reality to all things. Beings can be comprehended and, as St. Bernard of Clairvaux once said, if you comprehend it, it is certainly not God. And so it is with the doctrine of creation—it is not susceptible to comprehension.

“By faith we understand that the worlds were prepared by the word of God, so that what is seen was made from things that are not visible” (Heb 11:3).

We have previously distinguished between the “how” questions of science and the “why” questions of religion. The deepest reason for making this distinction is the Christian doctrine of creation *ex nihilo*—“from nothing.” God uses no preexisting material to create the universe, so no “how” explanations are possible to describe the act of creation. His act of creation causes matter, space, time and even the very laws which govern the universe to exist and, without his constant divine action, there would literally be “no thing,” as well as no space and no time, whatsoever. God, in one divine action from all of eternity creates and sustains all that exists, regardless of whether it was the cosmic explosion of the Big Bang and the celestial formation of the billions of galaxies that are flying through space or the evolution of planetary life and the formation of the earth's majestic mountain ranges. Time and space are not determinative factors when it comes to God's divine activity of creation, for “a thousand years in thy sight are but as yesterday when it is past” (Ps 90:4) for God. With unlimited Divine youthfulness and energy God creates every daisy, causes every sunrise, because God is holding all things in existence through his perfect, eternal act of creation *ex nihilo*. In the words of the Letter to the Hebrews, “By faith we understand that the worlds were prepared by the word of God, so that what is seen was made from things that are not visible” (Heb 11:3).

The doctrine of creation *ex nihilo* is perfectly hospitable to science precisely because it is not a “how” explanation. God’s creative act is not a change, so it cannot be studied in the way changes are studied. It preserves scientific and theological explanations from bleeding into, substituting for, or competing with, each other. In the Christian understanding, God is the cause of the existence, the reality, of all things, not an all-powerful, magical substitute for natural causes. He answers the ultimate questions: “Why does anything exist at all?” and “Why is the universe orderly and yet open?,” not questions like “How did mammals evolve?” or “How did the universe develop during the Big Bang?” Science takes care of those questions, and the more science can explain, the more it shows God’s majesty as Creator.

Creation Cum Tempore

The Church’s doctrine of creation includes the profession that the universe was created “with time.” This phrase should be interpreted as identifying *every moment* as the result of the divine act of creation. Since God is eternal, his creative act is itself timeless. The term “with time” (*cum tempore*) has been used by the Church and her theologians to emphasize that time only exists in relation to creatures, not God. It is a feature of the universe and is itself a created reality that simultaneously accompanies the creation of physical matter.

Creation with time means that every moment is the moment of creation, from the first moment of the universe’s existence until now. All things are being brought into existence out of nothing by God *right now*. For God, who transcends time, to create at the first moment of the universe is no different than what God is doing at this moment. Right now, as much as at any time in the past, God is saying “Let there be light,” “Let the earth teem with living things,” etc. God’s act of creation is not a historical event that happens within time, but it is instead a metaphysical reality describing the universe’s dependence on God’s eternal act of creating, which transcends time.

Particle physicist Stephen Barr offers the following analogy of a playwright to help us understand the timelessness of divine creation. The opening lines of Shakespeare’s *Romeo and Juliet* are: “Two households, both alike in dignity, In fair Verona, where we lay our scene, From ancient grudge break to new mutiny, Where civil blood makes civil hands unclean.” That is the *beginning of Romeo and Juliet*; it references a point in time when the play begins in Shakespeare’s fictional Verona. But Shakespeare is the *origin* of those lines and everything else in *Romeo and Juliet*. When Sacred Scripture speaks of God acting “in the beginning”

or before it, it is pointing to God as the origin of the universe and history, not to some moment in the past. Sacred Scripture uses temporal language to communicate this truth not because God’s creative act is a temporal one, but because of the poverty of human language to describe it.

Divine revelation also points to a first moment for our universe. That’s a truth that is important for us, but not for scientific reasons. It is important because it tells us that the universe we live in is subject to a narrative, although we do not know all of the details of that narrative. Just like salvation history, the universe has a purpose toward which it has been moving, in fits and starts, since whenever it began. And the story of our salvation is to that longer narrative the decisive turning point, the chapter which reveals what the whole story is about. We await a “new heavens and a new earth” in which all things will be conformed to the glory of Christ’s resurrection and in which “God will be all in all.”

Cum Libertate

In the first creation account God says, “Let us make man in our image, after our likeness” (Gn 1:26). This very human image of God mulling over the prospect of making human beings points to divine freedom, that God freely created humans and the entire universe. In the words of Psalm 135:6-7, “Whatever the LORD pleases he does, in heaven and on earth, in the seas and all deeps.”

Let’s reflect on what this implies. First of all, it means that God is free to either create the cosmos or not create it. It also means that God is not obligated to create the best possible universe. God is not forced to create one possible universe out of all possible universes because it is “best.” The important distinction to make here is between the act of creation and the product of that act, which is the universe and all things, including human beings and angels. The act of creation is perfect because it is divine. But the object resulting from the act of creation, insofar as it is finite, is necessarily imperfect. So, the universe is imperfect, but it corresponds perfectly to what God freely wills to create. Furthermore, God has pledged himself to bringing his creation to its fullest possible perfection. In the words of the *Catechism*,

With infinite power God could always create something better. But with infinite wisdom and goodness God freely willed to create a world “in a state of journeying” towards its ultimate perfection. In God’s plan this process of becoming involves the appearance of certain beings and the disappearance of others, the existence of the more perfect alongside the less perfect, both constructive and destructive forces of nature.

With physical good there exists also physical evil as long as creation has not reached perfection.

The perfect freedom by which God creates also means that the universe was created out of perfect love. God who is Love (1 Jn 4:8) chose to make this universe, and he did so without being under any coercion or divine necessity, which means that God did not have to create in order to be God. If the world is the product of freedom, does it not make sense that it freely develops, and that its development ultimately produces creatures capable of the exercise of freedom? And if so, does that not also mean that God is never coercive, he never forces creation into a rigid program with no stain, no tinge, no possibility of tragedy or suffering? If God is free, he not only made the universe freely, but made it the arena of freedom. This makes love possible, but it also makes evil possible.

Most importantly, Divine freedom finds its most powerful realization in self-giving, sacrificial love. This brings us to our final element, which is the most important, the one that, once understood, contains all the others.

Ex Trinitate

For the world to have its beginning in God the Creator means that it has its origin from the Trinity. It is not simply from the Father - the Father, Son and Holy Spirit create together. The Holy Trinity is a perfect communion of love, which means that the universe is the product of divine love and goodness. St. Thomas Aquinas teaches that there are two kinds of love: the love that is justice and the love that is mercy.

Justice is the giving to another what is due to him or her. When I love and respect a great person, such as a saint, I am not being merciful to him or her; I am being just. Similarly, when I give my children my time and attention, I am not being merciful to them, I am simply being just to them—I am giving them what is theirs by right. These should be called love, but each is an example of loving out of justice, because love is what is due. In these cases, those who receive love have a right to it.

But what about when I forgive an offense committed against me and am friendly to a person who has hurt me? What about when I refuse to retaliate with insult or injury and, instead, offer a kind word? Or, when I give to the poor, helping them to have a better life? This is a love that actually causes goodness where it is absent, “a love springing from mercy.”

Nothing can be good unless it exists, and nothing is owed to something that doesn't exist. As we have already seen, God creates the universe *ex nihilo*, out of nothing. He causes good things to exist not out of any justice to them but out of something like mercy. Therefore, divine mercy, “the root of divine love,” is the reason for the universe and everything in it.

Creation *ex Trinitate* is the heart of the Christian doctrine of creation. Nothing is unless it is created, and everything created exists because of God's inexhaustible, merciful love. Machinists sometimes create because they have some need, as do some playwrights. But God had no need to create, no hunger to fill by creating. Rather, the universe is the product of love overflowing, and merciful love is therefore the foundation and deepest meaning of all things, which is the same mercy with which the world is redeemed by Christ on the Cross.

Questions for Reflection

- 1 | Have you ever stopped to think about Creation as God's act of love for you? Take some time to reflect on God's overwhelming love for you on display in the natural world.
- 2 | How can you use conversations about science to introduce (or reintroduce) the people you serve to God, who created and holds everything in being in an immense, freely given act of love for *them*?

Conclusion

Where do we go from here?

The four questions we have addressed here reveal the central issues at the intersection of faith and science. However, this is only the beginning. There are thousands of questions that the people you serve probably are asking: How can we explain miracles? If God is the creator of all things, why is there evil in the world? Is the creation story in Genesis Ch. 1 accurate? What about the Big Bang? While it would be impossible for us to address all of them here, we hope that this guide has laid the groundwork for you to begin to think about how to help others understand science through the eyes of faith.

One final consideration: behind the challenging questions we receive about science and faith is a *person* who is ultimately searching for God. In order for someone to truly understand the congruence of faith and science, they must understand our last and most important question: who is God and what do we mean when we call God Creator? To do this is to *come to know* on some level God Himself, whose inexhaustible, merciful love is poured out in His creation. All of the scientific or theological knowledge in the world is not enough. God the Creator is a *person* to be encountered.

In his recent encyclical *Laudato Si*, Pope Francis tells us that, “Creation is a continuing revelation of the divine”. In a time

where a fast-paced, throw-away culture blocks our vision, Pope Francis invites Catholics and all people to rediscover God the Creator through an “attentiveness” to the natural world. With the proper theological formation which you have begun to receive through this guide, an attentiveness to creation can open us to an encounter with God. Our work of sharing the “Good News” about faith and science is also about using the knowledge we have been given to guide those we serve into an encounter with God through creation.

So, in beholding the glory of the Trinity in creation, man must contemplate, sing and rediscover wonder. In contemporary society people become indifferent “not for lack of wonders, but for lack of wonder” (*G. K. Chesterton*). For the believer, to contemplate creation is also to hear a message, to listen to a paradoxical and silent voice, as the “Psalm of the sun” suggests: “The heavens are telling the glory of God; and the firmament proclaims his handiwork. Day to day pours forth speech, and night to night declares knowledge. There is no speech, nor are there words; their voice is not heard; yet their voice goes out through all the earth, and their words to the end of the world” (Ps 19: 1-5).

—John Paul II, General Audience, January 26, 2000.

Ideas for cultivating attentiveness:

- 1 | Get out into creation! Go on a walk and offer prayers of thankfulness to God for the beautiful intricacy and intelligence of the created things you pass along the way.
- 2 | Use your child’s science homework as an opportunity to point out how God the Creator is at work in the phenomena they are studying.
- 3 | Assign students to observe an object in nature over the course of many weeks as they learn about faith and science in class. Have them record their observations and reflections.
- 4 | Briefly explain the four pillars of the theology of creation (*ex nihilo, cum tempore, etc.*) to those you serve as you sit outside amidst the beauty of nature. Invite them to reflect on the love of God for them as reflected in His (ongoing) act of creation.

Endnotes

Much of the content of this booklet has been adapted from Faith, Science, & Reason: Theology on the Cutting Edge by Christopher Baglow. Please see the following page for more information about this textbook.

¹ Sydney Ross, “Scientist: the Story of a Word”, *Annals of Science* 18:2 (1962): 69.

² *Ibid.*, 71-72.

³ See www.catholicscientists.org.

⁴ Stephen M. Barr, *Modern Physics and Ancient Faith* (Notre Dame: University of Notre Dame Press, 2003), 66-68; cf. Wilson, 31.

⁵ Haught, *Science and Religion*, 22.

⁶ Jonathan Sacks, *The Great Partnership: Science, Religion, and the Search for Meaning* (New York: Schocken Books, 2011), 2.

⁷ Pope John Paul II, [Address to the Participants in the Plenary Session of the Pontifical Academy of Sciences](#), November 8, 2004.

⁸ Albert Einstein and Leopold Infeld, *The Evolution of Physics*, 18th print ed. (New York: Touchstone, 1967), 262-263.

⁹ Joseph Ratzinger, *Introduction to Christianity*, 174.

¹⁰ C.S. Lewis, “Is Theology Poetry?” in *The Weight of Glory And Other Addresses* (New York: Harper Collins, 2001), 140.

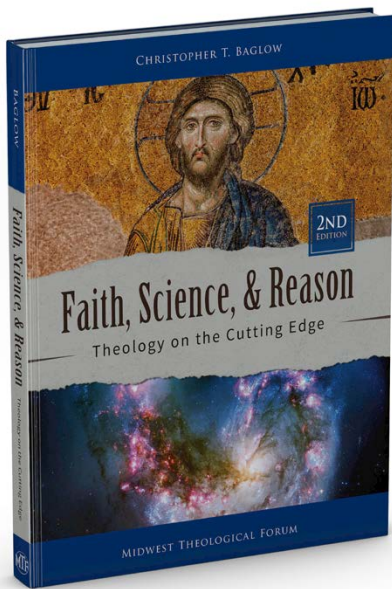
¹¹ Pope Francis, *Laudato Si*. 2015. Pa. 85.

¹² *Ibid.* Pa. 266.

¹³ Fr. Terrence Ehrman, *Serene Attentiveness to the Creator and Creation*. *Ecological Encounters*, p. 108.

¹⁴ Ehrman, Terrence. [A Professor Responds to the Pope’s Call for an Ecological Conversion](#). *America*, March 22, 2016.

Additional Resources



Faith, Science & Reason

Is scientific reason compatible with religious faith? Is it possible to believe in miracles and also in the integrity of nature? How do spiritual realities fit into the world of matter studied by physics and biology?

Responding to these questions and the modern conflict between science and faith, Dr. Christopher Baglow, Director of the Science and Religion Initiative at the University of Notre Dame's McGrath Institute for Church Life, reveals the true story of the relationship between religious faith and scientific knowledge.

Faith and science are not enemies. They are, in fact, both seeking understanding of the same universe and together they can lead us to a fuller knowledge both of the natural world and of God. Baglow's innovative text provides the tools needed to better understand and communicate the close relationship between the Catholic faith and science.

Science & Religion Initiative

The Science & Religion Initiative at Notre Dame's McGrath Institute for Church Life attends to areas of integration and fruitful dialogue between religion and science. Through its programming, the Institute works to equip educators to be competent and effective communicators of the complementarity of faith and reason, science and religion.

Week-long summer seminars serve teachers of both science and religion. Science educators learn to engage the Catholic vision of creation and the human person while upholding the integrity of independent scientific investigation. Religion teachers are given the opportunity to explore how science informs and enhances their appreciation of God's creation and action. The Science & Religion Initiative also hosts Institute Days at Catholic high schools across the nation to provide excellent in-service programming for teachers and administrators.



◆ mcgrath.nd.edu/science

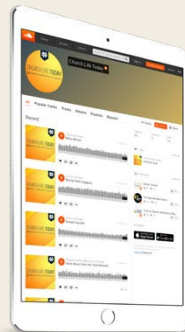
McGrath Institute for Church Life

Free resources to use in your school, parish, or home

The McGrath Institute for Church Life is a kind of living bridge between the University and the Church. We hope this bridge is one with two-way traffic, from the University out to the Church, and from the Church back to the University, where both partners, as it were, give and receive, teach and learn, listen and speak, form and are formed.

If the McGrath Institute for Church Life is a bridge, then it does not exist for its own sake, but it goes somewhere. It leads to and flows out of the parishes, schools, dioceses, and very lives of the many Christians who make up the Church today and shape it for tomorrow. By attracting, educating and forming faithful Catholic leaders, we hope that the McGrath Institute will help nourish the Catholic imagination and renew the Church for generations to come.

If you desire to become a leader in the Church, grow in your faith or mature in your Christian vocation, we're confident that the McGrath Institute can help you on this journey.



Church Life Today Podcast

Church Life Today features conversations with pastoral leaders and scholars from around the country, and covers issues that matter most to today's Church. Learn from leaders in the Church as we discuss their work, experience, and lives of faith.

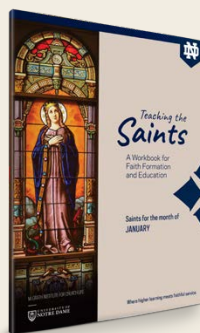
◆ mcgrath.nd.edu/resources/#churchlifetoday



Church Life Journal

The Church Life Journal offers readers first-rate Catholic scholarship—past and present. It is a publication that deepens the faith of all members of the Church, while also serving as a place where Catholic leaders can think through intellectual and pastoral problems of our day.

◆ churchlifejournal.nd.edu



Digital Downloads

The McGrath Institute for Church Life offers a variety of free digital and printable resources for parents, teachers and ministry leaders. Our most popular resources include *Teaching the Saints: Workbooks for Faith Formation and Education*, and *Discerning Your Spiritual Gifts: A Toolkit for Faith Formation*.

◆ mcgrath.nd.edu/resources

The McGrath Institute for Church Life partners with Catholic dioceses, parishes, and schools to address pastoral challenges with theological depth and rigor. By connecting the Catholic intellectual life to the life of the Church, we form faithful Catholic leaders for service to the Church and the world.



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