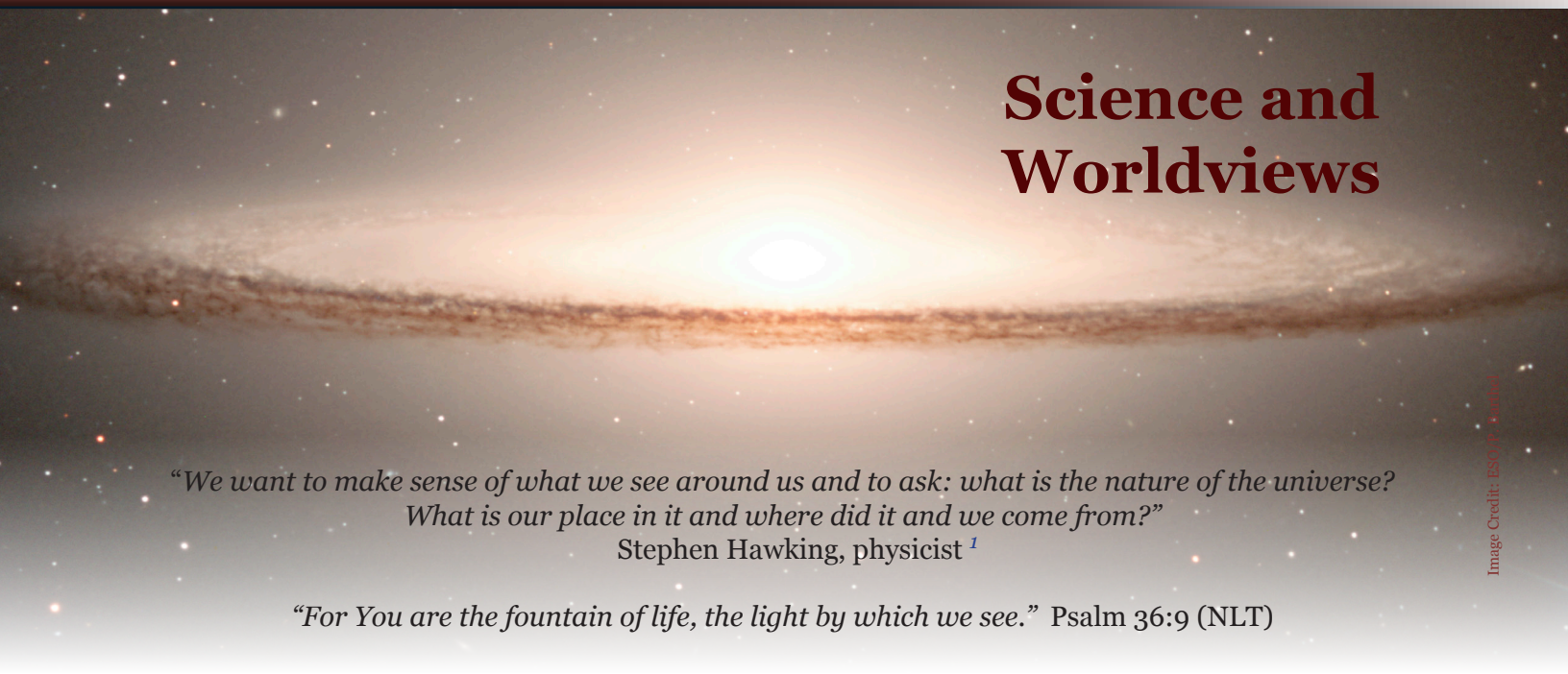
Chapter 1



Science and Worldviews

"We want to make sense of what we see around us and to ask: what is the nature of the universe? What is our place in it and where did it and we come from?"
Stephen Hawking, physicist [1]

"For You are the fountain of life, the light by which we see." Psalm 36:9 (NLT)

Image Credit: ESO, JP Kerbal

What Is a Worldview?

As the word suggests, a worldview is the way you view the world. A **worldview** can be defined as the **unprovable, implicitly accepted set of fundamental beliefs** that determines how you understand your purpose and place in the world; in other words, how you make sense of life. Your answers to big questions such as "What is the meaning of life?" and "Is there a God?" are determined by your worldview. Everyone has a worldview: by examining how you make decisions and what you prioritize in your life, it is possible to begin to identify your own worldview.

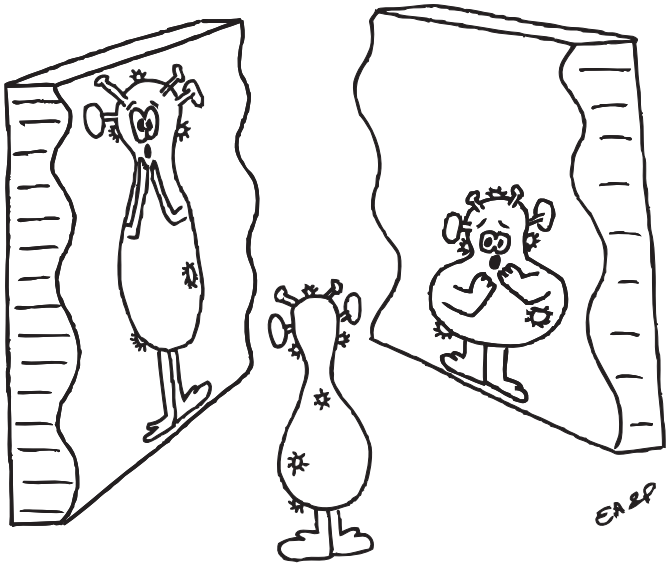
Another way of thinking about a worldview is as a **filter** or a **lens**. Like rose-colored glasses turn the whole world a different color, the lens of your worldview causes you to see things in a certain way and "colors" your interaction with the world around you. Your worldview even affects your approach to science. Whether you are aware of your worldview or not, it shapes your destiny as it guides your thoughts, attitudes, values, perspectives, decisions, and actions. It is important to note that a worldview and a **religion** are not the same thing. All religions have an associated worldview which characterizes their answers to the big questions of life; but even people who are non-religious must answer these same questions, and hence, also have a worldview.

In this chapter, we present an introduction to some competing worldviews. These are some of the most common worldviews that you will encounter in modern culture. It is important that you be able to recognize them so you can distinguish between verifiable scientific knowledge and philosophical worldview claims.

I. Worldviews That Accept Supernatural Reality

A. Theism

According to the theistic worldview there is a God (monotheism) or there are gods (polytheism) who created and transcend all that exists in the physical world. This Supreme Being is supernatural



A worldview is like a lens that affects the way you see yourself, others and the world.

(which means it exists beyond the physical world), but is still involved in ongoing interactions with the creation. Nature is admired and respected by mankind as a creation of God.

- **Monotheism**
  A subcategory of theism, is monotheism. Many of the world's religions have a monotheistic worldview, including Christianity, Judaism, and Islam. The Christian worldview emphasizes **the ongoing relationship between God and His creation, exemplified in the Lord Jesus Christ, a personal Savior approachable to anyone who calls on His name.** The Christian worldview follows from adhering to the basic principles of Christian theology. Most Christian denominations agree that these principles are accurately summarized in the Nicene and Apostles' Creeds[1].

- **Polytheism**
  Polytheism is a **belief in many gods**. Ancient polytheism is well-documented in Greek and Roman mythology; modern examples include Hinduism and Shintoism. The deities of polytheistic religions are often similar to human beings. They have complex emotions along with different personality traits and personal histories.

B. Deism

Deism is similar to theism in the belief in a God, a Superior Being, who created and transcends all that exists in the physical world. The important distinction, however, is that **the God of deism is *not* involved in ongoing interactions with the creation, nor with human affairs.** The deist God is not personal and is not somebody one communicates with through prayer. Instead of continued personal involvement, the deist God is likened to a watchmaker: he created the Universe and the laws of nature, set the natural world in motion, and now lets it operate with no further interaction on his part.

C. Pantheism

Pantheism is a worldview centered on the idea that **God and nature are inseparable and cannot be distinguished.** Therefore, nature is considered sacred and everything that exists is part of an all-encompassing God. The Universe is part of God and God is part of the Universe. This worldview is not as common today as it was in ancient times, but is still present in our era in subtle forms. When aspects of nature are revered or worshipped as if they were part of a universal God, this is pantheism. Those who hold this worldview often capitalize words like Nature and Cosmos out of respect for the

perceived “divine” characteristics of the natural world.

II. Worldviews That Do Not Accept Supernatural Reality

A. Philosophical Naturalism

Philosophical naturalism is a worldview that says the world can be explained entirely by physical, natural phenomena and laws. This worldview is often simply called naturalism. Naturalists either assert that there is no supernatural (or metaphysical) existence, or that if there is, it has no impact on our physical world. Philosophical naturalists not only view the universe as a closed system of material governed by cause and effect, but also generally hold to the idea that nothing exists outside the realm of nature. According to this view the universe is self-contained, self-sufficient, and self-explanatory. Philosophical naturalists reject or declare irrelevant both a supernatural realm of existence and immaterial beings such as God, angels, and the concept of an immaterial human soul.

Note: Be careful not to confuse this worldview with methodological naturalism, which is a method for studying the natural world by considering only natural explanations of observations, without any supernatural assumptions about reality (see Chapter 2). Methodological naturalism can be consistent with theism, while philosophical naturalism cannot.

- **Materialism**

  Materialism is a more specific category of philosophical naturalism, where **matter—the stuff you can touch and feel—is the one ultimate reality.** In this worldview, everything can be reduced to, explained by, and ultimately depends on matter. **Reductionism**, which is often associated with materialism, views human beings as nothing but the material parts from which we are made. The human mind is considered to be a manifestation of physical and chemical processes occurring in the gray matter inside our heads.

- **Scientism***

  Also considered a category of philosophical naturalism, scientism is a worldview whereby **science is either the only reliable method (strong scientism) or the best, most dependable method (weak scientism) for obtaining true knowledge.** For those who adopt the strong version of this philosophy, the scientific method applied to the natural world is the only path that leads to knowledge and truth. Strong scientism divides all thought into two categories: scientific knowledge and nonsense. In this worldview, there is no other type of knowledge or attainable truth. Because the scientific method strives for objectivity when investigating the natural world, scientism often masquerades as being completely objective, when in reality it is a philosophical worldview.

- **Evolutionism***

  Evolutionism asserts that all life is the result of purely natural unguided, unsupervised processes. The important distinguishing point about this worldview is that the **processes are controlled only by natural laws and random chance with absolutely no initial or continuing input from a supernatural being.** It is important to be able to discern the difference between evolutionism and evolution. Evolutionism is a worldview, not a scientific theory. Just as scientism should not be confused with science, evolutionism should not be confused with evolution. Evolution is a scientific theory that can be accepted or rejected based on evidence. Evolutionism masquerades as objective science, when in reality it uses a scientific theory to propagate a philosophical idea (see Chapter 3).

*It is rare that a person would admit to a worldview of scientism or evolutionism. Most of the time, you

will find these worldviews **conflated** with objective science. Conflation means to bring together or to combine two separate ideas into a single idea. For example, a biology teacher might be teaching about the scientific theory of evolution and comment on the gullibility of people who believe in the existence of God. In this case, the teacher is conflating the science of biological evolution with the philosophical worldview of evolutionism.

B. Atheism

The most important distinguishing characteristic in the worldview of atheism is the assertion that **no God or gods exist.** Atheists reject the existence of a supernatural being and often explain the widespread belief in a supernatural God as an invention of the human mind. The worldview of atheism is very broad and encompasses any worldview that rejects the supernatural, including philosophical naturalism, materialism, or secular humanism. **New Atheism** is a recent movement of people who not only ascribe to the worldview of atheism, but are active in persuading and convincing others to join them.

C. Agnosticism

Agnostics assert either that they personally **do not know if God exists (soft agnosticism) or that no one can know if God exists (hard agnosticism).** In agnosticism, metaphysical claims (relating to a reality beyond what is perceptible to the senses) about the afterlife or ultimate reality are either currently unknown or are simply not knowable. Agnosticism can be compatible with the worldview of scientism, whereby a person only accepts what can be learned about the world through science; however, agnostics might also take a skeptical view of science.

D. Secular Humanism

Secular humanism is a worldview which rejects a supernatural being and knowledge attained through divine revelation, but instead **places great confidence in the capacity of humankind.** From the secular humanist's perspective, morals, values, and societal norms find their source, foundation, and justification in the accumulated wisdom of humans. It is a philosophy centered in the role of humanity, with all its capabilities, needs, accomplishments and responsibilities, to give meaning and shape to human lives. According to this view "man is the measure of all things" (Protagorus, Greek philosopher, 490-420 BC). This view strongly promotes relativism (see following entry). Secular humanists look to human endeavors for ultimate meaning and purpose, including not only science and technology, but also human accomplishments in art, literature and music.

E. Relativism

According to the worldview of relativism, **there is no real, absolute, objective truth to be unveiled about the world.** Truth is subjective, dependent on human cultural conventions. Relativism is characterized by changing standards and values. What is right for one person may not be right for another, and what we learn and measure about the world today may not be the same tomorrow. **Moral relativism** is a branch of relativism that only applies the idea of relativism to immaterial things such as a person's belief in the supernatural or moral decisions. A moral relativist can still accept absolute truth in the natural world. A more extreme relativist would also say it is impossible to know anything absolute about the natural world either.

Does the Boundary Ever Become Blurred Between Science and One's Worldview?

Scientists span a broad spectrum of worldviews and religious positions just like non-scientists. When communicating with the public, many professional scientists express not only scientific knowledge in their area of expertise, but also philosophical beliefs that reflect their worldview. We should certainly give respectful consideration to statements made by scientists about scientific facts and conclusions in their areas of expertise. But when a scientist expresses a worldview that is a matter of personal choice, these statements should not carry the same weight and authority. Just because a person is an accomplished expert in one particular scientific field, it does not mean they have a monopoly on truth and are right about everything, including their philosophical worldview beliefs. To have a proper understanding of science and scientific conclusions, **it is of crucial importance to discern between scientific information and worldviews.**

Fundamental Beliefs and Assumptions Necessary to the Scientific Enterprise

In the next chapter, we explore the process of science: what science is and what science is not. Here, we simply note that the process of science is only possible if we accept some assumptions and fundamental beliefs as part of our worldview. These beliefs cannot be proven nor derived from science alone:

★ There is a real, physical world and an objective reality; in other words, the world is not just a product of our imaginations.
★ The natural world is rational; that is, events can be described by reasonable relationships such as cause and effect.
★ Our minds are capable of comprehending (at least in part) some of this rationality.
★ There is consistency in the observed patterns in the natural world. So, for example, different scientists in different parts of the world when repeating the same experiment under the same conditions will get the same results. The regular patterns observed in nature can often be expressed with mathematical equations.

It is interesting to think about why these assumptions are valid and to ask whether all worldviews explain them equally well. In modern times it is easy to forget that Christianity had a strong influence on the scientific revolution and the development of modern science. From the list above, you see that certain worldviews are incompatible with the assumptions upon which science is based. For example, in a polytheistic worldview the Sun and Moon might be different gods, playing with humans at their whim. In this case, there would likely not be rationality or repeatability in nature. Or, if no objective reality exists, as claimed by the relativist worldview, then one wonders why anyone would study the natural world at all!

On the other hand, a theistic Christian worldview helps to demystify nature. Instead of considering the Sun, Moon, stars and the ocean to be gods, they are viewed as created things. By investigating the natural world, we learn about the Creator who established the laws by which nature is governed. The Christian worldview also offers a consistent explanation for the comprehensibility of the universe: the rationality of our minds and the rationality in nature have a common origin in the mind of God, the Creator. In the past, the Christian worldview provided a meaningful motivation for investigating the natural world scientifically. Many early scientists had theistic worldviews, including some with strong Christian beliefs (see frame 'Believers Who Led the Way in Science').

Believers Who Led the Way in Science

"Men became scientific because they expected law in nature...
and they expected law in nature because they believed in a lawgiver."
C.S. Lewis, Miracles [2]

The origin of much scientific investigation was motivated and supported by Christian beliefs. Many pioneers in science were committed Christians:



Johannes Kepler: Discovered the laws of planetary motion.
Kepler believed that through his scientific investigations he was *"...merely thinking God's thoughts after him. Since we astronomers are priests of the highest God in regard to the book of nature, it benefits us to be thoughtful, not of the glory of our minds, but rather, above all else, of the glory of God."* [3]



Michael Faraday: Known for his pioneering work in physics and chemistry, specifically in electricity and magnetism.
"Faraday found no conflict between his religious beliefs and his activities as a scientist and philosopher. He viewed his discoveries of nature's laws as part of the continual process of 'reading the book of nature', no different in principle from the process of reading the Bible to discover God's laws. A strong sense of the unity of God and nature pervaded Faraday's life and work." Jim Baggot [4]



James C. Maxwell: Developed the classical theory of electromagnetism, unifying electricity and magnetism as manifestations of the same phenomenon. The minister who visited him many times before his death commented: *"He had gauged and fathomed all the schemes and systems of philosophy, and had found them utterly empty and unsatisfying - 'unworkable' was his own word about them - and he turned with simple faith to the Gospel of the Saviour".* [5]

Other prominent scientists in history who are known as committed Christians include: **Blaise Pascal** (founder of the modern theory of probabilities), **James Joule** (discoverer of the first law of thermodynamics), **William Thomson Kelvin** (who first stated the second law of thermodynamics), and **Gottfried W. Leibniz** (inventor of calculus).

Just as Christians actively pursued scientific knowledge in the past, some leaders in the professional sciences today are also Christians. In this Introduction to the Science and Faith Dialogue you will find interviews with some Christian professional astronomers and will have the opportunity to read their stories. We begin by introducing you to one such professional who has received many awards for his significant accomplishments in astronomy:
Dr. Allan Sandage: Cosmologist—one who studies the origin and eventual fate of the universe, received the National Medal of Science in 1970 for his lifetime achievements in

astronomy. As a graduate student, he worked with Edwin Hubble (for whom the Hubble Space Telescope is named), continuing important work on the Hubble constant (the rate of expansion of the universe) after Hubble died. At age 50, he publicly disclosed that he had decided to become a Christian, saying:
"It was my science that drove me to the conclusion that the world is much more complicated than can be explained by science.... It was only through the supernatural that I can understand the mystery of existence." Lee Strobel in *The Case for a Creator* [6]

Key Concepts

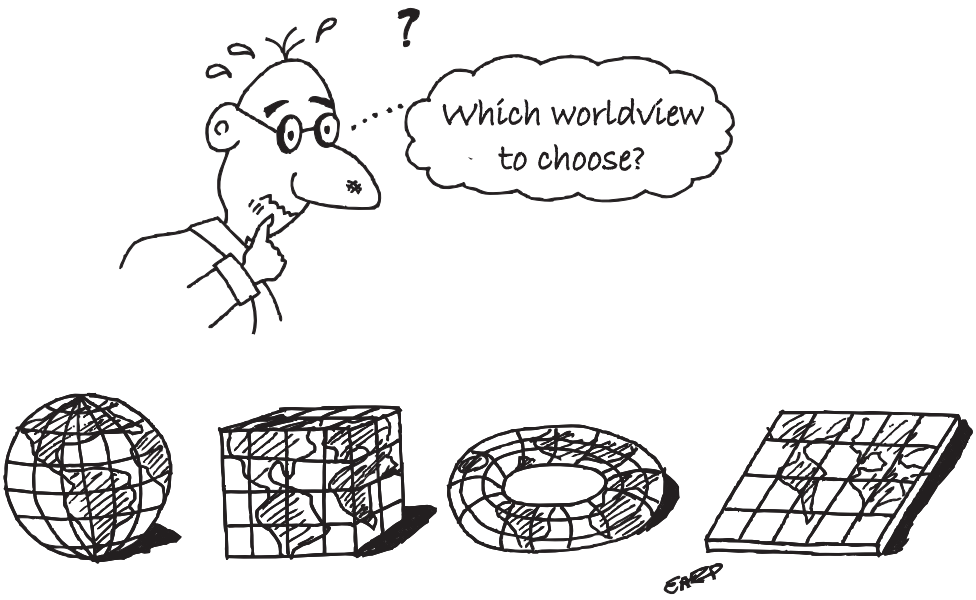
★ Everybody has a worldview, a set of beliefs that determines how they make sense of life and how they answer big questions about their existence.

★ It is of crucial importance to learn how to discern between scientific information and worldviews.

★ Just like everybody else, scientists hold to different worldviews. When scientists express their worldview beliefs, these statements should not carry the same weight and authority as statements about their field of scientific expertise.

★ The Christian worldview made an important contribution to the development of science.

★ The choice of which worldview to hold is a personal one; in fact, a worldview develops over time based on a person's history and background. Often, a person is unaware of the worldview they hold or of its implications.



For Further Reading:

- ★ *A World of Difference*, Kenneth R. Samples, Baker Books, 2007
- ★ *The Universe Next Door,* James Shire, Intervarsity Press, 1997

Exercises

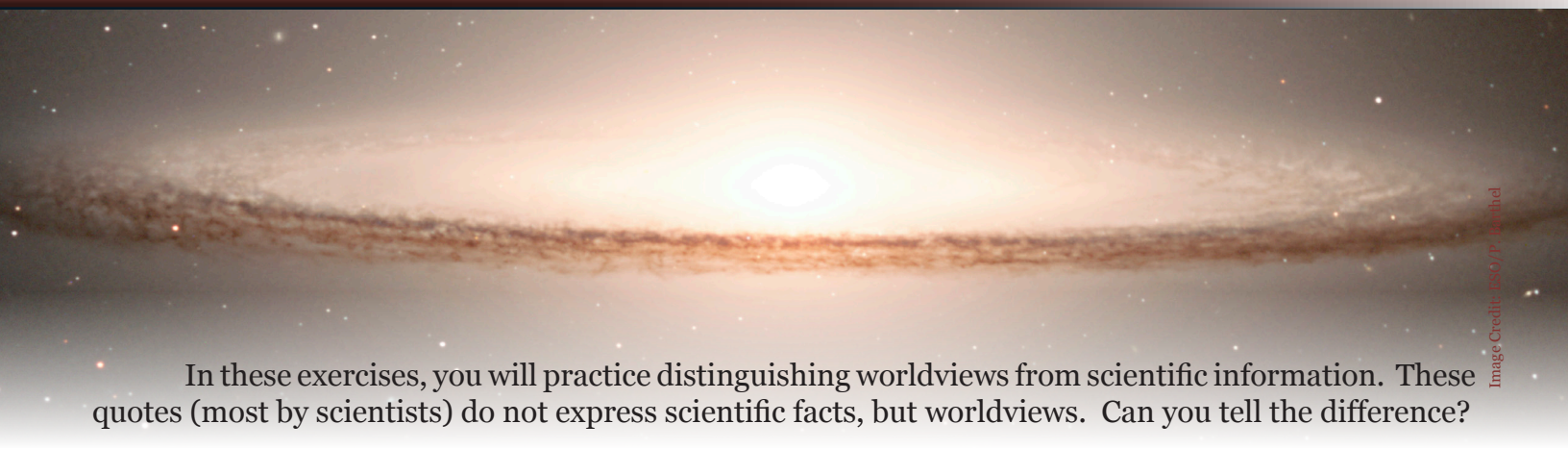


Image Credit: ESO/P. Barthel

In these exercises, you will practice distinguishing worldviews from scientific information. These quotes (most by scientists) do not express scientific facts, but worldviews. Can you tell the difference?

Note: The attitudes and beliefs expressed in the quotes in the exercises in this chapter are not necessarily representative of the personal beliefs of the scientists to whom they are attributed since they are not inserted in their original context.
Also remember that ideas should be evaluated by their merits independently of their sources (more about this on Chapter 5).

1.1 Matching

Match each quote or statement with the worldview it most likely represents by writing the letter of your choice in the blank. Write the reason for your choice and list additional worldview(s) that might fit the quote besides those given in the list.

Word Bank:

A. Moral Relativism
B. Scientism
C. Theism
D. Secular Humanism
E. Christianity
F. Evolutionism
G. Deism

(1) _____*"In the evolutionary pattern of thought there is no longer either need or room for the supernatural."* Julian Huxley, evolutionary biologist [7]

(2) _____ *"My comprehension of God comes from the deeply felt conviction of a superior intelligence that reveals itself in the knowable world."* Albert Einstein, physicist [8]

(3) _____ *"Only science gives us objective knowledge that is valid for everyone."*

(4) _____ *"This most beautiful system of the sun, planets, and comets, could only proceed from the counsel and dominion of an intelligent and powerful Being.... This Being governs all things, not as the soul of the world, but as Lord over all; and on account of His dominion He is to be called Lord God."* Isaac Newton, physicist [9]

(5) _____ *"The universe appears to have been designed by a pure mathematician."* James Jeans, physicist [10]

(6) _____ *"Any belief is valid if it works for you."*

(7) _____ *"The significance of our lives and our fragile planet is then determined only by our own wisdom and courage."* Carl Sagan, astronomer [11]

1.2 Crossword Puzzle

Which worldview is being expressed in the following quotes or statements? Choose from the world-views presented in this chapter.

(1) *"The cosmos is all that is, or ever was, or ever will be."* Carl Sagan, astronomer [12]

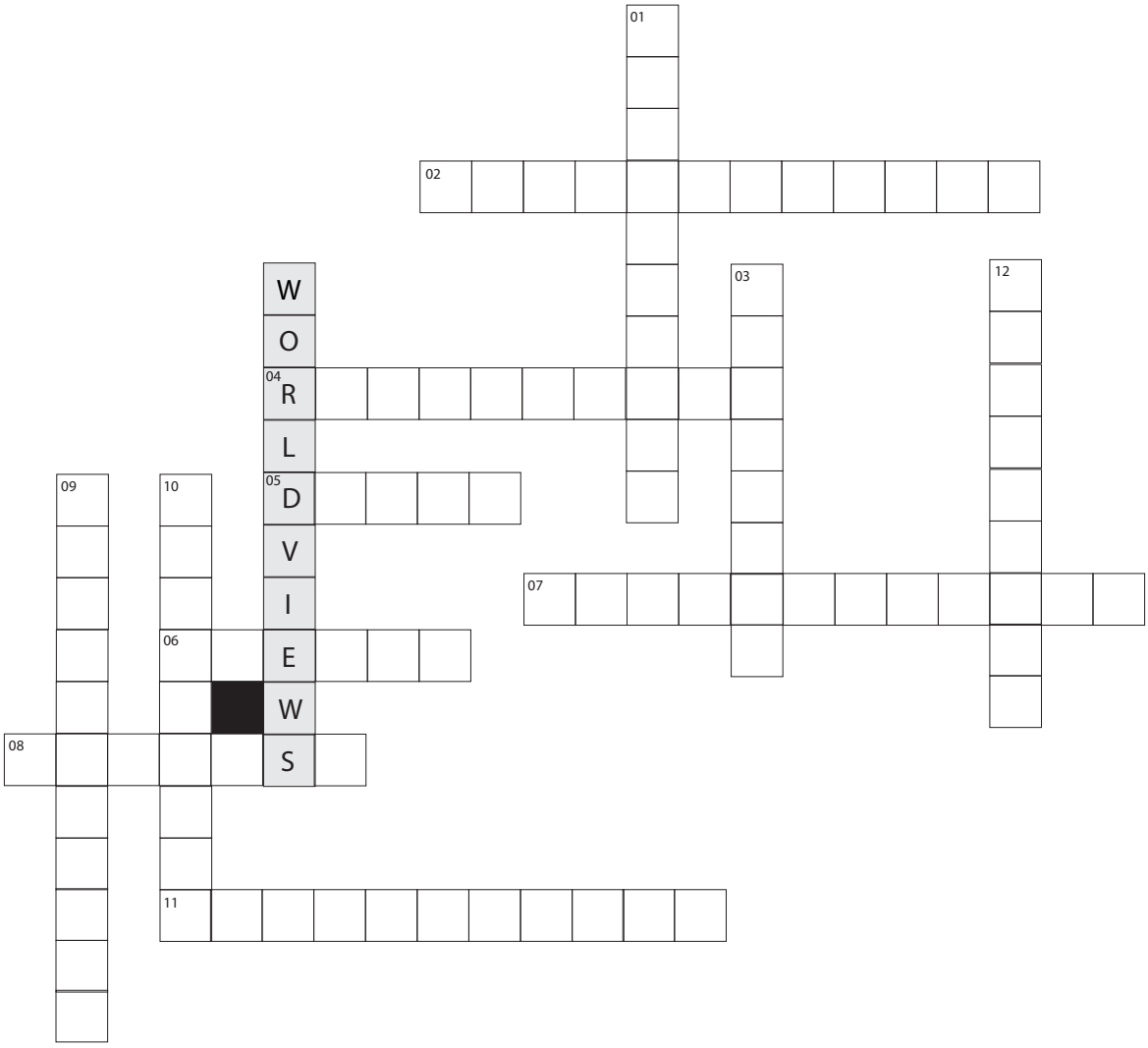
(2) *"Man is the result of a purposeless and natural process that did not have him in mind."*

(3) *"Here, one felt no weight of the supernatural pressing on the human mind, demanding homage and allegiance. Humanity – with all its distinct capabilities, talents, worries, problems, possibilities - was the center of interest."* (The Cambridge dictionary of Philosophy)

(4) *"There are no absolute truths. Something is true if it works for you."*

(5) *"These [natural] laws may have originally been decreed by God, but it appears that he has since left the universe to evolve according to them and does not now intervene in it."* Stephen Hawking, physicist [13]

(6) *"I have a profound belief in God and a deep appreciation for his created universe... For example, the powerful, dynamic Earth that we live on has always spoken to me of a power that was greater than ourselves – a driving force that we could neither control nor comprehend."* Eilene Theilig, planetary geologist [14]



(7) *"I take God very seriously indeed. I am a Christian believer and I believe that God exists and has made Himself known in human terms in Jesus Christ."* John Polkinghorn, physicist and Anglican priest [15]

(8) *"There is no God."*

(9) *"Is there a supernatural power, a supreme deity behind the cosmic history of the universe? I do not deny. I do not know. I do not believe."*

(10) *"Our obligation to survive is owed not just to ourselves but also to that Cosmos, ancient and vast, from which we spring."* Carl Sagan, astronomer [16]

(11) *"It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our a priori adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. ...for we cannot allow a Divine Foot in the door."* Richard Lewontin, geneticist, Harvard University [17]

(12) *"The primary problem is not to provide the public with the knowledge of how far it is to the nearest star and what genes are made of.... Rather, the problem is to get them to reject irrational and supernatural explanations of the world, ... and to accept a social and intellectual apparatus, Science, as the only begetter of truth."* Richard Lewontin, geneticist, Harvard University [18]

1.3 Multiple Choice

Choose the best answer to each question. Be able to explain your reasoning.

(1) Which of the following two worldviews consider valid knowledge to be attainable through revelation of a personal God?

a) Deism and Christianity
b) Secular Humanism and Christianity
c) Relativism and Theism
d) Christianity and Theism
e) Secular Humanism and Theism

(2) Bertrand Russell, a famous philosopher, wrote *"Whatever knowledge is attainable must be attained by scientific methods; and what science cannot discover, mankind cannot know."* [19] This quote expresses:

a) Naturalism
b) Hard Scientism
c) Hard agnosticism
d) Materialism

Suppose you are watching a television talk show and the host interviews a guest who says, *"If an experience seems real, it is real. If an idea feels right to you, it is right. We are incapable of acquiring knowledge of the true nature of reality."*

(3) Which two worldviews are expressed in the above statement?

a) Agnosticism and humanism

b) Humanism and relativism
c) Relativism and hard agnosticism
d) Soft agnosticism and humanism

(4) In which ways does the quote above contrast with the scientific enterprise?
a) Science is based on realism; there is an objective reality to be uncovered.
b) Scientific conclusions can be counterintuitive, thus our "feelings" are not an accurate guide to knowledge.
c) Both a and b are correct.
d) Neither a or b are correct.

(5) Which of the following is a good reason for thinking that the world behaves in a regular and rational way and is knowable, understandable, and can be described with something as rational as mathematics?
a) The rationality of our minds and the rationality expressed in the physical world have a common origin: God's Mind.
b) As agents ordered by God to have dominion over His creation, we are endowed with the capacity to function in that world, and even to understand it to some extent.
c) God made us and He intended that we would know the world.
d) All of the above.
e) None of the above.

1.4 Quotations

Write down the worldviews being expressed in the following quotes. Discuss your answers with a small group of other students. Why might there be differences among your answers?

(1) *"Outside of science there is only subjectivity."*
Worldview: _____

(2) *"The human race is just chemical scum on a moderate-sized planet."* Stephen Hawking, physicist [20]
Worldview: _____

(3) *"The equations of physics have in them incredible simplicity, elegance and beauty. That in itself is sufficient to prove to me that there must be a God who is responsible for these laws and responsible for the universe."* Paul Davies, physicist [21]
Worldview: _____

(4) *"Life is the result of random processes; no God was involved."*
Worldview: _____

(5) *"I find it quite improbable that such order came out of chaos. There has to be some organizing principle. God to me is a mystery but is the explanation for the miracle of existence, why there is something instead of nothing."* Allan Sandage, cosmologist and winner of the Crawford Prize in astronomy [22]
Worldview: _____

(6) *"I am a collection of water, calcium and organic molecules called Carl Sagan. You are a collection of almost identical molecules with a different collective label. Is there nothing in here but molecules? Some people find this idea... demeaning to human dignity. For myself, I find it elevating that our universe permits the evolution of molecular machines as intricate and subtle as we are."* Carl Sagan,

astronomer, in *Cosmos* [23]
Worldview: _____

(7) *"A commonsense interpretation of the facts suggests that a super-intellect has monkeyed with physics…"* Fred Hoyle, astrophysicist [24]
Worldview: _____

(8) *"There is no reason to suppose that science cannot deal with every aspect of existence."* Peter Atkins, chemist, Oxford University [25]
Worldview: _____

(9) *"… you, your joys an your sorrows, your memories and ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules."* Francis Crick, co-discoverer of the structure of DNA [26]
Worldview: _____

(10) *"Only nine percent of Americans accept the central finding of modern biology that human beings (and all the other species) have slowly evolved by natural processes from a succession of more ancient beings with no divine intervention needed along the way."* Carl Sagan, astronomer [27]
Worldview: _____

(11) *"The exquisite order displayed by our scientific understanding of the physical world calls for the divine."* Vera Kistiakowsky, physicist, Massachusetts Institute of Technology [28]
Worldview: _____

Extended Response Questions

1.5 Christian philosopher and author C.S. Lewis wrote in The Weight of Glory, *"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."*[29] This quote highlights an important element in the definition of a worldview. What is this element?

1.6 The official Position Statement of the National Association of Biology Teachers (NABT, 1995) states that, *"The diversity of life on earth is the outcome of evolution: an unsupervised, impersonal, unpredictable and natural process of temporal descent with genetic modification that is affected by natural selection, chance, historical contingencies and changing environments."* [30]

a) Identify two words in this statement that make claims that cannot be supported scientifically. Explain why these words go beyond scientific assertions. (Note: These two words were later deleted from the NABT position statement when people complained about their philosophical assumptions.)

b) This statement employs science to serve a philosophical agenda. What worldview is being expressed here as science?

1.7 Read the following statements about music:

John: *Music is a form of individual artistic expression.*
Sally: *Music is vibrations in the air captured by our ears, transmitted to our neurons and interpreted by our brains.*

Peter: *Music has rhythmic and melodic sounds with the power to speak to our hearts and awaken our emotions.*

a) Which statements are accurate ("true") descriptions of music?
b) Which statement(s) include scientific description(s) of music?
c) Which statement(s) capture the mystery and essence of music?
d) In your opinion, can we portray reality in its fullness with purely scientific descriptions?
e) Copy the definition of scientism. Do you agree or disagree with this worldview? Support your answer using a different example than music.

1.8 American constitutional law requires that public schools be neutral on religious questions. For example, a school cannot forbid Muslim students from praying to Allah during the school day as their religion requires, but the school cannot force non-Muslim students to participate in such prayers.
Do you think that worldview questions should be placed in the same Constitutional category as religious questions? In other words, do you think schools should be neutral on the topic of philosophical naturalism? On atheism? On secular humanism? How do you think schools should address different worldviews?

1.9 In the list below, circle those things we do with our minds that machines such as computers cannot do:

Cherish memories	Be anxious about the future
Store information	Make decisions
Judge right from wrong	Forget things
Analyze data	Detect patterns
Learn from our mistakes	Feel excited about things

a) In what ways is our mind like a computer, a machine made of flesh?
b) To what degree do you think that electrical transmissions causing chemical reactions in the physical brain explain the entirety of human thought and experience?
c) In your opinion, is there a difference between "mind" and "brain"?
d) How do the questions above relate to the worldview of materialism?

1.10 In science it is often useful to reduce whole systems to smaller parts in order to facilitate our understanding of the system. Breaking complicated things into smaller parts that can be studied, called the method of reductionism, is a tool scientists use to help describe and study complex systems. For example, we study the cell by studying the various smaller components (called organelles) within each cell. But what is the applicability of this method? Can we apply this same reductionistic approach to understanding everything about more complex systems?
Consider a human being. If you counted every atom in your body, you would discover that 63% of the atoms are hydrogen, 26% are oxygen, 10% of the atoms are carbon, 1% are nitrogen, and a few other trace elements including calcium, phosphorus and potassium. [31]
a) To what extent is this an accurate description of a human being? To what extent is this description complete?
b) List at least five aspects of human nature that are impossible to study using a reductionist approach.

1.11 Review the difference between soft and hard agnosticism, then read the quotes below which reflect an agnostic worldview.

Sally: *I cannot know whether a deity exists or not, and neither can you.*
John: *I don't have answers for fundamental questions on the nature of ultimate reality, but maybe*

there will be more evidence in the future and I will be able to find something out.

a) Which of these quotes expresses soft agnosticism? Explain your answer.
b) Which expresses hard agnosticism? Explain your answer.
c) Why do you think it might be important or worthwhile to be able to distinguish between the two approaches to agnosticism?

1.12 Many agnostics express sincere honesty when they say they do not know if God exists and some of them sincerely pursue answers to fundamental questions about life and its meaning. Hard agnosticism goes a step beyond from "simply admitting to a lack of knowledge on these matters" to "claiming that nobody can ever know if God exists." Do you agree or disagree? Is it possible for a person to know if God exists? Look up Romans 1:19-20 and discuss 'hard agnosticism' in light of this passage.

1.13 According to some scholars, agnosticism is impossible in practice, since a person can only live either as if God does not exist, or as if God does exist. Do you agree or disagree? Explain your answer

1.14 The quotes below express scientism. Which one(s) express strong scientism and which one(s) weak scientism? Explain your answers.

(1) *You can't know something unless you can prove it scientifically.*
(2) *Any other intellectual activity is inferior to science. Science is the best pathway to truth.*
(3) *If you can quantify something or test it in the lab, then you can know it. Otherwise, it's just one person's opinion.*
(4) *Religious beliefs are neither true nor rational since they are not scientifically testable.*
(5) *A field of knowledge is valid only if scientific research supports it.*

1.15
a) Many of our ancestors expressed a pantheistic worldview. They revered the Sun, the Moon and the stars as gods. In biblical times pantheism was a common worldview. Can you find verses in the first chapter of the book of Romans that refer to pantheism? Write down these verses and discuss pantheism in light of the Romans passage.

In the modern scientific era we have good understanding of the heavenly bodies that the ancients worshipped. It is not as common to find people today who worship the Sun and the stars. But pantheism, where people worship and revere created things rather than the Creator, still exists in a more subtle form. Read the following quotes and note that the capitalization of words like Nature, Cosmos and Universe can sometimes signify a subtle pantheistic perspective.

"...everything that exists is part of Nature and is brought into being by Nature with a deterministic necessity." Benedict de Spinoza, philosopher [32]

"We are, in the most profound sense, children of the Cosmos." Carl Sagan, astronomer, in Cosmos[33]

b) Make a list of created things that people worship today.
c) How do you determine the proper balance between caring for created things in a God-honoring way and worshipping those created things?

1.16
a) Why is relativism as a worldview incompatible with the scientific enterprise?
b) Why is relativism as a worldview incompatible with Christianity?

1.17 Some scientists argue that religion, aesthetics and much of philosophy and ethics are merely subjective opinion, because they cannot be put to an experimental test. What is the worldview expressed by this line of thinking?

1.18 *"Science is far from a perfect instrument of knowledge. It's just the best we have."* Carl Sagan, astronomer [34]
Even though science is the best tool we have for gathering knowledge about the physical universe, it only tells us how nature works on a physical level. Science is not the appropriate tool for developing insight into philosophical, spiritual, emotional, and historical issues or the nature and purpose of human beings. For example, consider these questions:

- How do two people make a marriage relationship last?
- How can you have a good relationship with your parents?
- Why was I born into a prosperous family instead of a poor one?

Think of at least three more examples of questions where although science might shed some light on the issue, it is not the best tool for obtaining knowledge about a particular subject.

1.19 Philosopher Alfred North Whitehead and Joseph Needham, a historian of Chinese technology, suggested that what was lacking in the development of science in non-Western cultures was monotheism. Explain how the monotheism of Western cultures might have positively influenced the development of science. (If you're having trouble answering the question, consider: which is more compatible with universal laws of physics, monotheism or polytheism? Why?)

1.20 *"Why should a few simple laws of Nature explain so much and hold sway throughout this vast Universe? Isn't this just what you might expect from a Creator of the Universe?"* Carl Sagan, astronomer [35]

a) Think about what makes it possible for us to learn things about the world in which we live. What explanation for the rationality encountered both in the world and in our minds would be proposed by each of the following worldviews?

Philosophical naturalism	Atheism
Deism	Relativism
Agnosticism	Theism
Pantheism	Christianity

b) Which worldview do you think offers the best explanation for rationality and our ability to know and learn about the world around us? Why?

1.21 Spend an afternoon at a bookstore looking at books about astronomy, or general scientific magazines like Science and Nature, or the science section of a newspaper. Can you identify at least two statements by scientists or science journalists that are expressing not just scientific information but their worldviews? Identify the worldviews being expressed.

1.22 C. John Collins, Professor of Old Testament at Covenant Theological Seminary in St. Louis, gives the following good advice in his book *Science and Faith, Friends or Foes*?

> *"...we can't rely solely on arguments to help people embrace the Christian worldview. There is no substitute for a gentle and holy Christian character that everyone knows they can rely on in a pinch: that's what shows others our worldview is one to live by."* [36]

Some people hold their worldview as a conscious choice. Other people may hold their worldviews for reasons that are unconscious and beyond their rational choice. In addition to being prepared to offer rational reasons for holding the Christian worldview, Christians should also be sensitive to the underlying reasons people may have for choosing their own worldviews. Consider the following examples:

- A person who is fearful of being judged may hold to relativism.
- Somebody whose father abandoned her as a child might be angry and also feel abandoned by God, leaning towards atheism.
- A person holds to naturalism and finds escape in the science lab because they dread making changes they know would be necessary if God was in their life.
- A humanist may hide deep insecurities by trying to show extreme human confidence.

a) What are other reasons people might choose their particular worldviews?
b) Speculate how you would feel if someone patiently made an effort to understand the way you think and the worldview you hold. How can you show Christian character in the way you approach a conversation with a friend who holds a different worldview than you?

1.23 Deists many times refer to God as a "Divine Watchmaker" who carefully and skillfully constructed a watch, wound it up, and then let the clock run on its own with no further involvement. The Christian worldview claims that God was not only the first cause and Creator of the universe but that He is still involved in His creation. Read Colossians 1: 16-17 and Hebrews 1:3 and then discuss how the deistic worldview compares to the Christian worldview.

1.24 Secular humanists encourage people to 'live their lives according to their own lights.' How does this idea compare to the Christian worldview? Support your answer with at least two Bible verses that are relevant to this comparison.

1.25 *"It is certainly true that all beliefs and all myths are worthy of a respectful hearing. It is not true that all folk beliefs are equally valid—if we're talking not about an internal mindset, but about understanding the external reality."* Carl Sagan, astronomer [37]

In light of this quote, discuss the difference between tolerance, being respectful of other worldviews, and relativism.

1.26 *"...The more scientific advance is achieved, the greater will be our understanding of the universe—and hence, the greater need to explain this very success."* Alister McGrath, philosopher and theologian [38]
a) On what worldview assumptions does the process of science depend?
b) What "success" is being referred to in the quote?
c) Rewrite the quote in your own words.
d) How does the success of scientific inquiry provide Christians with an opportunity to share their faith with non-believers?

1.27 The scientific process assumes that the rationality in the world can be understood in part by the rationality of our minds.
a) If the human mind is nothing but the result of evolutionary processes from lower animals as evolutionists would claim, do you think there is a base for trusting in our reasoning?

b) In what way does the reliability of the scientific enterprise depend on the reliability of our own rea-

soning?

c) Read the following quotes and restate them in your own words. What are Darwin and Lennox each saying about the human mind? With whom do you agree? Why?

"With me, the horrid doubt always arises whether the convictions of man's mind, which has been developed from the mind of the lower animals, are of any value or at all trustworthy." Charles Darwin, naturalist [39]

"If my mind is guided by random (not rational) atoms, then I should not be able to trust my own mind experiences. But yet atheists say you can still do science. This is like sitting on a tree branch and cutting it down at the same time." John Lennox, mathematician and philosopher of science [40]

d) Discuss how Christianity contrasts with naturalism in providing a reason to trust in human reasoning and rationality.

1.28 Some critics of religion argue that religion hinders the progress of science. Instead of looking for an explanation of a natural event, these critics claim that religious people are content with not knowing or with simply saying, *"God did it."* Respond to this criticism by discussing how the Christian worldview contributed to the early development of science.

1.29 What are Scriptures' advices/responses concerning the different worldview(s)?

a) "*The fool says in his heart, 'There is no God.'"* Psalm 14:1
What is the worldview being referred here? What is Scriptures' response/advice?

b) *"... lean not on your own understanding..."* Pv 3:5
What is the worldview being referred here? What is Scriptures' response/advice?

c) *"Although they claimed to be wise, they became fools... They exchanged the truth of God for a lie, and worshiped and served created things, rather than the Creator."* Romans 1:22-25
What is the worldview being referred here? What is Scriptures' response/advice?

1.30 *"The universe appears to have been designed by a pure mathematician."* James Jeans, physicist [41]
Why do you think physicist James Jeans considers the Designer of the universe a pure mathematician?

1.31 In his book *An Atheist Defends Religion*, atheist Bruce Sheiman points out an inconsistency in the worldview of scientism. Read his statement below and explain in your own words what the inconsistency is.

"An additional dimension of faith is also expressed in scientism, which I previously defined as a belief that the materialist model of reality is all that exists and that science in effect disproves the existence of God. Scientism does not rely on empirically derived evidence for these conclusions, for there can be none. Thus, like religion, it makes claims that cannot be tested or proven. The hallmark of scientism—accepting reason as the only path to truth while at the same time negating faith—paradoxically requires faith." [42]

1.32 Pick any worldview and do background research on the origin and history of the ideas. For example, deism became popular during the Enlightenment era. Why?