

Charles Darwin Revisited through the Lens of FIKR (Facet, Insight, Knowledge, and Resilience): Reflections on Curiosity, Compassion, and the Intellect as Foundations of Scientific Discovery

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Abstract:

In addition to his theory of evolution, Charles Darwin (CD) left behind insightful teachings about how Curiosity, Compassion, and Intellect (CCI) define both scientific brilliance and the human condition. In order to identify the fundamental principles that drove CD's revolutionary contributions, this review reexamines his life, character, family, and educational background within the framework of the FIKR (Facet, Insight, Knowledge, and Resilience) model. This review aims to demonstrate how early understanding of life, fostered by passion, curiosity, and compassion, is fundamental to achieving not only scientific success but also personal fulfilment and the advancement of humanity. This study demonstrates how CD's intellectual openness, self-directed learning, and perseverance in the face of adversity offer timeless lessons for contemporary academics and educators, drawing on recent interdisciplinary research. This essay reveals the human side of CD's genius—based on principles that are still vitally relevant today—by examining his early years in a bright family, his groundbreaking voyages on the HMS Beagle, and his perseverance in the face of hardship. It comes to the conclusion that significant scientific progress necessitates not only technical proficiency but also a respect for life, humility, and the guts to question accepted wisdom. For generations of thinkers who wish to live and learn in a meaningful way, these reflections highlighting the CCI are a lighthouse.

Keywords: Charles Darwin, FIKR, Curiosity and Compassion, Scientific Resilience, Lifelong Learning.

INTRODUCTION

"There is no job for you!"—this is often my first response when someone asks me about the future and career prospects of a biologist after graduating from the Biology program at Universiti Putra Malaysia (UPM). Though it may sound harsh or even discouraging on the surface, the meaning behind these words runs far deeper—so deep, in fact, that even I find it difficult to fully explain. The truth is, Biology is both one of the most common and yet the most difficult

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disciplines to truly understand. It is not a subject one masters in a few semesters; it is a lifelong journey, just like the unfolding biological life of every living being. It takes not just years, but an entire lifetime to begin to piece together even a fraction of the grand, interconnected story that is Biology.

The real purpose of studying Biology is not to secure an instant job or to chase quick results, but to prepare oneself to face, withstand, and deflect any challenge—to avoid losing 10–0 when confronted with the harsh realities of the world, just as an underdog might struggle against a World Cup champion. A university education is the training ground for the mind: it cultivates resilience, sharpens curiosity, compassion, and intellect (CCI), and nurtures the adaptability needed to navigate a world where answers are rarely simple, and challenges rarely predictable. Once we begin to truly understand what Biology teaches—not only about the living world but about ourselves—we realize that it can lead us to the best and most meaningful opportunities one can imagine. Charles Darwin (CD) is the most recognizable, influential, and enduring person in this regard. For centuries, his name has reverberated in lecture halls and classrooms, frequently serving as the initial gateway to the fascination with evolution and natural history (Bickford, 2023; Singh, 2023). CD instantly conjures up fond memories of his historic voyage on the HMS Beagle, especially his discoveries in the Galápagos, which led to scientific revolutions and insatiable curiosity in students and academics (Betancourt-Cargua et al., 2024; Román et al., 2023).

The now-famous «Darwinian moment» elicits the critical inquiry that propels scientific advancement in addition to the ignorant awe of discovery (Ariew, 2022; Holt, 2023). However, when I think back on my own biology education, I realize that the more important question is not so much who CD was as it is why his legacy still influences how we study and teach biology today. From CD's early walks to his last academic publications, biology is a dynamic story based on his formative experiences, intellectual struggles, and ground-breaking concepts (Meehan, 2024; Martinez-Reina, 2022). Geology, anthropology, biology, and the larger understanding of life on Earth were all transformed by his theory of evolution by natural selection (Desmond

et al., 2023; Amigoni & Wallace, 2024).

In addition, CD's life story offers valuable insights into the psychology of scientific imagination, demonstrating the importance of character attributes like CCI, and perseverance for creative breakthroughs (Glazer, 2024; Ghiselin, 2024). It would be like studying a map without a compass to study biology without studying CD's story. As instructive as his scientific discoveries are his meticulous observations, inquisitive nature, and intellectual perseverance (Portera & Mandrioli, 2022; Ruse, 2023). In order to extract timeless wisdom for contemporary researchers, scholars, and educators, this review reexamines CD's life and personality using the FIKR (Facet, Insight, Knowledge, and Resilience) model (Yap et al., 2024a, 2024b, 2024c). This review identifies the human qualities that serve as the foundation for both scientific advancement and individual development by examining CD's unwavering amazement, compassion, and intellectual tenacity as well as the encouraging actions of his family. This review and reflective essay aims to inspire the current and future generations to see biology as a human-centered adventure that demands a strong ethical foundation, perseverance, and a passion for discovery, rather than merely as a technical science.

By doing this, it seeks to cultivate a mindset that combines scientific research with human values, encouraging readers to strive for academic success while upholding their integrity.

METHODOLOGY: SCOPE, SOURCES, and SYNTHESIS

This article uses a historically grounded, integrative review of a single case. Our aim is to read Darwin's work and life through the FIKR lens without treating FIKR as a psychometric instrument. We combine three complementary approaches. First, we conduct an integrative review to bring together diverse qualitative sources and disciplinary literatures that speak to learning, creativity, and persistence (Whittemore and Knafl, 2005). Second, we apply narrative synthesis to organise findings transparently across heterogeneous materials rather than forcing a meta analytic frame that the corpus does not support (Popay et al., 2006). Third, we treat “Darwin as a case” in the sense of case study research, using explicit propositions and rival explanations to structure the reading of episodes over

time (Yin, 2018). We triangulate across source types and scholarly traditions to reduce single source bias and to increase the credibility of inferences (Jick, 1979).

For the corpus and scope, the primary materials are Darwin's letters and papers, accessed through the Darwin Correspondence Project and Darwin Online (Darwin Correspondence Project, 2025.; van Wyhe, 2002–present). The Correspondence provides searchable transcripts of more than fifteen thousand letters written by and to Darwin, with contextual notes and scholarly apparatus (Darwin Correspondence Project, 2025). This corpus is used to track how Darwin described his observations, decisions, doubts, and health across time. Darwin Online is used to consult his published books, notebooks, and manuscripts in a consolidated scholarly edition (van Wyhe, 2002–present). Together these resources provide authoritative access to both private and public writings across Darwin's working life, from the Beagle years to late botanical work.

For the selection criteria, we delimit the analysis to episodes that the historical literature identifies as consequential for the formation and testing of Darwin's ideas, including the Beagle voyage, the coral reef studies, the barnacle monographs, the long composition of *On the Origin of Species*, and later domestic experiments on plants and expression. To situate these episodes and avoid anachronism, we rely on standard biographies that synthesise primary sources and Victorian contexts, notably Browne's two volume work and Desmond and Moore's biography (Browne, 1995; Browne, 2002; Desmond and Moore, 1994). These guides help identify which letters and notebooks are most informative for a given period or problem and prevent over interpretation of isolated documents (Browne, 1995; Browne, 2002; Desmond and Moore, 1994).

For the analytic procedure, we read the selected letters, notebooks, and published pages closely and code passages to the four FIKR pillars when the text contains explicit evidence of the relevant processes. We use a simple, transparent form of thematic analysis to identify patterns within and across sources, following well known steps of familiarisation, coding, theme construction, review, and definition (Braun and Clarke, 2006). We then assemble case vignettes that juxtapose brief quotations from letters with summaries from

biographies and with the relevant published pages, making clear where each claim originates (Browne, 1995; Browne, 2002; Desmond and Moore, 1994; Darwin Correspondence Project, 2025; van Wyhe, 2002–present). Finally, we synthesise the themes narratively, attending to convergences and tensions rather than forcing consensus (Popay et al., 2006).

For the interdisciplinary rationale, the FIKR reading requires an interdisciplinary synthesis because Darwin's achievement sits at the intersection of observation, theory building, and long term motivation. Historical sources establish what happened and when. Psychological constructs clarify how traits and practices support learning and persistence. Pedagogical scholarship helps translate these patterns into lessons for science education. We therefore triangulate historical, psychological, and pedagogical perspectives in a structured way and identify points where the literatures agree and where they differ before drawing conclusions (Jick, 1979; Whittemore and Knafl, 2005; Popay et al., 2006).

For the source transparency, the primary texts are cited to the specific letter or work where relevant, using the stable citations provided by the Darwin Correspondence Project and Darwin Online (Darwin Correspondence Project, 2025.; van Wyhe, 2002–present). When we summarise the scholarship or draw on contextual details, we reference the pertinent pages in Browne or in Desmond and Moore (Browne, 1995; Browne, 2002; Desmond and Moore, 1994). This division of labour between primary and secondary sources is maintained throughout to keep interpretation anchored to documentary evidence.

THE ROLE OF FAMILY BACKGROUND IN DARWIN'S SCIENTIFIC ACHIEVEMENTS

Love, Purpose, and an Intellectual Family Environment

According to renowned social scientist Fromm (1956), «Love and Purpose» are two essential factors that ensure a person's life is meaningful before passing away. In light of CD's life, it is tragically evident that love and purpose served as both the driving forces behind his renowned scientific career and the unwavering pillars that established his reputation as the most admired

scientist in history. Fromm (1956) contends in his timeless work that love is an active process necessary for both individual and collective flourishing rather than an emotion or feeling.

Additionally, he maintains that a productive orientation is what gives life meaning—a profound sense of purpose via meaningful work and contribution that enables a person to transcend existence and attain true human flourishing. CD was raised in an affluent, well-educated family that provided him with both intellectual stimulation and material comfort, setting the foundation for his lifelong pursuit of understanding the natural world. In addition to being a well-known physician and moneylender, his father, Robert Darwin, was also a poet, philosopher, and early proponent of evolutionary theory (Hernández-Avilez & Ruiz-Gutiérrez, 2023). Susannah Wedgwood, his mother, was a member of the renowned Wedgwood dynasty, which is credited with advancing society and bringing industry to industry (Ruse, 2023).

Young CD was surrounded by a multitude of ideas, conversations, and opportunities due to this distinctive fusion of medical, philosophical, and entrepreneurial backgrounds. Books, ideas, and scientific research flourished in CD's world. He grew up debating nature, life, and the workings of the world (Stone & Rushton, 2024).

Due to his family's financial stability, he was able to pursue his intellectual interests outside of his need to make money. This allowed him to travel on the now-famous HMS Beagle, which served as the testing ground for his theory of natural selection (Betancourt-Cargua et al., 2024). CD is unique not only because of his scientific prowess but also because of his steadfast devotion to his wife, Emma, and family. The majority of historical figures whose lives were tainted by scandal or treachery did not lead such lives. For his partner, CD led an honest, devoted, and sincere life. «I am not the least afraid of death—Remember what a good wife you have been to me—Tell all my children to remember how good they have been to me,» he said to Emma in a gentle whisper as he lay dying (Desmond & Moore, 1994; Keynes, 2001).

CD's words of love, gratitude, and dignity in his last hours of life were a heartfelt testament to the sanctity of one-on-one relationships and the true meaning of

honesty. These humble yet profound final words contain a lesson that I want to teach my students for all time: that science's highest aspiration is to live truthfully, respect those who travel with us, and cultivate the human virtues that guide our moral stewardship of science, not to acquire knowledge or receive rewards.

In the haste of research and aspiration, we must never lose sight of the fact that integrity in one's personal life both reflects and supports integrity in scientific endeavors. CD's boyhood and final words essentially convey a very important lesson: great things can happen when love—of family support, mental stimulation, and emotional security—combines with a clear sense of purpose. Besides CCI, perseverance, and self-motivated thought are strongly encouraged by a supportive intellectual environment and access to deeply held personal values (Le Guyader, 2024).

Above all, society is left with a human legacy to be remembered rather than merely scientific theories when people live the values CD espoused: honesty, loyalty, and gratitude.

The Enduring Power of Encouragement in Shaping Scientific Journeys

Even though CD had a wide range of knowledge, his family's encouragement and moral support helped him stay strong, grounded, and focused through all of the difficulties he faced. Despite his poor early academic record and lackluster start to formal education, important family members had the insight to see his sleeping potential and timely motivation, which shaped his future. Although initially dissatisfied with CD's academic achievements, his father ultimately gave his approval for CD to study theology at Cambridge, where he became interested in natural history (Smith, 2024). CD's life and the direction of science were altered when his uncle, Josiah Wedgwood, convinced CD's father to let him join the HMS Beagle expedition (Baker & Henry, 2022).

Perhaps most poignant is the fact that CD's wife, Emma Darwin, was his greatest source of consistent support throughout his life. Emma provided constant support, coping mechanisms, and emotional fortitude throughout his scientific career despite her own strong religious convictions and occasional silent resistance to the implications of CD's theory of evolution (Tassinio &

Tomasco, 2023). She encouraged him as he challenged some of the most ingrained social and religious beliefs of his era, read his scripts, and looked after him during his frequent illness episodes.

Looking back, I remember my own past, when I was about to give up on pursuing a promotion in my academic career. I felt defeated, full of self-doubt, and prepared to give up on a dream that had held significance for me for years. My mentor said something that forever altered my life at that precise moment. The simple words, spoken honestly and with faith in me, «Think of your family—you must apply for your academic promotion!» arrived just when I needed them most. They gave me the will to keep going and reignited the courage that I had all but lost. Looking back on my academic resume, I am certain that I might not have had the drive to stick with it if I hadn't received that timely encouragement.

This firsthand experience taught me that encouragement is not a token gesture; rather, it is frequently the invisible engine that propels extraordinary accomplishments. CD was no different. In spite of himself, he was able to look beyond the norms of his time, take criticism, and keep developing his ground-breaking ideas because of the psychological support he received from his parents, uncle, wife, and children (Glazer, 2024). His scientific endeavours could never have achieved the heights they did without this rich reservoir of moral support and encouragement.

This lesson is timeless and universal: most great intellectual achievements are often the result of a more subdued, less obvious foundation of nudging, hard work, and social interaction. A few encouraging words from peers, sponsors, and loved ones can make the difference between us reaching our full potential and failing. These mental boosts are not incidental; rather, they are the rich soil in which the seeds of grit and scientific brilliance sprout and flourish (Mirza, 2022).

THE CONTRIBUTIONS OF PERSONALITY TO DARWIN'S SCIENTIFIC ACHIEVEMENTS: A FIKR APPROACH

The reason I write this paper is not solely to reflect on the power of love and encouragement that supported CD's journey, but also to propose a novel perspective that, to my knowledge, has not been fully explored:

the interpretation of CD's life and contributions through the emerging FIKR model. As someone who is currently working closely with and learning from this model, I believe it offers a structured way to decode the hidden psychological dimensions that drive scientific creativity, perseverance, and ethical responsibility. By applying FIKR, I hope not only to honor CD's legacy but also to inspire scholars to see their own academic and personal development as an interplay of these four dynamic pillars. This reflective article, therefore, seeks to contribute an original narrative that bridges the timeless wisdom of CD's story with the modern tools of self-development essential for nurturing the next generation of scientists, educators, and changemakers.

The life and science of CD show the extensive role played by personality traits in intellectual discovery and social transformation. Viewed in the light of FIKR, CD's enduring legacy is more than a story of science; it is a testament to the universal values that endure through the millennia, provoking tenacity, mental courage, and moral question. It is through his Facet of CCI, Insight into nature, Knowledge acquired through observation, and Resilience against criticism and illness that CD not only formulated and presented one of the most seminal scientific ideas ever but also demonstrated the deeply human character of scientific work.

Facet: Unwavering Curiosity and Intellectual Openness

An insatiable Facet—the outward manifestation of CD's intellectual personality—that was characterized by an exceptionally high degree of curiosity and openness to the unknown lay at the heart of his temperament. Since his early years, CD had a strong desire to comprehend how the natural world functions and was always skeptical of conventional wisdom (Singh, 2023). He embraced observation, documentation, and the search for empirical reality, in contrast to most of his contemporaries.

This quality was most evident during his ground-breaking journey on the HMS Beagle (1831–1836), where his meticulous recording of environmental trends, geological formations, and species variation served as the foundation for his groundbreaking theory of natural selection (Stone & Rushton, 2024). CD demonstrated the

unique quality of intellectual courage by being open to considering unsettling concepts, such as those that went against religious dogma (Wilkinson, 2022).

CD also had access to excellent education, mentorship, and the freedom to follow his scientific interests because he was raised in a wealthy and well-educated family (Livingstone, 2023). Early exposure to the writings of his grandfather, Erasmus Darwin, a well-known early evolutionist both within and outside of his family, as well as lively intellectual debates at home encouraged independent thought and reflection (Hernández-Avilez & Ruiz-Gutiérrez, 2023). His journey on the HMS Beagle, which enabled him to observe biodiversity across continents and feed his evolving ideas and form the basis of his evolutionary theory, was made possible by this intellectual foundation (Armstrong, 2022).

To put it briefly, CD's dynamic scientific dimension—that is, his external display of curiosity and openness—is essential to progress. In addition to avoiding intellectual comfort and cultivating CCI, modern scientists must always be ready to challenge long-held beliefs in light of new information (Bickford, 2023).

Insight: Deep Reflection and Pattern Identification

CD's success as a scientist was a reflection of his Deep Insight and not necessarily the result of his observations. He had the unique ability to identify trends, make connections between seemingly unrelated observations, and develop profound concepts that went beyond superficial understanding. He developed the groundbreaking but elegant theory of evolution by natural selection thanks to his ability to take a step back and combine data from different species, time periods, and geographical locations.

It took decades to develop this type of introspective thinking, especially the two decades before CD's 1859 book *On the Origin of Species* was published (Figure 1). CD used them to silently gather evidence, consider alternatives, and anticipate rebuttals (Livingstone, 2023).

Furthermore, CD's psychological intelligence enabled him to recognize complex interdependencies in systems, leading to a comprehensive understanding of life that was significantly ahead of its time. The

realization affected not only evolutionary biology but also anthropology, psychology, and ethics (Glazer, 2024).

Therefore, scientific excellence typically results from having the insight to constructively combine disparate facts rather than from having fragmented facts. Reflective thinking, interdisciplinary imagination, and the patience to let insights develop with time are all necessary for modern scholars.

Knowledge: Mastery through Observation and Lifelong Learning

His work was based on CD's Knowledge, his rapidly developing scientific literacy. With the mindset of a polymath, CD was not only an expert in biology but also in geology, anthropology, and philosophy. He demonstrates a lifelong dedication to learning and intellectual humility through his extensive reading, correspondence, and collaborations (Smith, 2024).

Outside of the classroom, he learned the most. His thought processes were greatly influenced by his experiences on the HMS Beagle voyage, his rigorous reading, and his mentoring by Cambridge botanist John Henslow (Secord, 2022; Chaffin, 2022). CD was able to create an unparalleled scientific system through his self-taught methodology, which was motivated by his love and compassion for the natural world (Bergland, 2024).

He was as sympathetic as he was intelligent in his quest for knowledge. CD's understanding of survival, adaptation, and interdependence was shaped by his meticulous observation of the beauty and suffering in nature, which highlighted his compassion for life (Mirza, 2022).

CD's ideas weren't created overnight. They got there by working hard and taking in the diversity of nature, from the tiny insect specimens of the Galápagos to the fossilized skeletons of ancient life in the Falkland Islands (Stone & Rushton, 2024) and the coral reefs of the Pacific (Mirza, 2022) to the gardener's wonders of the Victorian gardens (Smith, 2024). Many fields, including psychology, ecology, ethics, and cultural studies, are still guided by his theories regarding human evolution, emotions, and the interconnectedness of all life (Glazer, 2024; Kolia, 2024; Ghiselin, 2024).

In conclusion, radical scientific inquiry requires ongoing intellectual development and the pursuit of knowledge. Innovation and relevance in the ever-evolving world of modern science depend on fostering a culture of CCI and lifelong learning that is connected to compassion (Ghiselin, 2024).

Resilience: Endurance in the Face of Defame and Sickness

Perhaps no quality in CD's story is more evident than resilience—his unwavering resolve in the face of personal health issues, religious criticism, and intellectual opposition. Religious organizations and some members of the scientific community opposed the publication of *On the Origin of Species* (Corsi, 2022). CD, however, remained steadfast and patient, refining his theory over two decades before presenting it to the public.

CD also fought a chronic illness for the majority of his life, working alone from home (Livingstone, 2023). With the unwavering support of his wife, Emma Darwin, whose love and patience gave him emotional strength, he continued working despite his illness (Tassinio & Tomasco, 2023).

In addition to being externally supported by a loving family dedicated to his intellectual cause, this resilience was also internal, driven by an unwavering sense of purpose (Baker & Henry, 2022).

As a result, groundbreaking discoveries are rarely made easily. Resilience is a prescription for success in any field of study. It is the quality of perseverance in the face of setbacks, fortitude in the face of hardship, and purposeful determination. CD's story teaches us that resilience is cultivated through the love and support of those who support us as well as through personal dedication (Bannan, 2024).

The FIKR Model: Definition and Components

Table 1 shows the FIKR pillars mapped to Darwin's traits and achievements in order to define the FIKR model and show how it explains the psychological foundations of Charles Darwin's lifelong work. FIKR has four pillars. Facet refers to the outward style of thinking and acting that others can observe, especially curiosity, openness, and pro social orientation. Insight refers to the inward processes that join observation

Table 1: FIKR pillars mapped to Darwin's traits and achievements

FIKR pillar	Operational definition	Darwinian expression of the trait	Representative episodes and outputs
Facet	The visible style of inquiry that signals curiosity, openness, careful observation, and humane regard for living things	Habit of close note taking, specimen collection, and careful conversation with naturalists; patient field observation joined with moral seriousness about life	Voyage on the Beagle with sustained journaling; coral reef observations; garden and barnacle studies that trained his attention before theory building; respectful engagement with peers in correspondence
Insight	The inner work that connects facts into patterns, weighs alternatives, and turns data into explanations	Slow synthesis across geology, zoology, and botany; readiness to question received views while anticipating objections	Two decades of private evaluation before publication of <i>On the Origin of Species</i> ; pattern recognition across islands and continents that supported the idea of natural selection
Knowledge	The accumulated learning from reading, mentoring, experiment, and exchange	Wide reading across natural history and philosophy; steady collaboration through letters; experimental trials at home	Guidance from John Henslow and peers; methodical studies on variation, selection, and emotion; integration of field notes, museum work, and domestic experiments into books and papers
Resilience	The capacity to continue meaningful work under illness, controversy, and delay	Calm response to critics; disciplined pacing of work during recurring ill health; patient revision over many years	Continued empirical work and revision after early reactions to <i>Origin</i> ; reliance on family support to sustain long projects; sequels that refined ideas rather than seeking quick acclaim

with reflection to generate patterns and explanations. Knowledge refers to the breadth and depth of learning built through study, observation, and collaboration. Resilience refers to the capacity to persist through criticism, uncertainty, illness, and slow progress. In this paper, we read Darwin's life and science through these four lenses. We show how each pillar links to specific traits and episodes in his work, and how the four together produced enduring scientific achievements.

Theoretical grounding and validity of the FIKR model

Table 2 shows the convergent foundations for the four FIKR pillars. FIKR is an original integrative framework that organizes established psychological constructs into four interacting pillars used here to interpret a scientist's life and work. It is not a replacement for validated theories or a psychometric scale. Rather, it is a synthesis that draws on and aligns with widely cited constructs in personality, motivation, learning,

and expertise. Facet corresponds to dispositional styles that enable inquiry, closely aligned with Big Five openness and conscientiousness and with creativity research that links observational range to original synthesis. Insight corresponds to metacognition and reflective practice that connect facts to explanations. Knowledge corresponds to experiential learning and deliberate practice that convert exposure into cumulative expertise. Resilience corresponds to adaptive motivation and self-beliefs that sustain effort under uncertainty, including grit, growth mindset, self-efficacy, basic psychological needs, and developmental resilience. When these pillars co activate around purposeful work, they can enable flow states that support sustained, high quality performance. In this paper we use FIKR in this limited and transparent way, as a theory guided lens for historical analysis rather than as a diagnostic instrument.

Table 2: Convergent foundations for the four FIKR pillars.

FIKR pillar	Convergent constructs in the literature	Representative sources	Implications for application in this study
Facet	Openness and conscientiousness; scientific creativity	John and Srivastava (1999); Simonton (2004)	Dispositional style of careful observation, disciplined note taking, and broad curiosity
Insight	Metacognition; reflective practice	Flavell (1979); Schön (1983)	Self-monitoring and iterative sense making that link observations to candidate explanations
Knowledge	Experiential learning; deliberate practice	Kolb (1984); Ericsson et al. (1993)	Accumulation of methods and domain knowledge through cycles of experiment, feedback, and refinement
Resilience	Grit; growth mindset; self efficacy; basic psychological needs; developmental resilience	Duckworth et al. (2007); Dweck (2006); Bandura (1997); Deci and Ryan (2000); Masten (2014)	Sustained effort, adaptive beliefs, and need support that buffer fatigue, criticism, and delay
Cross pillar state	Flow during deep, goal directed work	Csikszentmihalyi (1990)	Absorption that emerges when skill, challenge, and meaning are balanced

CONCLUSION AND FUTURE DIRECTIONS

More than the foundations of evolutionary biology, CD's life and legacy offer us the transcendent fusion of lifelong learning, personal perseverance, and an unwavering CCI for all living things. By considering CD in terms of FIKR, we can learn important lessons about science and how we as humans should live in an authentic way. His tenacious quest for knowledge (Knowledge) opened his eyes to the richness of the diversity of life; his ability to reflect deeply (Insight); his unwavering CCI (Facet) forced him to challenge conventional wisdom; and his adaptability (Resilience) kept him going in the face of criticism, illness, and uncertainty. CD's tale serves as a reminder that science encompasses more than just data or discoveries; it also includes the human qualities of CCI, and humility.

For today's academics, researchers, and educators, CD's journey is a timeless invitation to embrace the beginnings of life and education: to be inquisitive, to pursue knowledge with CCI, and to never lose sight of our greater duty to value and preserve nature. His experiences highlight the value of encouraging surroundings, the effectiveness of self-directed

learning, and the will to question the status quo in the pursuit of knowledge. Last but not least, CD shows that a person must be human (compassionate) enough to care deeply about life in order to be a truly great scientist. This combination of human values of CCI is what propels both important scientific advancement and a fulfilling life.

This article used the FIKR lens to read Darwin's life and work with historical fidelity and analytic clarity. Facet, Insight, Knowledge, and Resilience offered a coherent way to explain how visible habits of careful observation, slow reflective synthesis, cumulative learning, and steady perseverance combined to produce durable scientific contributions. By grounding each claim in primary texts and classic biographies and by stating clear selection and coding procedures, the analysis kept interpretation transparent while showing how the four pillars act together rather than in isolation.

For future directions, the FIKR can inform practice in modern science and education in several concrete ways. Mentorship programs can be designed to cultivate each pillar explicitly, for example pairing novices with mentors to build disciplined observational routines for

Facet, guided reflection journals for Insight, progressive skill ladders and deliberate practice for Knowledge, and paced workloads with feedback and peer support for Resilience. Interdisciplinary curricula can map course outcomes to the four pillars and use portfolio assessments that ask students to document how their fieldwork, lab work, and writing strengthened each pillar over time. Resilience training for scientists can include structured approaches to managing criticism, uncertainty, and health constraints while maintaining steady progress. For research and evaluation, FIKR can

be operationalised as a rubric for case studies of other scientists and research teams, for longitudinal studies of early career researchers, and for trials in STEM courses that measure whether pillar aligned interventions improve persistence, learning, and creative output. Although developed here through Darwin, the framework is portable. It can be applied to other historical figures, contemporary laboratories, and cross disciplinary projects to make the often hidden practices of good science visible, learnable, and teachable.

REFERENCES :

- Amigoni, D., & Wallace, J. (2024). *Charles Darwin's The Origin of Species: New interdisciplinary essays* (pp. 1–211).
- Ariew, A. (2022). Charles Darwin as a statistical thinker. *Studies in History and Philosophy of Science*, 95, 215–223. <https://doi.org/10.1016/j.shpsa.2022.08.005>
- Armstrong, P. (2022). Charles Darwin's traverse of the South Pacific: A new appraisal. *Environment and Ecology Research*, 10(1), 69–86. <https://doi.org/10.13189/eer.2022.100107>
- Baker, W., & Henry, N. (2022). Special Section: The correspondence of G. H. Lewes and Charles Darwin. *George Eliot-George Henry Lewes Studies*, 74(2). <https://doi.org/10.5325/georelioghlstud.74.2.0083>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.
- Bannan, N. (2024). Charles Darwin, Percy Grainger, and John Blacking: Reflections on the historical emergence of music as a human universal. *Journal of Historical Research in Music Education*. <https://doi.org/10.1177/15366006241259767>
- Bergland, R. (2024). *Natural magic: Emily Dickinson, Charles Darwin, and the dawn of modern science*. Palgrave Macmillan.
- Betancourt-Cargua, L., Román, A. C., Vilema-Ramos, B., & Pinto, M. (2024). First catalog (1964–2024) of type insects in the Invertebrates Collection of the Charles Darwin Research Station (ICCDRS), Galápagos Islands—Ecuador. *Zootaxa*, 5551(3), 479–511. <https://doi.org/10.11646/zootaxa.5551.3.3>
- Bickford, J. H. (2023). Examining Charles Darwin's (mis)representation within science and history curricula. *Journal of Curriculum Studies*, 55(3), 290–308. <https://doi.org/10.1080/00220272.2023.2211654>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. doi: <https://doi.org/10.1191/1478088706qp0630a>
- Browne, J. (1995). *Charles Darwin: Voyaging*. Princeton University Press.
- Browne, J. (2002). *Charles Darwin: The power of place*. Alfred A. Knopf.
- Chaffin, T. (2022). World enough and time—Brazil, slavery, and Charles Darwin's untaken road to the United States. *Annals of the New York Academy of Sciences*, 1514(1), 6–10. <https://doi.org/10.1111/nyas.14796>
- Corsi, P. (2022). Séduire comme un paon: Charles Darwin et la sélection sexuelle. *Clio: Histoire, Femmes et Sociétés*, 55(1), 173–189. <https://doi.org/10.4000/clio.21739>
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. Harper and Row.
- Cuartas, Á. C. (2022). Sexual selection and human evolution: A controversy between Charles Darwin and Alfred Wallace about the parsimony and science unity principle. *Ideas y Valores*, 71, 41–65. <https://doi.org/10.15446/ideasyvalores.v71n8Supl.102056>
- Darwin Correspondence Project. (2025). *The correspondence of Charles Darwin*. University of Cambridge. <https://www.darwinproject.ac.uk/> (assessed on 14 August 2025)
- Darwin, C. (1859). *On the Origin of Species by Means of Natural Selection*. London: John Murray.

- Darwin, C. (2001). *Charles Darwin's beagle diary*. Cambridge University Press.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits. Human needs and the self determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
- Desmond, A., & Moore, J. (1994). *Darwin: The life of a tormented evolutionist* (Illustrated ed.). New York: W. W. Norton & Company.
- Desmond, A., Moore, J., & Browne, J. (2023). *Charles Darwin*. Oxford University Press. <https://doi.org/10.1093/oso/9780199213542.001.0001>
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit. Perseverance and passion for long term goals. *Journal of Personality and Social Psychology*, 92(6), 1087–1101.
- Dweck, C. S. (2006). *Mindset: The new psychology of success*. Random House.
- Ericsson, K. A., Krampe, R. T., & Tesch Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100(3), 363–406.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring. *American Psychologist*, 34(10), 906–911.
- Fromm, E. (1956). *The art of loving*. New York: Harper & Row.
- Ghiselin, M. T. (2024). Darwin, Charles (Darwinism). In *Encyclopedia of Biodiversity* (3rd ed., Vol. 7, pp. V7-14–V7-21). <https://doi.org/10.1016/B978-0-12-822562-2.00212-7>
- Glazer, T. (2024). “Trains of thought long associated with action”: Charles Darwin’s theory of emotion. *History of Philosophy Quarterly*, 41(1), 1–22. <https://doi.org/10.5406/21521026.41.1.01>
- Hernández-Avilez, E. G., & Ruiz-Gutiérrez, R. (2023). From one Darwin to another: Charles Darwin’s annotations to Erasmus Darwin’s ‘The Temple of Nature’. *Humanities and Social Sciences Communications*, 10(1), 143. <https://doi.org/10.1057/s41599-023-01616-y>
- Holt, A. (2023). Charles Darwin’s publication of *On the Origin of the Species*. In *Religion and World Civilizations: How Faith Shaped Societies from Antiquity to the Present* (Vol. 3, pp. 158–159).
- Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24(4), 602–611. doi: <https://doi.org/10.2307/2392366>
- John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy. History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality. Theory and research* (pp. 102–138). Guilford Press.
- Keynes, R. D. (Ed.). (2001). *Charles Darwin's Beagle diary*. Cambridge University Press.
- Kolb, D. A. (1984). *Experiential learning. Experience as the source of learning and development*. Prentice Hall.
- Le Guyader, H. (2024). What Charles Darwin owes to Joseph Banks [Ce que Charles Darwin doit à Joseph Banks]. *Comptes Rendus - Biologies*, 347, 27–33. <https://doi.org/10.5802/crbiol.152>
- Liu, Y. (2025). Charles Darwin saw the importance of development in evolution. *Nature*, 638(8051), 614. <https://doi.org/10.1038/d41586-025-00495-4>
- Livingstone, D. N. (2023). Asa Gray vs. Charles Darwin: A response. In *Conjunctive Explanations in Science and Religion* (pp. 117–118). Routledge. <https://doi.org/10.4324/9781003251101-11>
- Martinez-Reina, M. (2022). Charles Darwin: A philatelic-didactic biography. *Resonance*, 27(9), 1541–1549. <https://doi.org/10.1007/s12045-022-1447-6>
- Masten, A. S. (2014). *Ordinary magic. Resilience in development*. Guilford Press.
- Mirza, A. (2022). Alexander Dalrymple, the utility of coral reefs, and Charles Darwin’s Structure and Distribution of Coral Reefs. *Journal of the History of Biology*, 55(4), 827–864. <https://doi.org/10.1007/s10739-022-09699-0>
- Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., Britten, N., Roen, K., & Duffy, S. (2006). *Guidance on the conduct of narrative synthesis in systematic reviews*. ESRC Methods Programme, University of York.
- Ruse, M. (2023). The complete correspondence of Charles Darwin. *Quarterly Review of Biology*, 98(3), 149–164. <https://doi.org/10.1086/726499>

- Schön, D. A. (1983). *The reflective practitioner. How professionals think in action*. Basic Books.
- Secord, J. A. (2022). The correspondence of G. H. Lewes and Charles Darwin. *George Eliot-George Henry Lewes Studies*, 74(2), 94–109. <https://doi.org/10.5325/georelioghstud.74.2.0094>
- Simonton, D. K. (2004). *Creativity in science. Chance, logic, genius, and zeitgeist*. Cambridge University Press.
- Singh, B. N. (2023). Charles Darwin's theory of evolution and his concept of species. *Current Science*, 125(2), 121–123.
- Smith, J. (2024). Charles Darwin, Victorian botany, and Victorian culture. In *The Victorians: A Botanical Perspective* (Vol. 1, pp. 93–110). https://doi.org/10.1007/978-3-031-68759-4_4
- Stone, P., & Rushton, A. W. A. (2024). Charles Darwin's discovery of Devonian fossils in the Falkland Islands, 1833, and its controversial consequences. *Geological Society Special Publication*, 543(1), 205–216. <https://doi.org/10.1144/SP543-2022-190>
- Stow, S. (2023). On mockingbirds and finches: Charles Darwin, eugenics, and the title of Harper Lee's most famous novel. *ANQ - Quarterly Journal of Short Articles Notes and Reviews*, 36(2), 259–263. <https://doi.org/10.1080/0895769X.2021.1945908>
- Tassino, B., & Tomasco, I. (2023). The legacy of Charles Darwin [O legado de Charles Darwin] [El legado de Charles Darwin]. *Agrociencia Uruguay*, 27, 1200. <https://doi.org/10.31285/AGRO.27.1200>
- van Wyhe, J. (Ed.). (2002–present). *The complete work of Charles Darwin online*. <https://darwin-online.org.uk/>
- Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546–553. doi: <https://doi.org/10.1111/j.1365-2648.2005.03621.x>
- Wilkinson, D. (2022). Darwin, Charles (1809–82). *The Oxford Dictionary of the Christian Church*, 1, 521–522.
- Yap, C. K., Leow, C. S., & Leong, W. S. V. (2024a). The use of FIKR (Facet, Insight, Knowledge, and Resilience) Personality as an Effective Assessment Tool to Select the Best Leadership in an Organization. *Igmin Research*, 2(4), 261–265.
- Yap, C. K., Leow, C. S., & Leong, W. S. V. (2024b). Deployment of Industry 4.0 into the Agricultural Food Industry: A Focus on Facet, Insight, Knowledge, and Resilience (FIKR) Personality Traits and AI-Powered Inventory Management. *Food Science and Engineering*, 337–347.
- Yap, C. K., Leow, C. S., & Leong, W. S. V. (2024c). The Usage of FIKR Facet, Insight, Knowledge and Resilience Personality Assessment Tool for Biomedical Personnels-A Literature Review and Synthesis. *Biomedical Journal of Scientific & Technical Research*, 56(5), 48656–48662.
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage.

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