

who started physics

The quest to understand the fundamental workings of the universe has been a human endeavor since time immemorial. So, who started physics? The answer isn't a single name whispered on the wind, but rather a sprawling tapestry woven by countless brilliant minds across millennia. From the earliest observations of celestial movements to the intricate theories of quantum mechanics, the journey of physics is a testament to human curiosity and our persistent drive to unravel the mysteries of existence. This article will delve into the foundational figures and pivotal moments that shaped our understanding of the physical world, exploring the ancient roots, the scientific revolution, and the modern giants who continue to push the boundaries of knowledge. We will examine the earliest philosophical inquiries into nature, the groundbreaking contributions of figures like Aristotle and Archimedes, and the transformative era of Newton, Einstein, and beyond.

Table of Contents

Ancient Greek Foundations of Physics

The Dawn of the Scientific Revolution

Isaac Newton: The Architect of Classical Physics

The 20th Century Revolution: Relativity and Quantum Mechanics

Modern Physics and the Ongoing Quest

Ancient Greek Foundations of Physics

The very notion of systematically studying the natural world, distinct from mythology and pure philosophy, began to take shape in ancient Greece. These early thinkers, often called "natural philosophers," weren't just observing; they were attempting to explain phenomena through reason and logic, laying the groundwork for what would eventually become physics. Their inquiries, while sometimes speculative, marked a crucial shift in human thought.

Early Philosophical Inquiries into Nature

Long before formal scientific methods were established, thinkers like Thales of Miletus, around the 6th century BCE, are credited with being among the first to propose naturalistic explanations for phenomena, moving away from supernatural causes. He famously suggested that water was the fundamental substance from which all things originated. While not a scientific theory in the modern sense, this represented a profound intellectual leap – seeking underlying principles in the material world.

Aristotle's Contributions to Natural Philosophy

Perhaps the most influential figure of antiquity in this domain was Aristotle. His extensive writings covered a vast range of topics, including motion, mechanics, astronomy, and the

nature of matter. Aristotle developed a comprehensive system of physics that, while later proven incorrect in many aspects, dominated scientific thought for nearly two millennia. He categorized motion into natural and violent, and his concept of the elements (earth, air, fire, and water) and their inherent tendencies to move towards their natural places, shaped how people understood the universe's mechanics. He also explored ideas of force, gravity, and impact, albeit through a qualitative rather than quantitative lens.

Archimedes and Early Applied Physics

While Aristotle focused on philosophical explanation, Archimedes of Syracuse, a brilliant mathematician and inventor in the 3rd century BCE, stands out for his practical and quantitative approach. He is famously associated with the principle of buoyancy, explaining why objects float or sink, a cornerstone of hydrostatics. His work on levers and pulleys laid the foundation for simple machines and demonstrated a sophisticated understanding of mechanical advantage. Archimedes' method of using mathematical reasoning to solve physical problems was a remarkable precursor to modern scientific practice, earning him a significant place in the lineage of who started physics with a more empirical bent.

The Dawn of the Scientific Revolution

For centuries, Aristotelian physics held sway, often intertwined with theological doctrines. However, by the late Middle Ages and into the Renaissance, a growing dissatisfaction with the limitations of this ancient framework began to emerge. This period, often termed the Scientific Revolution, saw a radical shift in methodology and a renewed emphasis on observation and experimentation, paving the way for a more accurate and predictive understanding of the physical world.

Challenging Ancient Dogma

Figures like Nicolaus Copernicus, with his heliocentric model of the solar system, challenged the geocentric worldview that had been accepted for centuries. While Copernicus was primarily an astronomer, his work implied a different set of physical laws governing celestial motion. Later, Galileo Galilei would build upon these ideas, not only advocating for Copernicus but also conducting groundbreaking experiments that directly contradicted Aristotelian physics. Galileo's studies on falling bodies, his use of the telescope to observe the heavens, and his insistence on quantitative measurement were revolutionary.

The Importance of Experimentation and Mathematics

Galileo is often hailed as the "father of modern science" or "father of physics" because he championed the use of the scientific method. He understood that true knowledge about the physical world came not just from logical deduction or ancient texts, but from carefully

designed experiments and rigorous mathematical analysis. His work on kinematics, the study of motion without considering its causes, laid the groundwork for a more precise and predictive understanding of how objects move. He demonstrated that objects of different masses fall at the same rate in a vacuum, a direct refutation of Aristotelian ideas.

Isaac Newton: The Architect of Classical Physics

No discussion of who started physics would be complete without a profound acknowledgement of Sir Isaac Newton. His monumental work, *Philosophiæ Naturalis Principia Mathematica* (Mathematical Principles of Natural Philosophy), published in 1687, synthesized centuries of scientific inquiry and provided a unified framework for understanding motion and gravity that would endure for over two hundred years. Newton didn't just advance physics; he fundamentally reshaped it.

The Laws of Motion

Newton's three laws of motion are the bedrock of classical mechanics. These laws, expressed with elegant mathematical precision, explain how objects behave when forces are applied to them.

- The first law (inertia) states that an object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force.
- The second law (acceleration) states that the acceleration of an object is directly proportional to the net force acting on it and inversely proportional to its mass ($F=ma$).
- The third law (action-reaction) states that for every action, there is an equal and opposite reaction.

These laws provided a universal language to describe everything from falling apples to orbiting planets.

The Universal Law of Gravitation

Perhaps Newton's most profound contribution was the discovery of the universal law of gravitation. He proposed that every particle of matter in the universe attracts every other particle with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers. This single, elegant equation explained why apples fall to the earth, why the moon orbits the Earth, and why the planets orbit the sun. It unified celestial and terrestrial mechanics, demonstrating that the same physical laws govern the entire cosmos. Newton's work essentially answered

the question of who started physics by providing a comprehensive and predictive system.

The 20th Century Revolution: Relativity and Quantum Mechanics

While Newton's classical physics reigned supreme for centuries, the late 19th and early 20th centuries witnessed revolutionary new theories that fundamentally altered our understanding of space, time, gravity, and the very nature of matter and energy. These developments introduced concepts so counter-intuitive that they reshaped the very fabric of physics.

Einstein's Theories of Relativity

Albert Einstein, through his special and general theories of relativity, brought about a paradigm shift. Special relativity (1905) revolutionized our understanding of space and time, proposing that they are not absolute but are interwoven into a single continuum called spacetime, and that the speed of light is constant for all observers. His famous equation, $E=mc^2$, revealed the equivalence of mass and energy. General relativity (1915) further expanded this by proposing that gravity is not a force, but a curvature in spacetime caused by mass and energy. This theory provided a more accurate description of gravity, especially in extreme conditions like those near black holes, and fundamentally changed our perception of the universe's large-scale structure.

The Rise of Quantum Mechanics

Concurrently, a new branch of physics, quantum mechanics, emerged to explain phenomena at the atomic and subatomic levels, realms where classical physics faltered. Pioneers like Max Planck, Niels Bohr, Werner Heisenberg, Erwin Schrödinger, and Paul Dirac grappled with the bizarre behavior of particles. They discovered that energy, momentum, and other quantities are often quantized, meaning they exist in discrete packets rather than continuous amounts. Quantum mechanics introduced concepts like wave-particle duality, the uncertainty principle, and quantum superposition, which suggest that particles can exist in multiple states simultaneously until measured, and that there are inherent limits to how precisely certain properties of a particle can be known. This theory is the foundation of much of modern technology, from lasers to semiconductors.

Modern Physics and the Ongoing Quest

Today, physics continues to be a dynamic and evolving field. Researchers are actively exploring the frontiers of knowledge, seeking to unify the disparate theories that describe the universe and to uncover new fundamental principles. The question of who started

physics has, as we've seen, a very long and complex answer, but the spirit of inquiry that began with the ancient natural philosophers is more vibrant than ever.

Unification and Beyond

A major goal of modern physics is to find a "theory of everything" that can reconcile quantum mechanics with general relativity, providing a single, consistent framework for all fundamental forces and particles in the universe. String theory and loop quantum gravity are prominent candidates, though still under development and intense scrutiny. Scientists are also investigating dark matter and dark energy, the mysterious components that appear to make up the vast majority of the universe, and exploring the origins and evolution of the cosmos through cosmology and astrophysics.

The Future of Physics

The journey of physics is far from over. New discoveries are constantly being made through sophisticated experiments like those at the Large Hadron Collider and advanced astronomical observations. The fundamental questions that drove the earliest thinkers—what is the universe made of, how does it work, and where is it going—continue to inspire generations of physicists to push the boundaries of human understanding, seeking ever deeper truths about reality.

FAQ

Q: Was there one single person who "started" physics?

A: No, there wasn't one single person who "started" physics. It was a gradual development over millennia, beginning with ancient Greek natural philosophers who sought rational explanations for the natural world. Figures like Thales, Aristotle, and Archimedes made foundational contributions.

Q: When did physics become a distinct field of study?

A: Physics, as a distinct scientific discipline, truly began to emerge during the Scientific Revolution in the 16th and 17th centuries, with figures like Galileo Galilei and later Isaac Newton formalizing methods and developing comprehensive theories.

Q: Who is considered the most important figure in the history of physics?

A: While subjective, Sir Isaac Newton is often considered the most influential figure in the history of classical physics due to his laws of motion and universal gravitation, which

provided a unified framework for understanding the physical world for centuries.

Q: How did ancient Greek philosophers contribute to physics?

A: Ancient Greek philosophers like Aristotle and Archimedes laid the groundwork by proposing naturalistic explanations for phenomena, developing early theories of motion and mechanics, and emphasizing logical reasoning and mathematics in understanding the physical world.

Q: What is the difference between classical physics and modern physics?

A: Classical physics, largely developed by Newton, describes the macroscopic world and phenomena at everyday scales. Modern physics, which emerged in the early 20th century with theories like relativity and quantum mechanics, deals with the very small (subatomic particles) and the very large (cosmology) and involves concepts that differ significantly from classical intuition.

Q: Did Isaac Newton invent physics?

A: Isaac Newton did not invent physics, but he synthesized and formalized much of the existing knowledge, providing a comprehensive and mathematically rigorous system of classical mechanics and universal gravitation that became the foundation for physics for over 200 years.

Q: Are there any female physicists who made significant early contributions?

A: While prominent historical records often focused on male scientists, women have always been involved in scientific inquiry. However, significant foundational contributions to what we now call physics are often attributed to male figures until later centuries. Pioneering women in physics are more prominent in the 20th and 21st centuries, such as Marie Curie, Lise Meitner, and Emmy Noether, whose work profoundly impacted the field.

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