



What is a laboratory science course?

For students entering ninth grade in the 2024–25 school year, graduation requirements have changed from two science courses to two laboratory science courses. These changes were the result of House Bill 2170, which attempts to align Illinois high school graduates with post-secondary expectations. This may leave many students, parents, and school district administrators wondering what a laboratory science course is.

A science course is considered to be a laboratory science course if enrolled students are required to regularly engage in laboratory investigations. A laboratory investigation (also referred to as a lab) is defined as an experience in the laboratory, the classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models. Students should have opportunities during these experiences to design investigations, engage in scientific reasoning, record data, analyze results, and discuss their findings.

The Illinois State Board of Education recommends that students in laboratory science courses engage in laboratory investigations at least once per week, but the exact frequency is at the discretion of the local school district. Each of the courses detailed here may qualify as a lab science course if they involve direct, hands-on experience with the subject matter through experimentation, observations, and practical activities.

These suggestions are to provide guidance for local boards of education to decide what may qualify as a lab science. It is further recommended that students, parents, or school districts contact post-secondary schools to see if these courses meet the requirements for students applying to their programs.

Life Science Courses



Life science offers students an immersive exploration into all facets of the living world. From the microscopic realm of microorganisms to the intricate complexities of human anatomy and behavior, each course provides a unique perspective on life. Whether delving into the cellular processes of plants in botany or unraveling the mysteries of the human mind in psychology, students engage in hands-on experiments, dissections, and observations that foster a deeper understanding of biological phenomena. These courses not only provide theoretical knowledge but also offer practical experiences in laboratories and field settings, where students can apply scientific methods, analyze data, and cultivate a profound appreciation for the richness and diversity of life on Earth.

Biology (Life Science)

Biology offers hands-on experiments; dissections; and observations of living organisms, including studies on microorganisms, genetics, ecosystems, cells, and physiology.

It may qualify as a lab science by providing students with opportunities to directly interact with biological phenomena, utilize scientific tools and equipment, and analyze data through various experiments and observations.

Botany (Plant Science)

Botany examines plant life, from cellular structure to ecosystems, with activities that include dissections, studies on photosynthesis, growth experiments, and ecological surveys.

It may qualify as a lab science because it involves regular hands-on investigations into plant biology, allowing students to examine specimens in the lab and in the field, and gives students the opportunity to apply scientific methods, collect and analyze data, and engage in scientific reasoning.

Human Anatomy and Physiology

Human anatomy and physiology explores the human body's structure and function via dissections; experiments; and simulations, including studies on histology and physiological processes.

It may qualify as a lab science due to its hands-on approach to understanding the complexities of human anatomy and physiology.

Microbiology

Microbiology focuses on the study of microorganisms, with laboratory work that includes culturing bacteria, pathogen identification, and viral studies.

It may qualify as a lab science because it involves direct observation and manipulation of microorganisms, providing students with practical experiences in culturing, identifying, and studying microbial interactions.

Psychology (Behavioral Science)

Psychology studies human behavior and mental processes, using experiments, observations, and data analysis to explore memory, perception, and cognition.

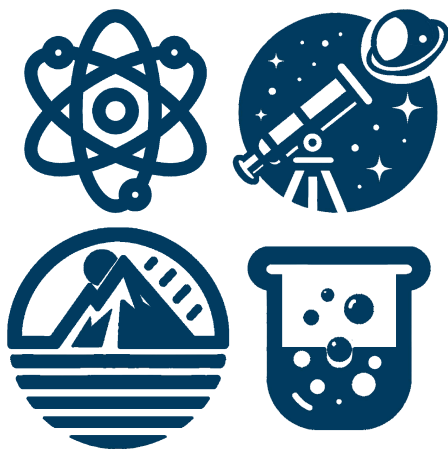
It may qualify as a lab science by employing scientific methods to study and understand human behavior through observation and direct experiments, analysis of gathered data, and review of case studies.

Zoology (Animal Sciences)

Zoology focuses on the study of animals, their physiology, behavior, and evolution. Activities include observations, dissections, and fieldwork.

It may qualify as a lab science by providing hands-on experiences in studying animal life and allowing students to engage in direct observation, experimentation, and analysis of animal behavior and physiology.

Physical Science Courses



Physical science explores the mysteries of the cosmos, the fundamentals of matter and energy, and the dynamic processes shaping our planet. Whether gazing into the vast depths of the cosmos in Astronomy, exploring the building blocks of matter in Chemistry, or delving into the dynamic forces shaping our planet in Geology, each course offers a unique blend of theoretical understanding and hands-on exploration. From the fundamental principles of Physical Science to the intricate laws governing motion and energy in Physics, students are immersed in a world of discovery, experimentation, and analysis. With a focus on practical engagement, laboratory investigations, and fieldwork, these courses provide an immersive and interdisciplinary approach to understanding the complexities of the physical universe.

Astronomy (Space Science)

Astronomy involves both observational and computational aspects of space science, including trips to observatories, analysis of star spectra, modeling of planetary orbits, and the study of cosmic phenomena.

It may qualify as a lab science because students have direct engagement with the observable universe and it offers hands-on activities, like directly observing celestial objects, collecting data, and analyzing data from observations.

Chemistry

Chemistry explores the properties of matter, chemical reactions, and atomic structures through practical experiments like mixing chemicals, performing titrations, and measuring reaction rates.

It may qualify as a lab science because it involves frequent laboratory investigations that allow students to interact directly with chemical phenomena, analyze results, and discuss findings. It embodies the essence of scientific exploration.

Geology (Earth Science)

Geology examines Earth's structure, minerals, and natural processes through lab experiments and fieldwork, including rock identification and fossil study.

It may qualify as a lab science because of its extensive use of field and laboratory investigations to study geological phenomena, allowing students to apply scientific concepts and analytical skills.

Physical Science

Physical science introduces fundamentals of chemistry, physics, Earth science, and space science, combining theoretical knowledge with hands-on experiments.

It may qualify as a lab science because of its comprehensive approach to exploring physical phenomena, enabling students to engage in various laboratory investigations across multiple scientific domains.

Physics

Physics investigates the fundamental laws of the universe, with experiments on motion, waves, and energy. Theoretical concepts in practical settings are applied.

It may qualify as a lab science through its experimental approach to understanding and applying the laws of nature, involving hands-on activities that reinforce theoretical knowledge.

Integrated Science Courses



Integrated science draws on multiple disciplines of science to develop a synergy of knowledge. Some schools may offer integrated science content interconnectedness between life and physical sciences. With Environmental Science, students blend biological, chemical, and geological principles to explore Earth's interconnected ecosystems and examine the impact that humans have on their environment in the forms of pollution, loss of biodiversity and climate change. Through hands-on fieldwork and laboratory investigations, students witness the profound impact that humans have on the planet and gain necessary skill to solve various environmental problems. With Forensic Science, students focus on crime scene analysis, combining areas of biology, chemistry, and physics to unlock the mysteries of forensic investigation.

Environmental Science

Environmental science combines biology, chemistry, and geology to study ecosystems, pollution, and conservation through activities like water quality testing and biodiversity assessments.

It may qualify as a lab science due to its integrative approach to studying and solving environmental problems that involves hands-on fieldwork and laboratory investigations.

Forensic Science

Forensic science applies scientific methods to crime scene analysis, including fingerprint analysis, blood spatter interpretation, DNA profiling, and ballistics.

It may qualify as a lab science because it involves direct interaction with physical evidence and investigations using scientific techniques and problem-solving.

Career and Technical Education



Career and Technical Education encompasses a wide variety of courses that extend beyond traditional academic learning, providing students with the opportunity to engage in hands-on, practical experiences across multiple disciplines. CTE courses offer a unique blend of theoretical knowledge and applied skills. These courses provide an immersive learning and direct interaction with real-world scenarios and equip students with the necessary skills and understanding to excel in various technical and scientific careers. Through a combination of laboratory experiments, project-based learning, and problem-solving activities, students are encouraged to explore, create, and analyze, fostering an appreciation for the interconnectedness of science, technology, and industry.

Illinois provides a flexible approach to science education by allowing local school districts to allow Career and Technical Education (CTE) courses to replace the lab science requirements for graduation, providing the courses contain at least 50% of the content of the courses they replace. (See [Illinois School Code. - 105 ILCS 5, Section 27-22.05.](#))

Agricultural Science

Agricultural science may cover a broad spectrum of disciplines, such as animal and plant science, horticulture, agribusiness, environmental science, agricultural mechanics, food science, and leadership.

It may qualify as a lab science by offering extensive hands-on experiences across diverse agricultural fields, involving direct interaction with natural phenomena, use of agricultural equipment, and data analysis.

Biotechnical Engineering (Biomedical Engineering)

Biotechnical engineering may offer experiential learning in biomedical engineering, bioprocess engineering, and environmental engineering.

They may qualify as a lab science by using laboratory investigations with tools and models to understand biological and technological phenomena, and embodying a hands-on, data-driven approach.

Construction (Architecture)

These courses may provide practical experiences in construction and building design related trades, and teach the fundamental principles and technical skills in carpentry, masonry, plumbing, and electrical installations.

Construction may qualify as a lab science by offering laboratory investigations that apply construction principles, allowing students to engage in data recording, analysis, and the application of technical knowledge in real-world settings.

Engineering (Mechanical Engineering/Applied Science)

Engineering may include activities in which students apply scientific principles to design, build, and test solutions by engaging in activities such as building circuits and constructing prototypes.

It may qualify as a lab science through the emphasis of in-field problem-solving, solution design, and hands-on construction projects, during which students engage in scientific reasoning and technical skills development.

Health Science (Anatomy and Physiology/Biomedical Sciences)

Health science may integrate the study of human anatomy, physiology, microbiology, and health conditions through laboratory experiments, hands-on investigations, and case studies.

It may qualify as a lab science with their practical approach to exploring the human body, providing direct interaction with biological phenomena, collecting and analyzing data, and enabling investigative learning through scientific reasoning and laboratory work.

Technology (Energy/Manufacturing/Construction)

Technology may cover many topics, including electronics, robotics, telecommunications, electromagnetism, and energy conversion, that relate to industries in manufacturing, construction, or energy production.

It may qualify as a lab science by emphasizing hands-on experiences, encouraging students to design technological solutions, and fostering scientific reasoning and tool manipulation. Students apply technical processes to develop critical skills in problem-solving and data analysis.