

NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE

COURSE SYLLABUS

Course title: First Year Experience: Success in Science

Course #: COL 099

Course description: 3 semester hours

A First Year Experience course where students gain college success skills and basic scientific knowledge. Students will learn time management, effective study skills and information literacy skills. The scientific content focuses on basic principles of biology and chemistry for students who wish to strengthen their science and college success skills before registering for college level science courses. Instructional topics include the scientific method, the structure of matter, atomic theory, chemical interactions, cell structure, function, and theory. Basic laboratory skills such as metric measurement and microscope use. Students will also develop basic computer skills including email, word processing, and web navigation through the use of ePortfolio and Blackboard. This course does not fill a science requirement.

Goals: The ultimate goal of this course is to prepare students for success in college-level science classes by developing a strong background in basic essential biological and chemical concepts and by developing fundamental college level study skills.

Outcomes: At the conclusion of the course the student will be able to:

Adapt and apply appropriate academic strategies to their courses and learning experiences

Demonstrate how to effectively evaluate information sources and utilize appropriate sources for academic inquiry.

Use written and oral communication to discover, develop, and articulate ideas and viewpoints.

Identify and apply strategies to effectively manage time and priorities.

Construct a plan for a successful path into and through completion of a degree or certificate program and beyond.

Additional Outcomes Openstax

1.1 Identify and describe the properties of life

1.1 Describe the levels of organization among living things

1.1 List examples of different sub disciplines in biology

1.2 Identify the shared characteristics of natural sciences

1.2 Understand the process of scientific inquiry

1.2 Compare inductive reasoning with deductive reasoning

1.2 Describe the goals of basic science and applied science

2.1 Describe matter and elements

2.1 Describe the interrelationship between protons, neutrons, and electrons, and the ways in which electrons can be donated or shared between atoms

2.2 Describe the properties of water

2.3 Describe the ways in which carbon is critical to life

2.3 Describe the four major types of biological molecules

2.3 Understand the functions of the four major types of molecules

3.1 Describe the roles of cells in organisms

3.1 Summarize cell theory

- 3.2 Compare and contrast prokaryotic cells and eukaryotic cells
- 3.2 Describe the relative sizes of different kinds of cells
- 3.3 Describe the structure of eukaryotic plant and animal cells
- 3.3 Summarize the functions of major cell organelles
- 3.4 Understand the fluid mosaic model of membranes
- 3.4 Describe the functions of phospholipids, proteins, and carbohydrates in membranes
- 3.5 Explain why and how passive transport occurs
- 3.5 Understand the processes of osmosis and diffusion
- 3.5 Define tonicity and describe its relevance to passive transport
- 4.1 Explain what metabolic pathways are
- 4.1 State the first and second laws of thermodynamics
- 4.1 Explain the difference between kinetic and potential energy
- 4.1 Describe the difference between kinetic and potential energy
- 4.1 Describe endergonic and exergonic reactions
- 4.1 Discuss how enzymes function as molecular catalysts
- 4.2 Explain how ATP is used by the cell as an energy source
- 4.2 Describe the overall result in terms of molecules produced of the breakdown of glucose by glycolysis
- 4.3 Describe the location of the citric acid cycle and oxidative phosphorylation in the cell
- 4.3 Describe the overall outcome of the citric acid cycle and oxidative phosphorylation in terms of the products of each
- 4.3 Describe the relationships of glycolysis, the citric acid cycle, and oxidative phosphorylation in terms of their inputs and outputs
- 4.4 Discuss the fundamental difference between anaerobic cellular respiration and fermentation
- 4.4 Describe the type of fermentation that readily occurs in animal cells and the conditions that initiate that fermentation
- 4.5 Explain why metabolic pathways are not considered closed systems
- 5.1 Summarize the process of photosynthesis
- 5.1 Explain the relevance of photosynthesis to other living things
- 5.1 Identify the reactants and products of photosynthesis
- 5.1 Describe the main structures involved in photosynthesis
- 5.2 Explain how plants absorb energy from sunlight
- 5.2 Describe how the wavelength of light affects its energy and color
- 5.2 Describe how and where photosynthesis takes place within a plant
- 5.3 Describe the Calvin cycle
- 5.3 Define carbon fixation
- 5.3 Explain how photosynthesis works in energy cycle of all living organisms
- 6.1 Describe the prokaryotic and eukaryotic genome
- 6.1 Distinguish between chromosomes, genes, and traits
- 6.2 Describe the three stages of Interphase
- 6.2 Discuss the behavior of chromosomes during mitosis and how the cytoplasmic content divides during cytokinesis
- 6.2 Define the quiescent G_0 phase
- 6.2 Explain how the three internal control checkpoints occur at the end of G_1 , at the G_2 -M transition, and during metaphase
- 7.1 Explain that variation among offspring is a potential evolutionary advantage resulting from sexual reproduction
- 7.1 Describe the three different life-cycle strategies among sexual multicellular organisms and their commonalities
- 7.2 Describe the behavior of chromosomes during meiosis
- 7.2 Describe cellular events during meiosis

- 7.2 Explain the differences between meiosis and mitosis
- 7.2 Explain the mechanisms within meiosis that generate genetic variation among, the products of meiosis
- 7.3 Explain how nondisjunction leads to disorders in chromosome number
- 7.3 Describe how errors in chromosome structure occur through inversions and translocations
- 8.1 Explain the scientific reasons for the success of Mendel's experimental work
- 8.1 Describe the expected outcomes of monohybrid crosses involving dominant and recessive alleles
- 8.2 Explain the relationship between genotypes and phenotypes in dominant and recessive gene systems
- 8.2 Use a Punnett square to calculate the expected proportions of genotypes and phenotypes in a monohybrid cross
- 8.2 Explain Mendel's law of segregation and independent assortment in terms of genetics and the events of meiosis
- 8.2 Explain the purpose and methods of a test cross

College Policies

Plagiarism: Plagiarism and Academic Dishonesty are not tolerated at Northwestern Connecticut Community College. Violators of this policy will be subject to sanctions ranging from failure of the assignment (receiving a zero), failing the course, being removed/expelled from the program and/or the College. Please refer to your "Student Handbook" under "Policy on Student Rights," the Section entitled "Student Discipline," or the College catalog for additional information.

Americans with Disabilities Act (ADA): The College will make reasonable accommodations for persons with documented learning, physical, or psychiatric disabilities. Students should notify Dr. Christine Woodcock, the Counselor for Students with Disabilities. She is located at Green Woods Hall, in the Center for Student Development. Her phone number is 860-738-6318 and her email is cwoodcock@nwcc.edu.

School Cancellations: If snowy or icy driving conditions cause the postponement or cancellation of classes, announcements will be made on local radio and television stations and posted on the College's website at www.nwcc.edu. Students may also call the College directly at **(860) 738-6464** to hear a recorded message concerning any inclement weather closings. Students are urged to exercise their own judgment if road conditions in their localities are hazardous.

Use of Electronic Devices: Some course content as presented in Blackboard Learn is not fully supported on mobile devices at this time. While mobile devices provide convenient access to check in and read information about your courses, they should not be used to perform work such as taking tests, quizzes, completing assignments, or submitting substantive discussion posts.

Sexual Assault and Intimate Partner Violence Resource Team: NCCC is committed to creating a community that is safe and supportive of people of all gender and sexual identities. This pertains to the entire campus community, whether on ground or virtual, students, faculty, or staff.

Sexual assault and intimate partner violence is an affront to our national conscience, and one we cannot ignore. It is our hope that no one within our campus community will become a victim of these crimes. However, if it occurs, NCCC has created the SART Team - Sexual Assault and Intimate Partner Violence Resource Team - to meet the victim's needs.

SART is a campus and community based team that is fully trained to provide trauma-informed compassionate service and referrals for comprehensive care. The team works in partnership with The Susan B. Anthony Project to extend services 24 hours a day, 7 days a week throughout the year.

The NCCC team members are:

Ruth Gonzalez, Ph.D.	860-738-6315	Green Woods Hall Room 207
Susan Berg	860-738-6342	Green Woods Hall Room 223
Kathleen Chapman	860-738-6344	Green Woods Hall Room 110
Michael Emanuel	860-738-6389	Founders Hall Annex Room 308
Seth Kershner	860-738-6481	Library
Jane O'Grady	860-738-6393	Founders Hall Annex Room 212
Robin Orloski	860-738-6416	Business Office Room 201
Patricia Bouffard, Ex-Officio	860-738-6319	Founders Hall Room 103
Savannah Schmitt		Student Representative

At NCCC we care about our students, staff and faculty and their well-being. It is our intention to facilitate the resources needed to help achieve both physical and emotional health.