RECORD OF ACADEMIC ACHIEVEMENT

The Evergreen State College - Olympia, Washington 98505

OFFICIAL TRANSCRIPT DOCUMENT

Heaton, Gwendolyn — A00424344

Last, First Middle — Student ID

CREDENTIALS CONFERRED:

Bachelor of Science — Awarded 24 Mar 2023

TRANSFER CREDIT:

Start	End	Credits	Title
09/2018	08/2020	90	**South Puget Sound Community College**

EVERGREEN UNDERGRADUATE CREDIT:

Start	End	Credits	Title
09/2020	06/2021	35	**Integrated Natural Sciences** *4 - General Biology: Evolution and Ecology* *5 - General Biology: Molecular and Cellular Biology* *3 - General Biology: Animal Physiology* *13 - General Chemistry I, II, and III* *4 - Statistics I* *3 - Field Techniques and Scientific Communication* *3 - Applied Math: Scientific Problem Solving Skills*
09/2021	03/2022	31	**Environmental Biology and Chemistry** *8 - Organic Chemistry* **4 - Organic Chemistry: Instrumentation and Spectroscopy* **3 - Organic Chemistry Laboratory* **5 - Microbial Ecology with Laboratory* **3 - General Microbiology with Laboratory* **3 - Environmental Microbiology with Laboratory* **3 - Biogeochemistry and Bioremediation with Field Methods* **2 - Environmental Chemistry*
03/2022	06/2022	16	**Developmental Biology** **5 - Cell Biology* **5 - Molecular Biology* **4 - Developmental Biology* *2 - Molecular Developmental Biology Laboratory*
09/2022	12/2022	8	**The Fungal Kingdom** **4 - Fungal Biology and Taxonomy* **2 - Lichen Biology and Taxonomy* **2 - Research Seminar in Mycology*
01/2023	03/2023	15	**Marine Biodiversity** **5 - Marine Invertebrate Zoology* **3 - Marine Biodiversity* *5 - Marine Invertebrate Zoology Laboratory* *2 - Microscopy*

Cumulative

195 Total Undergraduate Credits Earned

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I came to the Evergreen State College after doing two years of full time Running Start at South Puget Sound Community College. I transferred with my Associates of Arts to Evergreen and pursued my Bachelor of Science in integrated biology and chemistry. During my studies, I became more interested and involved in environmental science. This became my main focus and much of my upper-division learning was in environmental science classes.

At Evergreen, I started with Integrated Natural Sciences. This was a year-long general biology, chemistry, and math course. In it, I gained a solid foundation of general science and math to build upon.

Next in my educational journey I took Environmental Biology and Chemistry. This was a microbiology and organic chemistry focused course. I gained many laboratory skills for an upper-division biology lab and chemistry lab. I also gained field skills in water quality testing. To complete my lab-based science classes I took Developmental Biology. The focus of this course was on developmental and molecular biology with an upper-division developmental biology lab component. This was a pre-med targeted class and greatly expanded my biology knowledge and lab skills greatly.

The last school year at Evergreen was focused on upper-division field based environmental science classes. In the fall I took Fungal Kingdom. This was primarily a field based class where I gained fungi and lichen identification skills with applicable scientific writing knowledge. My last course at Evergreen was Marine Biodiversity. This was a marine invertebrate and ecology class where I gained many lab and zoology skills that have rounded out my natural science education.

Overall, I have high level lab skills in biology, chemistry, and molecular biology. My courses have also given me experience in field work and research proposals. My experience at Evergreen has provided me with the education I need to be prepared for future careers or education in a wide range of scientific paths.

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January 2023 - March 2023: Marine Biodiversity

15 Credits

DESCRIPTION:
Faculty: Erik V. Thuesen, Ph.D. and Pauline C. Yu, Ph.D.

This program consisted of an immersive survey of marine invertebrate zoology, with lectures, laboratory and field trips with field observation and sampling. Lectures and labs covered all the major phyla (and several minor phyla) of invertebrates, their evolutionary and taxonomic relationships, anatomical features and local representative species. Additional lectures covered coral reef and estuarine ecology, comparative larval biology and zooplankton ecology. Students were assessed on the basis of 2 quizzes, 1 in-class midterm, a lab practicum and a final take home exam. Students were also assessed on the basis of a laboratory notebook of illustrations of live and preserved, intact and dissected specimens of most of the invertebrate phyla. The field trips included field observations of rocky intertidal and muddy intertidal temperate marine habitats, qualitative sampling of benthic marine sediments and quantitative sampling for biodiversity.

Instruction in microscopy techniques and hands-on training were included with the aims of students learning microscopy theory and being proficient for unsupervised operation in basic compound light microscopy, stereomicroscopy with a digital z-stacker (automontage) capability, and scanning electron microscopy. Students were assessed for their microscopy knowledge on the basis of a take-home exam, an online quiz, and practicum examination on the instruments.

For training in experimental design and scientific writing, students designed and wrote scientific proposals in small groups. They were required to demonstrate understanding of the scientific literature, appropriate citation and bibliography formatting, proposal time management and budgeting. Proposals were peer-reviewed in a mock National Science Foundation panel as part of the proposal review and revision process.

Textbook: Brusca, Giribet and Moore. 2022. *Invertebrates* (4th ed). Oxford University Press.

EVALUATION:
Written by: Pauline C. Yu, Ph.D.

Gwendolyn has met the requirements of this program. Gwendolyn’s attendance record was very good. Gwendolyn's engagement in Gwendolyn’s own learning was good, and Gwendolyn's engagement in helping classmates with learning was also good, where Gwendolyn was frequently and consistently collaborating with classmates on lab observations.

Gwendolyn demonstrated an overall adequate understanding of the presented concepts in marine science. Gwendolyn demonstrated strong understanding on 2 quizzes, good understanding on the midterm (including excellent answers to questions about tentacles and medusozoan life cycles) and minimally adequate work on the take home final exam. Gwendolyn demonstrated good breadth but minimally adequate depth of knowledge on the lab practical exam. Gwendolyn completed most of the notebook observations assignments, and demonstrated a consistently very good ability to observe and describe marine organism anatomy and morphology through maintaining the observations notebook. Gwendolyn’s drawings were generally sufficiently detailed, but more frequently insufficiently labelled or annotated. During the fieldtrip at Friday Harbor Labs, Gwendolyn participated in all of the activities and Gwendolyn's engagement in exploratory observation was very good.

Gwendolyn demonstrated an overall good understanding of the presented concepts in microscopy as demonstrated on the microscopy take home exam and in the certification for use of the microscopy

equipment (both the advanced automontage stereomicroscope and the JEOL scanning electron microscope) without further supervision.

Gwendolyn was responsible for participating in a group proposal project researching, and writing on the group-selected topic of "An Observational Survey of Holoplanktonic, Meroplanktonic and Zooplanktonic Organisms found in Estuarine Environments at the Mouths of Houston, Perry and McLane Creek of Eld Inlet in Relation to the Food Web of *Oncorhynchus keta.*" The draft bibliography was incomplete. The proposal did a good job of summarizing background research, articulating methods, developing a timeline, and mostly using proper citation formatting; the budget, broader impacts and scope of the proposal were in need of further refining, as the ambitious nature of the proposal was not in full alignment with what was achievable. Gwendolyn did a good job of presenting and critiquing other group projects in the mock panel review exercise.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 15

*5 - Marine Invertebrate Zoology
*3 - Marine Biodiversity
5 - Marine Invertebrate Zoology Laboratory
2 - Microscopy

* indicates upper-division science credit

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September 2022 - December 2022: The Fungal Kingdom

8 Credits

DESCRIPTION:
Faculty: Lalita Calabria and Paul Przybylowicz

The Fungal Kingdom was a two-quarter, junior/senior program focused on the taxonomy, physiology and ecology of fungi, with an emphasis on Pacific Northwest fungi and lichens.The major learning objectives were to: 1) develop a detailed understanding of the biology and taxonomy of lichens and fungi; 2) become proficient using field methods for mushroom and lichen collection and identification, including dichotomous keys, molecular systematics, and chemical testing; 3) demonstrate the ability to recognize the common fungi and lichen species of the PNW; and 4) to develop scientific literacy, critical thinking and research skills, as well as science communication skills. Students' understanding was assessed through weekly study questions, several quarter-long projects, participation and two exams. There were both 16- and 12-credit options available. Each major component of the program is described below.

The text for fungal biology and physiology was *21st Century Guidebook to the Fungi*, 2nd Edition by Moore, Robson and Trinci, along with selected scientific research papers. Lichen lectures were supported by readings from *Lichens of North America* by Brodo, Sharnoff and Sharnoff, a series of essays titled Ways of Enlichenment by Goward and a selection of peer-reviewed literature. Topics covered during fall quarter included: lichen biodiversity, evolution and reproduction, fungal diversity and classification, molecular systematics, cell biology, spore production and discharge, genetics, and bioinformatics. Students learned to use molecular tools to identify fungi, from DNA isolation and amplification to the bioinformatics needed to clean and compare their data with sequences in online DNA databases. Other skills covered included sterile technique, along with compound microscope slide preparation and observation.

Field collection and identification skills were a significant focus. Students used dichotomous keys to identify unknown mushroom and lichen specimens and developed fluency in identification terminology. Every student compiled both a lichen and mushroom Identification Notebook which included 12 specimens with detailed descriptions, key characters and photos for each specimen and drawing of key features for several specimens.

Field identification skills were further developed using iNaturalist, an online citizen science tool to document biodiversity. Weekly observations for both mushrooms and lichens were required. Each student completed a reflective summary of the collective results from the quarter. A sight identification exam tested students' ability to identify local mushrooms and lichens from memory using scientific names.

Weekly research seminars focused on current topics in mycology. Topics covered included bioremediation, radiotrophic fungi and medicinal uses of fungi. Students summarized peer-reviewed articles to inform critical discussions to develop informed perspectives.

EVALUATION:
Written by: Lalita Calabria and Paul Przybylowicz

Gwendolyn Heaton met the major learning objectives for this program. Gwendolyn attended most of the program meetings and submitted a majority of the program work. Overall, the quality of their work was generally good. Gwendolyn participated enthusiastically in the learning community and through that participation helped support and build the community.

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Gwendolyn made good progress in fungal and lichen biology and taxonomy. Gwendolyn completed a majority of weekly study questions. Answers on weekly study questions indicated a satisfactory understanding of the material covered in lecture and readings. Gwendolyn's performance on the midterm and final exam indicated a very good understanding of fungal biology and ecology, with a minimal comprehension of the lichen topics.

In the taxonomy portion of the program, Gwendolyn made some progress in their ability to identify mushrooms and lichens. Gwendolyn was present in lab and had specimens that they worked to identify. However, there was little to evaluate at the end of the quarter.

Gwendolyn completed a few of the required entries into the class *iNaturalist* mushroom project with 3 mushrooms and no lichens. Based on the quality and completeness of Gwendolyn's entries, it appeared that Gwendolyn did not make significant use of this identification resource.

Gwendolyn participated in the research seminar discussions. Gwendolyn completed a majority of the seminar response posts which were generally good. Gwendolyn asked good questions and contributed their thoughts in a supportive manner. As a result, Gwendolyn deepened their skills in interpreting primary scientific papers and science media sources from a critical perspective.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 8

*4 - Fungal Biology and Taxonomy
*2 - Lichen Biology and Taxonomy
*2 - Research Seminar in Mycology

* indicates upper-division science credit

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March 2022 - June 2022: Developmental Biology

16 Credits

DESCRIPTION:
Faculty: Nancy C. Murray, Ph.D.

Developmental Biology was a one-quarter, interdisciplinary science program that interwove upper-division cell, molecular and developmental biology. In addition to the content, learning goals included the development of analytical and critical thinking and quantitative reasoning skills. Weekly activities included lectures, labs, and workshops. Students were required to actively contribute to the learning community and were evaluated on the bases of their performances on weekly quizzes, midterm and final exams, homework, workshops, and labs.

Molecular Cell Biology: The study of molecular and cellular biology was posited around the concept that the cell is the fundamental unit of life. Through this lens, students studied prokaryotic and eukaryotic cell structure, chromosomal organization of coding and non-coding regions, DNA mutations and repair mechanisms, protein structure and function, molecular genetic mechanisms (eukaryotic transcription and translation), biomembrane structure, membrane transport, protein trafficking, cell cycle regulation, post-transcriptional control mechanisms, molecular genetic techniques bioinformatics, and signal transduction pathways. The textbook used was *The Cell: A Molecular Approach,* by Cooper, 8th edition.

Developmental Biology: Developmental biology is the study of becoming, of change, and of the many cellular and molecular mechanisms accounting for those changes during an animal's life. Eukaryotic model organisms (yeast, *Drosophila melanogaster*, and *Xenopus laevis)* were used. Using the text, *Principles of Development,* by Wolpert, et al., 6th edition, students studied the following topics: fertilization, *Drosophila* and amphibian axis formation, neurulation, patterning of the central nervous system and brain growth, neural crest cells and axonal specificity, limb development, metamorphosis and, regeneration.

Laboratory

In the lab, students carried out experiments using *Xenopus laevis* to study axis formation and learned *in-vitro* fertilization methods. In addition, students acquired bench skills in data collection and analysis, aseptic technique, DNA isolation, polymerase chain reaction (PCR), restriction digest, CRISPR, and bioinformatics. Students were required to maintain a laboratory notebook documenting their work and analyses of their experimental results.

EVALUATION:
Written by: Nancy C. Murray, Ph.D.

Gwendolyn entered the program with a strong background in the natural sciences. Overall, she was a dedicated and diligent student who prioritized time and effort to her academic studies with good results. Her work in all areas of the program is described below.

Overall, Gwendolyn had a strong quarter of learning. She was conscientious and demonstrated a strong work ethic. She was committed to understanding the material and when she had questions, she sought out help from faculty or her peers. Her effort was reflected in her good to very good weekly quiz, midterm, and final exam scores and in her detailed answers to homework problems. In the lab, she was a careful and deliberate worker. Her lab notebook improved with feedback and is now organized, detailed, and easy to follow.

Gwendolyn leaves the program earning full, upper-division science credit.

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SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 16

*5 - Cell Biology
*5 - Molecular Biology
*4 - Developmental Biology
*2 - Molecular Developmental Biology Laboratory

* indicates upper-division science credit

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September 2021 - March 2022: Environmental Biology and Chemistry

31 Credits

DESCRIPTION:
Faculty: Andrew D. Brabban, Ph.D. and Paula Schofield, Ph.D.

Environmental Biology and Chemistry was an interdisciplinary science program that used topics and theoretical concepts within microbiology and organic chemistry to study the natural world and human interaction with it, including anthropogenic pollution. It included upper division organic chemistry, environmental and general microbiology, environmental chemistry, and chemical instrumentation. Although each subject is listed separately, the material was delivered in an integrated manner, approaching many concepts from both biological and chemical perspectives. Each week, students spent 9 hours in lecture and small group problem solving sessions, 7 hours in the laboratory and doing some fieldwork, and 2 hours in seminar discussions. Students were evaluated on the basis of weekly homework assignments, seminar assignments, field and laboratory reports, in-person class activities, and performance on weekly on-line quizzes and regular in-person examinations. Some students elected to take components of this full time program.

Organic Chemistry I and II with Laboratory: In fall quarter, students studied the relationship between the structure and behavior of organic molecules. Specific concepts included chemical bonding, acid-base properties of organic molecules, stereochemistry, nomenclature, electron delocalization and resonance. The chemistry of alkanes, alkenes, and alkynes were examined in detail, and the fundamental mechanism of electrophilic addition was emphasized. The laboratory work introduced common techniques in synthetic organic chemistry, including reflux, extraction, recrystallization, steam and simple distillation. Analytical techniques included thin layer chromatography, melting point analysis, gas chromatography, GC-MS, and infrared spectroscopy. In winter quarter, the chemistry of alkyl halides, carboxylic acids and their derivatives, benzene and its derivatives, aldehydes and ketones, as well as free radical reactions were covered. Emphasis was placed on the mechanisms of nucleophilic substitution and elimination, electrophilic aromatic substitution, nucleophilic acyl substitution, and nucleophilic addition. Thermodynamics and kinetics were highly emphasized as fundamental and guiding principles within each topic. For the winter lab work, in addition to a Grignard synthesis and a green chemistry synthesis of adipic acid, students conducted a 5-week interdisciplinary project to characterize microorganisms in soil via phospholipid fatty acid (PLFA) analysis. Students took soil samples from the Evergreen State College Campus, extracted the phospholipids from the membranes of microorganisms, chemically derivatized them to fatty acid methyl esters (FAMEs), then used GC-MS analysis to identify biomarkers and profile microbial communities. The textbook used was *Organic Chemistry* by Paula Yurkanis Bruice (8th Ed.).

Organic Chemistry: Instrumentation and Spectroscopy: Students gained significant hands-on training through individual and group workshops on the following instruments: FT-IR spectrophotometer, Gas Chromatograph, Gas Chromatograph-Mass Spectrometer, and FT-NMR spectrometer. In addition to learning significant background theory, students learned sample preparation, operation, and analysis of spectra/data for each instrument, and used this knowledge to analyze products from synthetic labs. Students also applied these skills to elucidate the structures of a series of unknown compounds through workshops and homework assignments. In addition, students used a tailored GC-MS method for the separation and analysis of fatty acid methyl ester (FAME) biomarkers to study microbial communities in soil.

General and Environmental Microbiology with Laboratory: This component of the program began by examining the broad variety of microorganisms so far identified, ways of growing microorganisms and measuring growth, the biochemistry of these species and their varying cellular structure. It then progressed to examining the roles microorganisms play in the environment and the broad diversity of

ecosystems they occupy. Specifically, we examined microbial metabolism and biogeochemical cycling at a biochemical level, examining the many modes of aerobic and anaerobic catabolism, such as chemolithotrophy. The laboratory component was structured to teach the basic techniques of microbiology required to safely and precisely manipulate microorganisms, such as aseptic technique, making media and growing cultures. Students learned to work quantitatively with organisms carrying out MPN and dilution series to examine water samples, bacterial and phage replication. Students also used quantitative methods to examine cellular processes such as electron transport, using biochemical assays such as the Hill Reaction. The textbook used was Madigan, M., Martinko, J., Bender, K.S., Buckley, G.H., Sattley, W.M., and Stahl, D.A. *Brock's Biology of Microorganisms* 15/e. New Jersey: Pearson: Benjamin Cummings, 2017.

Microbial Ecology and Bioremediation with Laboratory and Field Methods: Students gained an understanding of the relationships between, and the role of, microorganisms in natural and polluted environments. Course material examined microbial metabolism and biogeochemical cycling, water pollution, toxicology, wastewater treatment, methods of measuring microbial numbers and microbial activity, abiotic and biotic interactions within microbial communities, and bioremediation. Remediation of both organic and inorganic chemicals using active/passive, *in situ/ex situ*, chemical/biological processes including the design and use of wetlands was covered. Lab and field work focused on developing both quantitative and qualitative methods of measuring microbial growth and pollution including DO and BOD_5 assays, MPN, viable and total cell count methods, culture enrichment, soil analysis and genetic methods such as PCR detection of microorganisms in water samples. The textbook used was Madigan, M., Martinko, J., Bender, K.S., Buckley, G.H., Sattley, W.M., and Stahl, D.A. *Brock's Biology of Microorganisms* 15/e. New Jersey: Pearson: Benjamin Cummings, 2017.

Environmental Chemistry: Each week students read primary literature and other texts, and completed detailed homework assignments on each reading. Topics covered included green chemistry, energy use in the USA, biofuels from algae, contaminants of emerging concern, environmental hydrocarbon degradation, and the anthropogenic carbon cycle. Readings were mostly taken from primary literature: *Journal of the American Chemical Society, Bioresource Technology, Chemosphere, Environmental Pollution*; and also other texts: *US Energy Information Administration (EIA) Annual Outlook 2021; epa.gov*.

EVALUATION:
Written by: Andrew D. Brabban, Ph.D. and Paula Schofield, Ph.D.

Gwendolyn entered this program to learn advanced concepts, as well as lab and field techniques within biology and chemistry to prepare for a future career in environmental studies.

Coursework:

In the organic chemistry component of the program, Gwendolyn submitted assigned work and completed the online and in-person quizzes and exams. Gwendolyn struggled with some of the organic chemistry material presented in the program, but she worked to try to improve her grasp over the course of the two quarters. Overall Gwendolyn showed an adequate grasp of the fundamentals of organic chemistry, specifically, nomenclature, structure-property relationships, stereochemistry, and a weak grasp of reactions and mechanisms.

Gwendolyn has demonstrated a working understanding of both general and environmental microbiology in her examinations this quarter. She was able to solve most of the set qualitative and quantitative problems, including growth, cell quantification and cell morphology and structure. In the environmental component, Gwendolyn showed a fair understanding of the environmental processes examined in the program, and solved some of the quantitative redox and thermodynamic problems as they relate to the

environment. In microbial ecology and bioremediation, Gwendolyn showed a fair understanding of the theory covered and some ability to apply both quantitative and qualitative methods to measure microbial numbers and activity in the environment. Gwendolyn was also able to apply her biogeochemical knowledge to assess polluted sites, and then design the appropriate remediation processes.

Gwendolyn came to seminar discussions well prepared, completing detailed assignments on the readings. Her work showed she had a solid understanding of the topics and had thoroughly read the texts. In addition, Gwendolyn was an engaged member of seminar discussions, contributing to the dialogue.

Laboratory and Field Work:

Gwendolyn successfully worked with a variety of lab partners, and she learned the basic laboratory bench skills and techniques in organic chemistry and microbiology.

Gwendolyn worked very well with her group members on all aspects of the interdisciplinary field assessment and lab projects. These included an in-depth study (discharge, dissolved oxygen, conductivity, pH, temperature) of McLane Creek, a rural salmon spawning creek that drains into Eld Inlet of Puget Sound; a BOD_5 study of the college campus natural waters; and the examination of ground water flow in reference to petrochemical pollution. Gwendolyn's data collection was efficient and thorough, and overall, her group's project reports were organized, included site descriptions, the appropriate calculations, tables, and figures. Overall, the two larger group reports on McLane Creek and BOD_5 were both good. Gwendolyn also contributed to the 5-week group project on the characterization of soil microbial communities via phospholipid fatty acid/FAME analysis. Gwendolyn's group successfully obtained and characterized numerous FAMEs as microbial biomarkers. Following feedback on a draft report, Gwendolyn's group submitted a good final extensive lab report of this work. It lacked some detail throughout; however, it was organized and contained very good site descriptions and data presentation.

Chemical Instrumentation and Spectroscopy:

Gwendolyn learned the theory and practical application of chemical instrumentation typically used in organic chemistry. Specifically, she learned how to prepare samples, operate, and analyze data from the FT-IR, GC, and GC-MS instruments, and she used these to analyze products from organic syntheses. In addition, Gwendolyn and her project group successfully used a tailored GC-MS method for the separation and analysis of FAME biomarkers to study microbial communities in soil. Gwendolyn learned the theory of FT-NMR and successfully analyzed spectra, as evidenced by homework and quiz scores.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 31

8 - Organic Chemistry
*4 - Organic Chemistry: Instrumentation and Spectroscopy
*3 - Organic Chemistry Laboratory
*5 - Microbial Ecology with Laboratory
*3 - General Microbiology with Laboratory
*3 - Environmental Microbiology with Laboratory
*3 - Biogeochemistry and Bioremediation with Field Methods
*2 - Environmental Chemistry

* indicates upper-division science credit

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September 2020 - June 2021: Integrated Natural Sciences

35 Credits

DESCRIPTION:
Faculty: Clarissa Dirks, Ph.D., Carri J. LeRoy, Ph.D., Lydia McKinstry, Ph.D.

Integrated Natural Sciences covered topics in general biology, general chemistry, statistics, and applied math. Students could choose to enroll in all or various combinations of the subject areas. Program work focused on the intersection of these disciplines to develop students' interdisciplinary understanding of the interactions of matter and energy in the natural world, and to develop problem-solving skills directed at understanding natural phenomena. Students used scientific process and reasoning skills and were expected to gain field research experience in designing experiments and analyzing data. Depending on the subject area, evaluations of student achievement were based on: weekly on-line quizzes, on-line examinations, weekly homework assignments, discussion boards, final and practical exams, formal laboratory reports, and engagement and collaborative participation in all program activities.

General Biology: Evolution and Ecology – Lectures and workshops focused on introducing students to the following areas of general biology: chemical evolution, mitosis and meiosis, Mendelian genetics, evolutionary processes, population genetics including Hardy-Weinberg equilibrium, speciation, phylogenies, history of life, introduction to ecology and earth systems, as well as community, population and ecosystem ecology. Assessments were based on weekly homework assignments and weekly quizzes.

Textbook: S. Freeman, *Biological Science*, 6th ed.

General Biology: Molecular and Cell Biology – Lectures and workshops focused on introducing students to the following areas of general biology: structure and function of cells and biomolecules, energy and enzymes, cellular respiration, metabolism, the central dogma of how genes work, gene regulation and genomics. Assessments were based on weekly homework assignments and weekly quizzes.

Textbook: S. Freeman, *Biological Science*, 6th ed.

General Biology: Animal Physiology – Lectures and workshops focused on introducing students to the following areas of general biology: water and electrolyte balance in animals, nutrition, gas exchange, circulation, nervous systems, and reproduction and development. Assessments were based on weekly homework assignments and weekly quizzes.

Textbook: S. Freeman, *Biological Science*, 6th ed.

General Biology: Biodiversity – Lectures and workshops focused on learning about the variety of life on earth by examining bacteria, archaea, green algae and plants, protists, fungi, and animals. To complement this work, students also learned about viruses and the immune system of animals. Assessments were based on weekly homework assignments and weekly quizzes. The culminating experience was an in-depth individual research paper and a group presentation.

Textbook: S. Freeman, *Biological Science*, 6th ed.

General Biology Laboratory – Laboratory investigations were focused on basic microscopy using both dissecting and compound microscopes, observational studies, making solutions and media, microbiology techniques such as working with bacteria, plant dissection and analyses, as well as DNA extraction,

PCR, restriction digestion and gel electrophoresis. In-person labs gave students hands-on skills while learning theory. Remote laboratory exercises focused on the theory of the techniques used and reading of primary literature papers associated with the skills.

General Chemistry I, II, and III with Laboratory – The following fundamental principles of chemistry were presented: the definition and characterization of matter and inorganic nomenclature; stoichiometry and the mole; atomic structure, electron configuration and periodic properties of the elements and trends. Principles of chemical bonding including Lewis structures and molecular shape were also introduced as well as gas laws and the relationship between structure and physical states of matter. More detailed quantitative topics included thermochemistry, chemical kinetics, chemical and acid-base equilibria including buffers, thermodynamics, redox reactions, and electrochemistry. In the chemistry laboratory students were introduced to basic chemistry experiments, as well as qualitative and quantitative techniques involving aqueous solution chemistry. Experiments included acid-base titrations; redox titration; kinetics and determination of activation energy; free energy and solubility equilibria; and testing of buffer capacity. Evaluations were based on participation, engagement, and weekly assessments including homework assignments, on-line examinations and quizzes, post-lab homework assignments, and formal laboratory reports.

Textbook: T. E. Brown, H. E. LeMay, B. E. Bursten, C. J. Murphy, P. M. Woodward, and M. W. Stoltzfus, *Chemistry: The Central Science,* 14th ed.

Statistics I – Concepts in Statistics I and hands-on activities allowed students to practice using statistical methods with real-world data. Topics included probability, variable types, basic summary statistics (mean, median, mode, variance, standard deviation, standard error), and parametric statistical methods: Students t-tests, Chi-square tests, Least Squares Regression, and Correlation. Students learned to use formulae and macros in Excel. Students learned to analyze raw data, interpret statistical results, and create professional quality figures to display scientific results. Students had biweekly quizzes on statistical concepts to test their own knowledge progression. Students engaged in weekly discussion boards while working on statistics labs to problem-solve issues with data analysis, software, and the interpretation of statistical findings. They completed a final practical exercise where they selected the appropriate statistical tests to analyze data collected through field research projects. They needed to collect and organize data, run hypothesis tests, interpret results, and create figures.

Field Techniques and Scientific Communication – Field exercises were intended to deepen the understanding of concepts covered in biology and statistics lectures/assignments. This area focused on data collection using field techniques such as plant identification, snail surveys, and quadrat plot sampling. The focus was on building students' understanding of the process of science with a particular emphasis on experimental design, data collection, statistical analysis, and scientific communication. Mid-to-late fall quarter, students read and answered questions about three primary literature papers, and worked in groups to design small field projects. As a small group, they collected and analyzed field data, wrote up their findings in a short paper, and presented their work to the class in a formal presentation. Mid-to-late winter quarter, students read and answered questions about two primary literature papers and a research talk presented to the class.

Applied Math – Assignments included problem sets on algebra practice, including logarithms and exponents, dimensional analysis, making solutions and dilutions, spatial reasoning, graphing and experimental design. Evaluations were based on participation and weekly completion of the work.

Foundations of College Success – First-Year students' academic skill development was supported by their participation in Foundations of College Success, a module of instruction and community-building activities where students were introduced to college support services and practices, wellness strategies, study techniques, and metacognitive strategies to foster both personal and academic growth.

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EVALUATION:
Written by: Clarissa Dirks, Ph.D., Carri J. LeRoy, Ph.D., Lydia McKinstry, Ph.D.

Gwendolyn enrolled in the General Biology, General Chemistry, Statistics, Field Techniques and Scientific Communication, and Applied Math components of Integrated Natural Sciences. Gwendolyn's engagement in the program was mixed as evidenced by attendance and participation. Gwendolyn was somewhat committed to doing well and learning the concepts and methods introduced. Throughout the year, students synthesized their learning with many homework assignments, weekly quizzes and biweekly exams, formal reports, and by reading several primary literature papers. Gwendolyn has now gained much of the foundational knowledge necessary to pursue upper level work in science.

General Biology: Evolution and Ecology – Gwendolyn demonstrated an overall very good comprehension of the concepts and skills presented in General Biology: Evolution and Ecology as evidenced by work in online problem-solving sessions and online weekly quizzes. Gwendolyn's performance on quizzes indicated a very good understanding of the material. Gwendolyn turned in all but one homework assignment, which were well done. In general, Gwendolyn showed enthusiasm for learning biology and worked well with peers during online workshop sessions.

General Biology: Molecular and Cell Biology – In General Biology: Molecular and Cell Biology, Gwendolyn demonstrated an overall good comprehension of the concepts as evidenced by work in online problem-solving sessions and online weekly quizzes. Gwendolyn's performance on quizzes indicated a fair to good understanding of the material. Gwendolyn turned in 13 of 15 homework assignments.

General Biology: Animal Physiology – Gwendolyn demonstrated an overall good comprehension of the concepts and skills presented in General Biology: Animal Physiology as evidenced by work in online problem-solving sessions and online weekly quizzes. Gwendolyn's performance on quizzes indicated a good understanding of the material. Gwendolyn turned in all but one homework assignment.

General Chemistry I, II, and III – Gwendolyn is a dedicated student who worked hard to develop an overall good understanding of the basic concepts and skills presented in chemistry. Gwendolyn was well prepared for each activity and submitted most of the homework assignments (17/21). Gwendolyn was an active learner throughout the year and made good use of workshop time, which greatly enhanced her learning. In fact, Gwendolyn made excellent contributions to the learning community; many of Gwendolyn's classmates benefitted from her collaborative strength during workshop sessions. Gwendolyn's responses on homework assignments, quizzes, and examinations demonstrated good working knowledge of stoichiometry and aqueous solution calculations, atomic structure and periodic trends, and the fundamental theories of chemical bonding. This work also showed good understanding of the quantitative material involving acid-base chemistry and buffers, redox chemistry, kinetics, chemical equilibrium and thermodynamics.

Statistics I – Gwendolyn was an active participant in the Statistics I component of this program. Gwendolyn was a strong participant in online discussion boards covering topics in statistics, especially early in the quarter. In particular, Gwendolyn used the discussion boards to help other students with the material by posting questions to deepen student learning. The quality of the discussion posts was often high. Gwendolyn completed almost all weekly statistics assignments covering a variety of topics and the applications of statistics to real-world data. The work on statistics labs was variable. Statistics lab assignments demonstrated a developing understanding of concepts in terms of probability, summary statistics, categorical data analysis, and t-tests. Lab assignments were completed in Excel and demonstrated competence with the software. Based on biweekly quizzes, Gwendolyn demonstrated competence in terms of understanding statistical concepts for the quizzes that were completed. Gwendolyn passed a final cumulative statistics exam, but the work showed major gaps in understanding.

Heaton, Gwendolyn — A00424344
Last, First Middle — Student ID

A final statistical experience, which involved students collecting datasets and working to analyze them through choosing appropriate tests, running tests, and interpreting their outcomes, demonstrated that Gwendolyn struggles to apply statistical tests to data and interpret statistical tests covered in fall quarter.

Field Techniques and Scientific Communication – Gwendolyn demonstrated very good learning and engagement in Field Techniques and Scientific Communication and turned in all but one assignment in this area. Gwendolyn participated in learning field survey techniques and seminars of primary literature about evolution and ecology. As a culminating research experience, Gwendolyn engaged in a small group study comparing plant diversity near fresh and salt-water sources. Gwendolyn's team was tasked with both writing a scientific paper and developing an oral Ignite presentation on their research. It involved considerable time outside of class as well as collaboration and organization. The group gave a very good presentation of their work and Gwendolyn was an equal contributor.

Applied Math – Gwendolyn was consistent in participation and collaboration in applied math workshops throughout both quarters. Gwendolyn submitted all of the problem sets to a high level of completion and demonstrated very good quantitative reasoning skills.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 35

4 - General Biology: Evolution and Ecology
5 - General Biology: Molecular and Cellular Biology
3 - General Biology: Animal Physiology
13 - General Chemistry I, II, and III
4 - Statistics I
3 - Field Techniques and Scientific Communication
3 - Applied Math: Scientific Problem Solving Skills

EVERGREEN

The Evergreen State College • Olympia, WA 98505 • www.evergreen.edu

EVERGREEN TRANSCRIPT GUIDE

Accreditation: The Evergreen State College is fully accredited by the Northwest Commission on Colleges and Universities.

Degrees Awarded: The Evergreen State College awards the following degrees: Bachelor of Arts, Bachelor of Science, Master of Environmental Studies, Master of Public Administration and Master In Teaching. Degree awards are listed on the Record of Academic Achievement.

Educational Philosophy:

Our curriculum places high value on these modes of learning and teaching objectives:

- Interdisciplinary Learning
- Collaborative Learning
- Learning Across Significant Differences
- Personal Engagement
- Linking Theory with Practical Applications

Our expectations of Evergreen Graduates are that during their time at Evergreen they will:

- Articulate and assume responsibility for their own work
- Participate collaboratively and responsibly in our diverse society
- Communicate creatively and effectively
- Demonstrate integrative, independent, critical thinking
- Apply qualitative, quantitative and creative modes of inquiry appropriately to practical and theoretical problems across disciplines, and,
- As a culmination of their education, demonstrate depth, breadth and synthesis of learning and the ability to reflect on the personal and social significance of that learning.

Our students have the opportunity to participate in frequent, mutual evaluation of academic programs, faculty and students. In collaboration with faculty and advisors, students develop individual academic concentrations.

Academic Program

Modes of Learning: Evergreen's curriculum is primarily team-taught and interdisciplinary. Students may choose from among several modes of study:

- **Programs:** Faculty members from different disciplines work together with students on a unifying question or theme. Programs may be up to three quarters long.
- **Individual Learning Contract:** Working closely with a faculty member, a student may design a one-quarter-long, full-time or part-time research or creative project. The contract document outlines both the activities of the contract and the criteria for evaluation. Most students are at upper division standing.
- **Internship Learning Contract:** Internships provide opportunities for students to link theory and practice in areas related to their interests. These full- or part-time opportunities involve close supervision by a field supervisor and a faculty sponsor.
- **Courses:** Courses are 2-6 credit offerings centered on a specific theme or discipline.

The numerical and alpha characters listed as Course Reference Numbers designate modes of learning and are in a random order.

Evaluation and Credit Award:

Our transcript consists of narrative evaluations. Narrative evaluations tell a rich and detailed story of the multiple facets involved in a student's academic work. A close reading of the narratives and attention to the course equivalencies will provide extensive information about student's abilities and experiences. Students are not awarded credit for work considered not passing. Evergreen will not translate our narrative transcript into letter or numeric grades.

Transcript Structure and Contents: The Record of Academic Achievement summarizes credit awarded, expressed in quarter credit hours. Transcript materials are presented in inverse chronological order so that the most recent evaluation(s) appears first.

Credit is recorded by:

Quarter Credit Hours:	Fall 1979 to present
Evergreen Units:	1 Evergreen Unit (1971 through Summer 1973) equals 5 quarter credit hours
	1 Evergreen Unit (Fall 1973 through Summer 1979) equals 4 quarter credit hours

Each academic entry in the transcript is accompanied by (unless noted otherwise):

- The Program Description, Individual Contract or Internship Contract which explains learning objectives, activities and content of the program, course or contract.
- The Faculty Evaluation of Student Achievement provides information on specific work the student completed and about how well the student performed in the program or contract.
- The Student's Own Evaluation of Personal Achievement is a reflective document written by the student evaluating his or her learning experiences. Students are encouraged but not required to include these documents in their official transcript, unless specified by faculty.
- The Student's Summative Self Evaluation is an optional evaluation summarizing a student's education and may be included as a separate document or as a part of the student's final self- evaluation.

Transfer credit for Evergreen programs, courses and individual study should be awarded based upon a careful review of the transcript document including the course equivalencies which are designed to make it easier for others to clearly interpret our interdisciplinary curriculum. These course equivalencies can be found at the conclusion of each of the Faculty Evaluation of Student Achievement.

The college academic calendar consists of four-eleven week quarters. Refer to the college website (www.evergreen.edu) for specific dates.

This record is authentic and official when the Record of Academic Achievement page is marked and dated with the school seal.
All information contained herein is confidential and its release is governed by the Family Educational Rights and Privacy Act of 1974 as amended.
If, after a thorough review of this transcript, you still have questions, please contact Registration and Records: (360) 867-6180.