

## ISCI 3000: Science for Early Childhood Education Teachers

### Fall 2009 Course Syllabus, Valdosta State University

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Please feel free to call either of us at our offices or use email to schedule a convenient time for an appointment. We both would be more than happy to speak to students anytime the office doors are open.

**Course Description:** This is a science content course that provides an overview of information about the natural world in preparation for teaching science at the elementary school grade levels. According to the 2007-2008 VSU Undergraduate Course Catalog, *Science 3000* covers “basic information about biology, chemistry and the physical sciences including astronomy, geology, and physics for early childhood education majors. The course gives an integrated view of the role of the life and physical sciences in understanding the natural world. Coordinated laboratory activities will be an integral part of the course.” *Science 3000* will bridge the gulf between scientific and educational disciplinary training by allowing future teachers to learn new scientific information through a variety of instructional innovations that enact the rhetoric of science education reform. This nontraditional approach to college science is structured to help prospective elementary school teachers make connections between methods of teaching and learning science.

**Course Objectives:** Science involves the systematic study of the natural world and the application of that understanding. For scientists, the natural world is a huge puzzle waiting to be solved. In order to address the inherent complexity of this challenge, the exploratory process is broken down and divided into pieces that are addressed by experts from the various scientific specializations. Ideally, science education puts the pieces of this puzzle back together in a coherent picture that represents scientific interpretation of the natural phenomena. *Science 3000* will present a unified vision of science by using an integrated presentation of the aspects of the natural world being studied and the specialized disciplines that focus on specific topics. The interrelationships of the physical and living domains will be explored using a hierarchy of twenty levels of systematic organization, as the conceptual framework for the scientific content. Particular attention will be given to the systematic procedures that scientists employ. Thus, this course will be structured to examine the both the existing body of scientific knowledge as well as the ways the scientific process takes place.

**Instructional Philosophy:** If anything indicates the need for science education reform, it is the idea that the average elementary class in the USA spends less than 15 minutes per week on formal science instruction. Higher accountability for progress in other subject areas have traditionally diminished the priority of science, but in 2007 there will be standardized tests that assess the progress K-5 students are making in science. The open admission by elementary teachers that they do not like or feel qualified to teach science also contributes to this situation. Out of my conviction that the college science courses taken by prospective teachers can influence the science experiences that future students will have in elementary classrooms, this course has been designed especially to meet the needs of Early Childhood Education majors. The scientific subject matter is aligned with the Georgia Performance Standards and specifically selected to prepare students for certification exams. Class sessions will model a wide variety of strategies suggested for the reform of K-12 science education. This approach is a deliberate attempt to facilitate the development of Pedagogical Content Knowledge or the ability to move beyond the mere assembly of subject matter knowledge and develop sound pedagogical philosophies for teaching science to children.

**Academic Honesty:** Members of the class are expected to maintain high standards of integrity. Always cite any source of original information. Never copy text from a classmate, book, or website and represent it as personal work. The VSU Biology Department Statement on Plagiarism is included as part of this syllabus to clarify common types of academic misconduct. Students are expected to read this carefully and sign the Student Information Sheet to indicate that this is understood. Dishonesty will not be tolerated; evidence of cheating will result in no credit for the assignment or depending on the case, a grade of “F” for the course and letter of concern documenting the problem to the College of Education.

**Special Services:** Students requiring classroom accommodations or modifications because of a documented disability should discuss this need at the beginning of the semester. Students not registered with the Special Services Program should contact the Special Services Office, Nevins Hall 1115, 245-2498.

**Family Educational Rights & Privacy Act:** Grades cannot be posted by Name, Social Security Number, or other Personal Identifiers. Grades and student work will not be given over the telephone, by email or to another student.

## SCI 3000 – Guidelines for Content & Evaluation

### Connections to the Georgia Core Curriculum: (Section 2.04: Core Curriculum Principles and Framework)

2. Permit opportunities for interdisciplinary learning;
6. Employ pedagogy designed to increase intellectual curiosity and to initiate a continuing interest in the subject matter;
7. Feature courses that are challenging and rigorous and provide learning experiences that distinguish a field;

### Alignment with VSU General Education Outcome #5:

Students will demonstrate knowledge of scientific and mathematical principles and proficiency in laboratory practices. They will understand the basic concepts and principles underlying scientific methodology and be able to collect, analyze, and interpret data. They will learn a body of scientific knowledge and be able to judge the merits of arguments about scientific issues.

### Relationship to Representative Georgia Performance Standards:

#### I. Natural World

- S2P2. Students will identify sources of energy and how the energy is used.
- S2P1. Students will investigate the properties of matter and changes that occur in objects.
- S3L1. Students will investigate the habitats of different organisms and dependence of organisms on their habitat.

#### II. Nature of Science

- SKCS1. Students will be aware of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.
- S1CS3. Students will use tools and instruments for observing, measuring, and manipulating objects in scientific activities.
- S2CS6. Students will be familiar with the character of scientific knowledge and how it is achieved.

#### III. Pedagogical Content Knowledge

- SKCS6. Students will understand the important features of the process of scientific inquiry.
- S1CS2. Students will have the computation skills necessary for analyzing data and following scientific explanations.
- S2CS5. Students will communicate scientific ideas and activities clearly.

### Learning Outcomes - Students in SCI 3000 will be expected to:

- I. **Display** recognition of scientific understanding of the features of the natural world.
- II. **Characterize** the distinctive features of scientific knowledge and the processes used to produce it.
- III. **Outline** the organization and content of the K-5 Georgia Performance Science Standards.
- IV. **Compare and contrast** how the abiotic factors influence the biotic features of representative Georgia ecosystems.
- V. **Teach** a science lesson to young children that conveys an integrated view of the natural sciences.

### Evidence of mastery for each will be demonstrated by the knowledge & skill shown in:

- I. **Course Portfolio** – An extensive individualized document built throughout the semester
- II. **Midterm Examinations** – Formative evaluations of conceptual appreciation scientific knowledge and processes
- III. **Oral Presentation** – Science Discipline Report
- IV. **Lake Louise Diary** – A creative, extensive display of field trip observations and subsequent synthesis of information
- V. **Final Examination** – A summative, comprehensive evaluation of Pedagogical Content Knowledge for K-5 Science

### The following facets of understanding will be built into the course assessments:

**Explanation** – Description of subject matter and pedagogical practices

**Interpretation** – Demonstration of astute reasoning and ability to make meaningful connections between concepts

**Application** – Explanation of the links between subject matter and science instruction

**Perspective** – Identification of the nature of science in our formulation of an understanding of the natural world

**Empathy** – Participation in a community service activity for underserved children

**Self-Knowledge** – Illustration of personal reflection on the process of learning and teaching science

## Tentative Class Schedule (Subject to Change)

<u>Date</u>	<u>Class Topic</u>	<u>Activity</u>	<u>Assignment/Extension</u>
Aug 18	The Natural World	Levels of Organization	Read Syllabus
20	Inquiry	Science Blocks	Student Information Sheet
25	Patterns in Nature	P & Num Lists & Cones	3E on NW
27	Organization of Knowledge	Classification	Pattern Display
Sept 1	Scientific Methodology	Processes	Dichotomous Key
3	Qualitative/Quantitative	Words or Numbers	Chart of Activities
8	Logic & Probabilities	Mastermind	<b>Human Body Project Due</b>
10	Natural Dimensions	Forms of Measurement	NW Chart w/Q&Q
15	History of Science	National Geographics	NW Chart w/ Units
17	Holistic/Reductionist	Big Bang & Human Genome	Timeline for Report
22	<b>MIDTERM EXAM # 1</b>	Review for Exam	<b>Portfolio: Formative Assessment</b>
24	Lake Louise & Presentations	Exam Review	12 Slides for Reports
26	<b>Mandatory Field Trip to Lake Louise (7:30-12:00)</b>		
29	Ecology	Microscopy	Field Notes
Oct 1	Data Analysis & Presentation	Graphing Data	Microbe Identification
3	<b>Lake Louise Rain Date</b>		
6	Scientific Reasoning	Fish Observation	Analysis of Lake Data
8	Experimental Design	Fish Experiment	Lake Louise Report
13	Myths & Truths about Evolution	Mosaic & Timeline	Origins Essay
15	The Theory of Evolution	Skulls	5E Fish Lab Report
20	<b>FALL BREAK HOLIDAY</b>		
22	Principles, Theories, & Laws	Gravity & Other Laws	7E Evolution Report
27	Philosophy of Science	Science or Not?	Sci Report Outline
29	Ethics & Fraud	Moral Debates	Certainty Scheme
Nov 3-5	<b>Practicum Release Dates</b>		
10-12	<b>Practicum Release Dates</b>		
17	Matter	Physical & Chem Changes	Group Slide Show Draft
19	Energy	Forms of Energy	Collage of Changes
24	<b>MIDTERM EXAM # 2</b>	Essay Question	<b>Portfolio</b>
26	<b>THANKSGIVING HOLIDAY</b>		
Dec 1	Social Impact of Science	Sci Rpts: Life & Earth	Group Handouts & Printout
3	Ethical Dilemmas	Sci Rpts: Physical & Applied	Group Handouts & Printout
10	<b>CUMULATIVE FINAL EXAM – Thursday, December 10<sup>th</sup> from 10:15-12:15</b>		

## Daily Assignments/Extensions

Every assignment should have your name, your section, and the date clearly displayed on the front page. This will be in the upper right corner if it is a written narrative and will be at the bottom right if it is a collage or set of pictures. A creative or appropriate title of the assignment should always be on the top in the center of the page. Points will be deducted for failing to follow these directions.

**Take note of the Learning Outcomes that are embedded in each assignment and ask in lecture if they are not clear.**

**Read Syllabus** – Between Lab & Lecture, look over the syllabus & come to class with 3 questions that **demonstrate you have read it** on a sheet of paper to be handed in for a grade.

**Student Information Sheet** – Fill out both sides of the form neatly. Your grade will depend on the effort made to answer the questions thoughtfully. **State your goals and why you plan to enter the teaching profession.**

**3E on NW** – Demonstrate that you can **complete the correct format of the reports** that are required in your portfolio for each lesson. On one sheet of paper with the proper heading & title there should be two paragraphs with the headings Exploration & Explanation. Theses must be 300-400 words long and show that you can: 1) **describe how the activity related to the scientific topic of the lesson** and 2) **identify the key concepts** by defining at least 5 vocabulary words in sentences of your own words and making reference to something you read in a book or online. Staple the Extension as the second page of this report.

**Pattern Display** – **Collect 10-12 images online of a pattern** that you enjoy seeing in nature. Display them and explain why you like it.

**Dichotomous Key** – Choose a topic and collect images of 25 examples of the collection. **Construct a schematic & numeric key.**

**Chart of Activities** – Make a chart with 3 columns. The left is the 24 terms on the worksheet; the middle is an example of how you use this process in your personal life; the right column should list a K-5 GPS that introduces this process with a description of how you could teach it at the elementary level. **Show you recognize the wide use of these processes in your examples.**

**NW Chart w/Q&Q** – Build a chart with 3 columns: 1) List the 20 Levels of Organization; 2) **Describe something about them in a short, qualitative, narrative, phrase**; 3) **Explain how some aspect of this natural phenomena could be quantitatively represented with numbers.**

**NW Chart w/ Units** – Use your chart from the last assignment as a template, except in the 2<sup>nd</sup> & 3<sup>rd</sup> columns **list 2 forms of measurement and the units of metric measures** that scientists use for investigations of these aspects of the natural world.

**Field Notes** – Submit the actual notes you took on the Lake Louise Trip. Your grade will be based on how thoughtful and reflective these are. **Describe your feelings about how informal education compares to classroom lessons.**

**Microbe Identification** – Using your drawings from lab, **identify 6 of the organisms you saw** online and submit pictures, your drawings and both the common and scientific names as binomial nomenclature in italics (*Homo sapiens*).

**Analysis of Lake Data** – **Graph any data collected at the field station** as instructed in lab. Submit tables of the data with these.

**Origins Essay** – **Write a well-organized essay** addressing: “How YOU believe life began and humans came into existence and why YOU believe What YOU believe.” This should be one single-spaced page and your grade will be based on: 1) The inclusion of a clear thesis (your belief) which carries and is supported throughout the paper, 2) At least 3 distinct, well-structured paragraphs with topic sentences (the first is an introduction and the last is a conclusion of equal length). No quotations of more than 1 line in length and if you cite or refer to scripture, you must clarify what it means to you.

**5E Fish Lab Report** – Page 5 of this syllabus contains an extension of the 3E format you have been using. Follow the 5E’s for a written report that covers both days of the fish lab. Every paragraph must be at least 300 words and should explain how the activity accomplishes that phase of the 5E lesson format. Engagement = First Fish Observations, Explanation = Information from lecture on minnows, Exploration = Experiment with Dark & Light pans, Extension = **Clarify the distinction between Inductive & Deductive reasoning**, Evaluation = One page brief write-up in the format of a lab report (Background = Information on Minnows, Materials & Methods = Synopsis of 2 days in lab, Findings = Tables with your inductive observations, your deductive group data & the entire class data and a graph of the class data, Discussion = Your personal interpretation of what the fish did in both the Inductive and Deductive phases, Conclusion = What you can infer on the basis of this whole lesson.

**7E Evolution Report** – This will be the same type of assignment as the previous one, but use the 7E’s to cover the Evolution lessons in one inclusive report. Elicitation = Mosaic of Quotations, Elaboration = Timeline, Engagement = Myths & Truths PowerPoint, Exploration = Skull Observations, Evaluation = Paint Chips, Explanation = Lecture on Evolution/Creationism Controversy, Extension = Define the 3 types of Evolution (Geological, Chemical, & Biological) and **explain why they are so controversial and how you will meet the various GPS that refer to evolution.**

**Certainty Scheme** – In a creative and original way, **use a visual metaphor to display the distinctions** between the key terms.

**Collage of Changes** – **Collect 12 pictures (6 Physical & 6 Chemical)** from the Web. Organize them in 2 sections on one sheet of paper and have captions describing in your words how you know they are this type of change.



## Evidence of Achievement & Knowledge Construction

**Attendance:** Since more than half of this course involves active experiences, it's extremely difficult to "make-up" missed material. Therefore, attendance is mandatory and will be taken each class period. Attendance will be taken up until the time lab or lecture starts and any arrival after that will be considered tardy. Three late arrivals to class (lab or lecture) will be counted as an unexcused absence. ALL other class absences must be made up by **writing a research paper** on the class lecture topic that uses no less than 2 cited outside published sources (i.e. not the text) and is 1 full single-spaced page (10-12 point type, 1" margins) and at least 500 words in length. Absences from lab and lecture are distinct and each requires a make-up to avoid the penalty. If you miss both for a good reason, you can combine the writing with pictures. These papers will substitute for the 2 paragraphs in your 3E in the portfolio, but you are still required to complete the Extension that was assigned. Failure to submit these make-up papers to the instructor within **2 weeks** of the absence, will impact the grade for the course. Anyone who misses more than 20% of the class sessions can receive a failing grade for the course.

**Class Participation:** The learning environment has a very significant impact on the satisfaction and success of all students. Therefore, certain standards of decorum will be expected and maintained so that everyone can all enjoy being in the lab and learning as much as possible. All students start out with 100% as their participation grade. This can be elevated to as high as 125% for consistent positive contributions and exceptional efforts that enhance the experiences of other students. This grade will be reduced at the discretion of the instructor on the basis of inappropriate conduct such as rudeness, lack of collegiality, or other negative behavior. As future teachers, a professional standard of decorum is expected and will be maintained in these classrooms. Intemperate language, excessive slang, and poor grammar are not acceptable.

**Short Assignments:** It is too easy to attend class on a regular basis, but put little thought into the course material until there is pressure to study for an exam. Therefore, regular short assignments will mandate consistent attention to the material that is being covered. These assignments will be described in lecture and are due at the start of the next lab session. These will be graded on a 10 point scale as follows: (10=Excellent, 8-9=Good, 7=Adequate, 6=Minimal, <6 Must be Resubmitted). The lowest grade will be dropped. Reports for the Human Body Project and Lake Louise Field Trip will be graded on the same scale but weighted more (100 point scale). **If a paper is not submitted at the start of lab, the possible points for the assignment will be reduced by 10% without exception and an additional 10% reduction will occur for each additional day.** Assignments more than 1 week late will not be accepted.

**Examinations:** There will be two midterms and a comprehensive final examination. The most important reason for these tests is preparation for the GACE exam. These are multiple choice tests that will consist of conceptual questions that probe understanding of the course material. Do not expect to depend on rote learning or memorization. This course is taught in a way that requires students to demonstrate individual construction of knowledge and the questions on these assessments are written to judge the ability to apply the course information. Hard work on the Daily 3E Write-Ups is the best preparation for these exams. Many students say that they do not need to study for the tests because they are confident that they have learned the material by doing the Portfolio. Building up thoughtful displays of the scientific information and demonstrating consideration of the connections is preparation for the challenges posed by conceptual questions. Success starts in class. Think about lesson, ask questions about what is happening, and keep good records.

**WWWeb** – The web is a great resource for supplementing the information presented in class sessions. Use the Web to obtain images to compose visual displays that demonstrate understanding of the topics. **Do not copy text from a site or print out sites in the portfolio!**

**Outside Reading:** Concentrate on doing selective reading in either your old text or from the WWWeb. This means there is no need to spend time on information that goes into detail over subjects that were not covered in class. Notes to document reading efforts can be in the form of an outline with key terms or a narrative summary and should be placed right after the 3E for the lesson in the Portfolio or reference to the book can be made in the Explanation section of the 3E report. Refer to the site by html of the book you used.

**GPS** – Obtain a complete set of K-5 science standards and address them in detailed reflections in the Portfolio. Do not put the GPS in the portfolio. Pay attention to the Major Concepts/Skills to Maintain. Note the progressive changes in complexity for higher grade levels. Anytime a class lesson correlates to a specific standard, explain this connection in detail. Do not just name the standard, explain how the lesson covers the content and gives ideas for lessons for children.

### Course Assessment:

#### 60% Written Work & Presentations

Average for Assignments (10 pointers, Human Body, & Lake Louise)	10%
First Portfolio Submission - Formative Evaluation	10%
Final Portfolio Grade (Revisions, Unit Summaries, & Final Product)	30%
Research Project	5%
Class Participation & Attendance	5%

#### 40% Exams

Midterms – (10% each)	20%
Final Exam – Comprehensive	20%

## Science 3000 Course Portfolio:

The course portfolio is the most significant aspect of the grading in this course and actually counts more than the exams. The portfolio should clearly display the “construction of knowledge” and process of building an understanding of the course material. This portfolio is an *Alternative Assessment* evaluating different indications of learning than traditional tests. This portfolio is also an important way to organize the course material and keep it for reference in the future. The organization by themes is a way all of the material on a topic will be collected together so that it will be easier to study for conceptual understanding. There should be a distinct section with divider tabs labeled for each theme. **Any Portfolio that does not reflect a substantial effort to display a comprehensive understanding of the lessons will not be accepted for grading and given a grade of 0/100 points.**

**For a minimum grade of 70%** - Complete a report of the *3 Stage (3E) Learning Cycle of Activity* for every class session and field activity. Place handwritten lab and lecture notes immediately in front of this 3E Summary for the particular lesson.

**\*Lab Notes Must End with a Genuine Question** that came from the experience– These questions should appear in bold and be very obvious. The lesson should be consolidated into a single 3E Summary for that topic that includes:

*Explorations:* Elaborate a synthesis of the purposes of all activities. Consider why these were chosen to generate interest in the topic. Do NOT restate **what** was done. Emphasize **why** it was done.

*Explanation:* Use the Lecture Notes & Text to Complete a Summary depicting the Central Concepts Covered in Class (Any class absence must be made up with copied class notes & the Make-Up paper)

*Extension:* Work beyond the class meeting to consolidate understanding – be sure to answer the lab question.

**For a minimum grade of 80%** - Acquire the *Language of Science*:

Reading Notes – Outline (or explicit references) summarizing text information relating to each topic covered in class

Vocabulary Terms - >5 New or Significant Terms per Lesson with paraphrased definition (Listed or highlighted in 3E)

**For a minimum grade of 90%** - Demonstrate a *Conceptual Understanding* of the Course Material:

Visual Displays - Photographs and/or web images to augment written descriptions and visually display concepts

Show a solid effort to document understanding with portfolio entries of exceptional quality and clarity

Summarize the scientific significance of the course theme in a full page, single-spaced, typewritten essay

Relate the Georgia Performance Standards and what was learned about science pedagogy

**Use a 1-inch notebook** with a creative cover including name and course information

There should be no blank pages or sub-dividers other than the 2 chapter designations (Nature of Science & The Ecosystem)

Every handout and short assignment should be included with the appropriate lesson.

The Portfolio will only include student work and NO web sites or information from other sources should be included

## Sequence for the Chapters

**C**= Lab/Lecture Notes & 3E Summary for each Lesson

**B**= Vocabulary & Reading Notes (for all relevant chapters), \*Chapter Divider with Picture Collage

**A**= Conceptual Summary, Reference to Standards, and Demonstration of Pedagogical Content Knowledge

## Evaluation Rubric for 3E - Daily Write-Ups

	Things to Avoid	Barely Adequate - 1	Satisfactory/Good – 3	Outstanding - 5
Exploration	Essentially Restates What Happened	Clear Description of Scientific Purpose	Synthesis of Results Tabular or Graphic Display of Data	Analysis & Inference of Connection to Main Topic
Explanation	Mechanical Description Rewriting Lecture Notes	>5 Key Terms Defined & Underlined	Information from Text Explicitly Included Reading Notes	Summary of Lecture Recognition of Concepts Evidence of Understanding
Extension	Thoughtless Reference to Website Information Unexplained Pictures	Evidence of Additional Information from Outside Sources	Creative Visual Display of Scientific Concepts	Connections Made to GPS Characteristics of Science Specific Content Area

**Work Ethic:** This course has an accurate reputation for being “a lot of work.” The effort required will be rewarded by gains in understanding of scientific information. Success depends on consistent effort and hard work. Rather than wasting energy complaining, just develop good habits and get things done. Grades are based on the quality of the product produced, not the time spent on assignments.

**Creativity & Illustrations:** This is not a traditional lab notebook and should be much more than a sterile display of course work. As preparation for teaching science to young students, think about colorful ways to show understanding and appreciation of the information. Use Google or other engines to download images for visual displays.

**Reading Notes:** These should be part of the Explanation and do not need formal citations if they are general information. When using the course text, use parenthetical page numbers, indicating where information related to class topics was found and to show that the information came from the book.

**Unit Documents:** For a grade higher than 90%, each chapter should demonstrate *Conceptual Understanding* of the relationships of the lessons that are included. There should be a summary addressing the scientific significance of the section. There must be introductory & concluding paragraphs that discuss what you learned out of the overall connections of the lessons or the theme of the unit. There must be a single paragraph on each lesson that describes how the lesson demonstrates part of the Georgia Performance Standards. Do not just list standards; explain the connection to what we did in class.

**Pedagogy:** Since this science content course is part of the major in Early Childhood Education, students are expected to focus on the “art and science of teaching” as well as the scientific subject matter. Each chapter summary should also contain evidence of conscious thinking about efforts to develop Pedagogical Content Knowledge or the ability to translate scientific subject matter into interesting and effective lessons that are appropriate for young children.

**Grading:** The Portfolio will be given a preliminary grade (10%) as formative assessment after the first midterm and a full (30%) summative assessment after the second test. Concentrate on demonstrating critical synthesis of every class session. If any lessons are not completed and summarized, the portfolio grade will not be any greater than a “C” regardless of other efforts. Top grades will be awarded for clear evidence of **Clear, Consistent, and Convincing** comprehension of the material. It is extremely important to focus on building a document that clearly demonstrates understanding of the course content. **The grade will be a reflection of the quality of the work presented. It will not be a measure of the amount of time spent on the assignments. Remember: the grade is based on a demonstration of what was learned; it is not given for the size of the Portfolio.**

## Portfolio Construction Guidelines

<b>PORTFOLIO</b>	<b>Insufficient</b> <70% Things to Avoid	<b>Minimal</b> <70% Basic Components	<b>Adequate</b> >80% Solid Effort	<b>Outstanding</b> >90% Exceptional/Excellent
<b>Product</b> Structure Inclusions Organization	Blank Cover/No Tabs Messy/Disorganized Empty/Excess Pages	Labeled Tabs Showing Several Throughout Consistent Sequence	Pictures on Dividers Consistent for Chapters Follows Checklist	Creative Innovations Additional Material Neat & Concise Document
<b>Skill</b> 3E Write-Ups Outside Learning Summary Narratives	Any Reports Missing Long Websites/No Notes “GSP” Errors	3 Named Paragraphs Use of Internet Typed, Single Spacing	>200 Words Each Text Reading Notes Full Page of Analysis	Augmented w/ Photos Other Good Sources Detailed Unit Summaries
<b>Knowledge</b> Science Content Scientific Processes Text Objectives	Errors & Mistakes Ignored Failure to Mention	>10 Keywords Explained Noted in Lab Activities Some Attention Given	Personal Definitions Field Trips Described Each Stated in Notes	Highlights Major Concepts Part of Chapter Summaries Effort to Elaborate
<b>Reasoning</b> Content Analysis Nature of Science Intersection (C&NOS)	Nothing Beyond Class Ignores Importance Absent	Outlined as Covered Mentioned Discussed	Elaborate Explanation Clear Description Explained in Detail	Significant Synthesis Definite Understanding Obvious Appreciation
<b>Disposition</b> Engagement Reflection PCK	Minimalist Posture Absence of First Person GPS w/ No Comment	Basic Effort Some Thoughts GPS Connections	Good Work Metacognition Shown Pedagogy of Science	Appreciation of Learning Superior Personal Insight Articulation of Significance

## Research Reports on Scientific Discipline

**Research Project:** Each person in the class will select a different scientific discipline as the focus of an ongoing investigation. Research on these topics will be conducted throughout the semester and presented as part of a group PowerPoint Presentation the last week of class. You will learn about the specifics of the branch of science or how these scientists investigate the Natural World. The report will be about this type of scientist and their scientific activity. It will NOT be a report about the subject or a content lesson on the topic.

All of your notes and drafts should be put together as the last entry in your Portfolio. There are several separate grades that will be averaged as the final evaluation of this project. Find articles on the internet and place your notes or outlines of them in the last section of the Portfolio along with any notes taken from library books or other resources. Photographs should be downloaded from the WWWeb on a disk or kept in a file for use on various assignments. The first assignment (**DUE: 9/17**) is a Historic Timeline that should include at least 6 key events or scientific discoveries that were important events in the history of your science. This should be done with pictures in a timeline arrangement and there should be enough text in your own words to show you understand why this was an important contribution. Another assignment is the 12 individual PowerPoint slides (**DUE: 9/24**) that will be included as a color printout in the Handout Format (6 slides per page on 2 pages). These should be photographs, not clip art, showing dynamic images covering the topics listed in the next paragraph. You will produce a written outline (**DUE: 10/27**) that answers the questions in the next paragraph in detail.

The important element of the research is identifying the types of questions this discipline addresses. What is the central focus of this line of research? What do these scientists want to know? How do they go about seeking answers to their questions? What is their research like? What types of studies do they carry out? What technology do they depend on? Who are/were some of the most important researchers in the field? Who are some nontraditional scientists (People of Color or Women since most famous scientists have been White Men)? What are some of the major discoveries that have been made? How does this work impact the rest of society or you? Where does this discipline fit into the Levels of Organization? How has this science influenced the K-12 GPS?

During the oral group presentations to the class, each person will receive an individual grade for preparation and effort. The group grade will be based on the creative integration of the individual reports (**Complete Draft DUE: 11/17**). Presentations should be interesting and entertaining. There must be at least 6 introductory and 6 concluding slides that compare and contrast the disciplines covered by the group. A full printout of the final group report in the Handout (6 slides per page) format is due at the time of presentation along with a one-page handout of key notes with enough copies for every one in the class.

### Physical Sciences

Mathematics  
Physics  
Inorganic Chemistry  
Organic Chemistry  
Physical Chemistry  
Optics  
Nuclear Science

### Life Science

Biochemistry  
Molecular  
Genetics  
Cellular  
Physiology  
Ecology  
Evolutionary

### Earth/Space Sciences

Geology  
Hydrology  
Astronomy  
Meteorology  
Paleontology  
Oceanography  
Pedology

### Applied Sciences

Agriculture  
Engineering  
Environmental Science  
Medicine  
Biotechnology  
Computer Science  
Forestry

## Science Report Grading Rubric

	<70%	80%	90%	100%
Slides	Slide Errors Too Much Text Blurry Images	>Six Slides Decent Images Intro & Concl	Striking Visual Displays	Enhancement of Topic
Indiv	Obviously Minimal Effort Mistakes on Info	Too Much Emphasis on Content	Accurate Portrayal of Scientists	Exceptionally Creative & Enthusiastic
Group	Lack of Coordination Late Submission Uncooperative	Cohesive & Coherent Activity/Demo	Strong Intro & Concl Evidence of Cooperation	Lively, Entertaining & Educational

**Expected Conduct:** Since this is a teacher education course, you will be expected to show considerable respect for your classmates and the learning environment. During lab and class, your conversations should only be about science and not disrupt the group or make it difficult for others to learn. If you have to be corrected more than once for creating a disturbance, you may be asked to leave. There is no eating, drinking, or popping gum in the lab or lecture room.

### Department Grades

	<50%	<75%	80-100%	125%
Attendance	2 Unexcused	3 Tardy/ 1 Unexcused	All Made-Up	Community Service
Participation	Rude/Impolite Disrupts Class	Passive in Class Off-Task	Volunteers Answers Involved in Labs	Very Active Participant Enhances Class Sessions

**Extra Credit Options:** There will be several extra credit opportunities throughout the semester. VSU seminars, environmental education classes, and book reviews (pre-approved by the lab instructor) are among the possibilities. Each of these will add 1-2 points to the final grade. All Extra Credit events must involve substantial science experiences.

### Practicum Trade-Off = Extended Projects

**Practicum Time Release:** Since ECED students in the second block will be out in the schools for two weeks, class meetings will be suspended to allow full attention to that field experience. In exchange for the time missed, there will be two outside activities. The Human Body and the Lake Louise Field Trip are described below. These are much more than a payback for time; they provide experiences in two very different ways to learn science.

#### Lake Louise Field Trip (9/26/09)

On Saturday, September 26<sup>th</sup>, we will meet from 7:30 – 12:00 for a Field Trip to the VSU Field Station. The grade for this experience will be based on a Lake Louise Diary. These will be submitted by a deadline (**DUE 10/8**) in the syllabus. These are to be included in the Portfolio. Documentation should contain the actual field notes (no matter how messy) (**DUE 9/29**), a graphical analysis and synthesis of data collected (**DUE 10/6**) and crisp presentations (pictures, graphs, and narratives) of findings after the actual trip.

A handout with directions for the group activities will be provided the week before the trip. There will be groups of students that will move around the grounds and complete the listed activities. The diary should be assembled as evidence of what was learned from this informal educational experience including reflection on the positive features of science education outside of the classroom.

There is no set format for the final product, it should be creative and demonstrate what is learned from the experience. This will be evaluated for evidence of thoughtful, creative effort, and the inclusion of the following concepts as documented by observations of:

- Biome – Characteristics of a Warm Moist Coniferous/Temperate Deciduous Forest
- Ecosystems – Abiotic & Biotic Aspects of the Lake, Swamp, & Forest
- Community – The Entire Group of Living Organisms (Direct & Indirect Evidence)
- Populations – Various Dispersal Patterns
- Organisms – Microbes, Fungi, Plants & Animals Observed

#### Human Body Profile (Due 9/8/09)

This assignment replaces two of the class sessions and associated study time during your Practicum. Students may work together and discuss creative ways to build a presentation, but everyone should produce their own project and construct a unique display that will be included in the Portfolio. These must be constructed in PowerPoint. Each system is limited to a 1 page display. There should also be a creative cover page and the final 2-page display of the integration of the systems for a total of 14 pages. Think of a creative name for the system and use that as the title on each page. Find a detailed picture of the entire body system print this with a short paragraph (2-3 sentences in a text box) that outlines the purpose/function of the system. Name and describe a health concern associated with each system in a small text box. Cover 12 Body Systems: Circulatory, Digestive, Endocrine, Excretory, Immune, Integument, Muscular, Nervous, Reproductive, Respiratory, Sensory, Skeletal)

For each system:

- Print an Image** of the Entire System & List/show pictures of the important organs or significant components
- Print a picture (not a drawing) of a distinct tissue/cell type** & draw arrows to indicate specialized structures

Construct a Diagram of Integration for the 12 systems and a write up an outline or short narrative to explain your diagram

A picture with labeled arrows showing connections for related functions (HINT: Only arrows for direct connections)

A key with brief descriptions of the interrelationships (HINT: All of these systems work together)

**Holistic Grading Concept:** This is a 100 point assignment that will be graded on how well these directions are followed, the effort put into making this a polished display, and the demonstration of a clear understanding of the function of the systems.

## VSU Biology Department Policy on Plagiarism

Plagiarism is a broad term used to describe many forms of cheating that involve taking credit for someone else's work. The most blatant type of plagiarism is copying from another source without giving credit to the author. Anytime the original ideas of someone else are used, appropriate citations must reference the source. The failure to acknowledge the use of someone else's ideas, even when they are paraphrased, (whether intentional or not), constitutes plagiarism. Using a paper written by someone else is obviously plagiarism. In addition, the improper citation of references can fall under this spectrum of offences. Plagiarism is equivalent to looking at someone's test and copying down their answers. It is the theft of intellectual property. The simplest way to avoid plagiarism is to give credit where credit is due! This document has been developed by the biology department faculty to explain plagiarism by clarifying appropriate academic behavior, identifying common mistakes or violations, and warning students of the serious consequences for academic misconduct relating to the misrepresentation of original work.

Recognition of and respect for the ownership of property is one of the distinguishing features of civilization. Ideas come from individuals and are effectively owned by their originators; thus they are intellectual property. In the academic sphere, the ideas of others are often encountered, most often in published form. As with tangible property, intellectual property is subject to ownership and protection. Moreover, publication establishes ownership of intellectual property. It is essential to respect the ideas and writing of others by scrupulously citing the sources of any and all ideas that are taken from other people's work.

Writing assignments are a very important way for students to demonstrate the ability to assimilate information and express personal knowledge in a coherent manner. The writing process is an active learning experience involving the demonstration of academic skills such as analysis, inference, and appropriate presentation. Assessment of student writing allows faculty members to evaluate not only an individual's understanding of course material, but also the mastery of processes that are considered an important part of biological education. Therefore, it is extremely important that any written work submitted represents a student's personal synthesis displayed in sentences completely constructed by the student.

The Writing Tutorial Services website at Indiana University (<http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>) gives the following guidelines for avoiding plagiarism. You must give credit whenever you use:

- another person's idea, opinion, or theory;
- any facts, statistics, graphs, drawings—any pieces of information—that are not common knowledge;\*
- quotations of another person's actual spoken or written words; or
- paraphrase of another person's spoken or written words.

\*In the sciences there is one important clarification to these rules. Any information, even if it is a theory or original idea, that has become widely circulated enough to be found in textbooks is defined as common knowledge. For example, Charles Darwin and Alfred Wallace do not need to be cited every time "natural selection" is mentioned.

There are a variety of ways to obtain assistance on writing assignments. Your professor can clarify expectations in class, help individually in an office conversation, or elaborate instructions by email. The new VSU Student Success Center will provide personal tutoring. There are a plethora of websites devoted to providing writing tutorials. By default, the biology department expects students to use the style recommended by the Council of Science Editors (CSE, formerly and still known as CBE), and succinct directions on how to use this format for citations and references is available on various websites such as: <http://library.osu.edu/sites/guides/cbegd.php>. Specific examples of citation styles may be given to you by your professor that will supersede the CSE/CBE Style.

## Quotations

Sometimes students get a little carried away with the use of quotations. Copying large volumes of material, placing it in quotes and citing the author is not plagiarism, but neither is it evidence of your ability to write a paper. So, you may receive a failing grade for excessive quotations because you failed to actually *write* the paper (see paragraph 3 above). There is a huge difference between transcribing a paper (quoting) and writing a paper (using your own words). You should use quotations judiciously when writing science papers. This style may differ from what instructors in other disciplines are telling you to do, so remember that science papers rarely use quotes of any kind. Generally, no more than five-ten words should be used in a single quote, and not more than one or two quotes per ten-page paper. If you do more than this then you must discuss it with your professor before you turn in your paper for grading.

## Punishment for Plagiarism

Plagiarism will not be tolerated in the biology department. Any student caught plagiarizing will receive a failing grade on the assignment and depending on the situation may automatically fail the course. Ask before making mistakes and do not assume that we are too lazy to check or too stupid to catch cheaters. Ignorance is no excuse and do not expect sympathy for academic misconduct.

## Lab Reports

Students will frequently work in groups during the laboratories. However, lab reports are **never** group projects unless specific instructions to the contrary have been given by the instructor **in writing**. When lab groups work together on projects, each person is expected to do their own analysis of the results. Never use another person's graphs, tables, or words in a report that is supposed to have been written independently. In other words, each student must prepare their own tables and graphs in addition to written descriptions within the report. If lab reports are plagiarized in whole or in part then **all reports in question will be penalized**, not just the reports that were plagiarized. Therefore, **never** give your reports to a classmate to copy.

## Long-Term Consequences for Cheating

If a professor takes punitive action on a student's plagiarism incident then, depending on the situation, the incident may be reported to the Dean of Students where it will be entered into the student's disciplinary record. If you send an application to a professional program such as Medical School or Law School, those schools will contact Academic Affairs at VSU and ask them for your Disciplinary Record. **The cheating incident will then be reported to the schools to which you have applied**. So, you can see that there can be terrible long-term consequences for plagiarism.

*I have read and understood this policy.*

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date