

**InTeGrate Instructor Story:**  
**Geoscience Methods and Resources for K-5 Pre-Education Majors at the**  
**College of Coastal Georgia**

**Instructor:** James B. Deemy

**Course Title:** Integrated Science: Life / Earth Science

**Course Number:** ISCI 2001

**Course Hours:** 2 class hours, 2 laboratory hours (3 Credits)

**Prerequisites:** Completion of the University System of Georgia general education Area A math requirement (usually college algebra or precalculus) and both Area D science requirements (one life science course and one physical science course as well as the companion lab for one of the previous).

**Course description:** This is an activity-based and inquiry-based Area F content course for early childhood education majors. This course will emphasize the characteristics of life, biodiversity/heredity, energy flow, the interdependence of life, the cell, earth systems, and the lithosphere, hydrosphere, and biosphere. These topics are in direct correlation with the Georgia Performance Standards (GPS) for K-5.

**Course Context:** ISCI 2001 is an introductory course for non-science majors specifically designed for elementary education majors.

**Course Topics:**

*Life Science*

- Life and its fundamental properties.
- Biodiversity and heredity.
- Cellular respiration, photosynthesis, and energy flow in ecosystems.
- The interdependence of organisms and the basic principles of population dynamics.
- The cell as a functional unit.

*Earth Science*

- The general attributes of the known universe and its visible constituents.
- The similarity and differences of the main objects that constitute the solar system.
- The position of the Earth within the solar system and their relationship of its motions of celestial bodies.
- The Earth's component systems and how they interact to make up home for humankind.
- What powers the external and internal processes that influence the evolution and the distribution Earth's landscapes.

**Materials Used:** Exploring Geosciences Methods

**Introductory Statement:** Exploring Geoscience Methods was an excellent capstone experience for Elementary Education Majors. The class I used this module with was 24 students of various backgrounds and academic preparation. I introduced this exercise as a capstone in the last three weeks of class so that students could delve into teaching science from a geoscience perspective. Most activities were completed in partner sets or groups of three but we did the discussion on geoscience methods as a full class. The

future teachers I was teaching were quick to point out ways that each broad category of inquiry discussed by Kastens and Rivet (2008) were applicable to teaching at the K-5 level. These ideas included using physical models to engage students, simple arithmetic based models, and observation exercises.

### **Inspirational Quote:**

“My students felt like these methods were well suited to teaching K-5 level science in a meaningful but academically safe setting.”

**My Experience:** I adapted this module to be an end of course three week capstone in place of a final exam. I used the modules largely as written but in place of essays I generally required students to outline an essay due to time constraints associated with keeping the module entirely in class.

**Module Relationship to Course:** The course is on a semester schedule and we met twice a week for an hour and fifty minutes. I used the module during all instructional time during the last three weeks of the semester or approximately 15-20% of the semester. All course material had been introduced prior to beginning this module which allowed students to pull from examples when we discussed geoscience methods and how they could be used in the K-5 classroom.

### **Unit by Unit:**

Week 1: Unit 1: Activities 1 & 2 (April 17<sup>th</sup> and 19<sup>th</sup>)

- April 17<sup>th</sup>: Module introduction and Unit 1: Activity 1
  - Students completed Unit 1: Activity 1, some students completed the activity at home depending on how quickly they read the Kastens and Rivet (2008) paper.
  - My role was to facilitate their individual work and their small group discussions (for Activity 1 we did not do a full class discussion).
    - Note: I let the students work in partners on the individual activities because it seemed to generate additional interest in the subject.
- April 19<sup>th</sup>: Unit 1: Activity 2
  - Students prepared and reviewed their materials from the previous class and then we discussed the broad themes of the Kastens and Rivet (2008) paper.
  - The discussion went for approximately 45 minutes and quickly moved into how to use geoscience methods with elementary school students.
  - College of Coastal Georgia is on the Georgia coast so many students focused on beach related topics.
    - Note: I let students run with these ideas even if they were not perfect for the K-5 curriculum because they were thinking and using the ideas Kastens and Rivet (2008) posed in the paper.

Week 2: Unit 2: Activities 2.1 & 2.2 (April 24<sup>th</sup> and 26<sup>th</sup>)

- April 24<sup>th</sup>: Unit 2: Activity 2.1
  - Students explored data and filled out the OWL Charts to summarize their thoughts.
    - Note: depending on student comfort with exploring online resources and interpreting data students may finish at widely varying times. Partners were encouraged to help each other to mitigate this issue.

- April 26<sup>th</sup>: Unit 2: Activity 2.2
  - Students outlined their position paper and then completed the exercise using National Map Viewer or Google Earth.
    - Note: This process required an increased amount of facilitation from me because of technical issues and student anxiety about using new file formats.
    - Note: Provide students explicit instructions to open the downloaded .kmz or .kml files in Google Earth because they will try to open them as a normal file on their laptop. Many became very anxious over this process and some may disengage at this point.
  - Unit 2: Activity 2.3 was left as an optional activity due to time constraints

Week 3: Unit 3: Activity 1 & 2 (May 1<sup>st</sup> and May 3<sup>rd</sup>)

- May 1<sup>st</sup>: Activity 1
  - Due to time constraints in class, I adapted Activity 1 by only requiring students to explore three resources rather than twelve. They then had to write up specific information to help them remember and use the resource in a future lesson plan.
    - Note: if doing this exercise as part of a homework I think the twelve suggested resources from the module will work but if in class three was difficult for some students.
    - As suggested by another network participant (Prof. Kristen Genet) students could probably work together in groups to achieve the suggested twelve resources.
- May 3<sup>rd</sup>: Activity 2
  - Students completed their lesson plans according to the standards they are being taught for the Georgia State School Systems.
    - Note: Students were able to complete the lesson but if you are thinking about expanding beyond one lesson it is probably ideal to try it with one first.
  - Activity 3 was again optional on the students own time.

**Assessments:** There were no formal assessments of student progress for the module beyond student products from each activity. In the future I might use reading quizzes and protocol quizzes to encourage more student preparation prior to class. Additionally I may also require students to include their lesson and resource summaries in their teaching portfolio assignment (required in place of a final exam).

**Outcomes:** My goals for the module were for students to build lessons that could one day be used during their teaching careers. I think we were partially successful in this endeavor but few students highlighted this experience in their teaching portfolio assignment (showcase of their best teaching materials from the semester). Moving forward I hope to include this module as a more critical aspect of student teaching portfolios and their teaching philosophy assignments. When scheduling this module at the end of the semester I had envisioned that some would include geoscience teaching in their portfolios but most did not. A few students included observation and modeling in their teaching philosophies but nothing explicit to the module. In the future I will probably use the module much just after spring break so that students have enough time to include their module products in the end of course teaching portfolio.