1. Assessment information collected

A. Understanding of basic geologic concepts: Students take a Geoscience Concepts Inventory (GCI) test before beginning Geos 101 and after Geos 112 to assess learning gains or losses during the introductory sequence. Students repeat the GCI again at the end of an upper division course.

B. Written and oral communication skills consistent with professional standards: Final papers in core classes assessed with course-specific rubric. Oral presentations for core classes assessed with “O” rubric.

C. Students in Secondary Education concentration can pass a certification exam in Earth Science content area: No students have graduated in the Secondary Education concentration during the past two years.

D. Students employed or admitted to graduate programs within one year of graduation: American Geological Institute (AGI) student exit survey. Additional input from annual student feedback seminar.

2. Conclusions drawn from the information summarized above

A. Data on student scores from the Geoscience Concept Inventory test (GCI) show that students scores for Geos 101 students improve on every question by the end of the semester when compared to average scores at the beginning of the semester (Table 1). More importantly, the average percentage scores at the end of Geos 101 have increased in 2015-16 relative to the average percentage scores in 2013-15. This indicates that students are learning material throughout the course that either improves their understanding of significant concepts in Geoscience, or they are learning material for the first time so that their final scores improve over their scores at the beginning of the semester. The improvement of the scores at the end of Geos 101 over the past three years shows that analysis of the scores by Geos 101 instructors has resulted in better methods of instruction to create a clearer understanding of some of these
concepts. Students also take the GCI at the beginning and end of Geos 112, which is the second semester course in our entry sequence for Geoscience majors. Pre and post scores in Geos 112 also typically show improvement after taking the course. Students do less well on some questions probably owing to a lack of retention of material from one semester to another. This may be somewhat amplified since the content focus of the two courses is different. Results from 2015 show improvement in the post-112 scores indicating a concerted effort to focus instruction on concepts that students appear to have difficulty retaining. It was also concluded that several questions on the test may be confusing for students given that average post-course scores were deemed too low (i.e. average post-course scores below 50%).

B. Students in several writing-intensive, core courses (Geos 315W, Geos 309W, Geos 351W) write multiple drafts of research papers. Assessments of their writing are compiled using course-specific rubrics. Comparison of the rubric scores for first and final drafts of Geos 315W term papers (Table 2) for the fall 2014 semester reveals average learning gains in all categories, particularly organization (Orgn: average gain of .97) and referencing (Refs" average gain .56), and an average difference of +3.1% between the first and final drafts. Credit for revisions was added to the rubric for the final draft in fall 2013, with positive results. Students spend more time and effort on the revision process. However, some students continue to show little interest in incorporating feedback, leading to low scores in the revision category and, in some cases, a decrease in score between the first and final drafts (e.g. Students 5 and 9). In Geos 309W, students write five separate assignments which are then incorporated into a final paper (Table 3). Students receive feedback on each assignment. Although performance for individual assignments did not always improve, students all produced substantially improved written work in their final assignment than they did in their first assignment. Improvement ranged from 3-20%.

Oral presentations were assessed in Geos 475 using a presentations rubric (Table 4). In the overall rating of their presentations, every student in the class saw an increase in their oral presentation performance between their first presentation and their last presentation. The average grades for the last presentation given in the class are all between 4 (very good) and 5 (excellent).

C. Because no students have graduated from the secondary education concentration there are no results from the Earth Science content competency exam.

D. During this period, we abandoned our own student exit surveys in favor of a national survey conducted by the American Geological Institute (AGI). This national survey allows us to compare employment of our students to national
averages. Unfortunately, we received very low participation rates for the AGI surveys (i.e. 2 undergraduate students in 2014 and 2015) and have decided to re-institute our own exit surveys moving forward (Table 5). Nevertheless, the national survey does provide some information on student employment from our own very small sample. In 2014, both undergraduate students (100%) reported that they had obtained employment in a geoscience-related field. In 2015, one undergraduate student (50%) reported having obtained employment. The AGI survey provides a basis for comparison of our student employment data with national trends. In the 2014 AGI national survey (Table 6), 15% of graduating BS/BA Geology students had accepted a position in a geoscience-related field, while in the 2015 survey (Table 7), 11% of graduating students had accepted a geoscience position. Our student employment data compares very favorably to these national trends.

We also compiled the results of our annual student feedback seminar (Table 8). The main feedback with respect to employment focused around regular offerings of classes and a request that courses be offered when the catalog states that they will be offered. There was also a request for some oral intensive classes to be offered every semester on a broader variety of topics. Students also indicated that they want to have more practice doing scientific writing to prepare for their field methods class and field camp.
3. **Curricular changes resulting from conclusions drawn above**

**A.** An analysis of the GCI pre- and post-course scores by the Geos 101 and Geos 112 instructors concluded that the GCI has been helpful in redirecting instructional emphasis to better explain concepts that students consistently have trouble with by the end of a course and/or by the end of the introductory sequence. The data show that this has been effective in improving overall scores for most questions year over year. Several questions were re-written following discussion to try to make the questions clearer and more straightforward as instructors felt that this might be at least part of the reason for low average scores on some questions following the introductory sequence.

**B.** The data presented from oral and writing intensive classes suggests that these courses have been effective in producing students who have the ability to make written and oral presentations consistent with professional standards. The fact that most students in these courses can make a very good to excellent oral presentation and produce a piece of written work that is of high quality suggests that this curriculum is working as intended. The Department will endeavor to offer a wider variety of oral intensive courses more often so that students have a broader choice of topics to complete this requirement.

**C.** No changes required to the curriculum.
D. Because of the low response rate to the AGI survey, we have decided to reinstate our own undergraduate exit survey in order to more efficiently collect data on student employment and/or continuing education. We will continue to ask students to complete the AGI survey as well, as this provides a good comparison of our own students' success measured against national standards. The fact that the majority of students who responded to the AGI survey had found employment in a geosciences-related field is encouraging and suggests that our program provides our students with the necessary skills to succeed in geosciences careers following graduation. In the annual student feedback seminar, students requested more field trips, more writing in undergraduate classes, and a broader range of oral-intensive classes. As mentioned above, we will be creating some new oral-intensive classes so that students will have a broader range of subject options to complete this requirement. Most faculty have at least some writing assignments in most classes, and we will ask faculty to try to do more. Additional field trips may be added in some classes at minimal cost but additional multi-day field trips to Alaskan sites more than a few hours drive from Fairbanks are not practical given the current financial climate. Students also requested that the course catalog reflect classes that are actually taught, and when those classes are taught. We will update the catalog to ensure that classes are being taught when the catalog indicates that they are being taught.

4. Identify the faculty members involved in reaching the conclusions drawn above and agreeing upon the curricular changes resulting

**SLOA committee:** Rainer Newberry, Sarah Fowell, Elisabeth Nadin, Erin Pettit, Paul McCarthy.

**Student feedback seminar assessment committee:** Rainer Newberry, Sarah Fowell, Mary Keskinen, Elisabeth Nadin, Bernie Coakley, Jochen Mezger, Paul McCarthy

Suggested curricular changes will be voted on by all faculty at our first fall faculty meeting, September, 2016.

Tables referred to in this report can be found at: www.uaf.edu/geology/downloads