

Final

GEOL 1121K - Principles of Geology

Hybrid 2016-2017

Course Description

This course is an introduction to the study of solid earth systems, particularly plate tectonics and its implications. The importance of the rock cycle, earth materials, and geologic time will also be emphasized. Prerequisite: READ 0098, unless exempt.

Program Outcomes/Goals

PO1

Evaluate observations

Students will demonstrate the ability to evaluate observations, inferences, or relationships in works under investigation.

Student Learning Outcomes

SLO1

Recognizing and analyze evidence for plate tectonics

Students will recognizing and analyze the evidence for plate tectonics.

Supported Initiatives

Standards (2)

SACSCOC 2012 Principles of Accreditation*: 3.3.1.1 educational programs, to include student learning outcomes

SACSCOC 2012 Principles of Accreditation*: 4.1 The institution evaluates success with respect to student achievement consistent with its mission. Criteria may include: enrollment data; retention, graduation, course completion, and job placement rates; state licensing examinations; student portfolios; or other means of demonstrating achievement of goals. (Student achievement)

General Education (1)

5: Quantitative Skills - Students will demonstrate an understanding of data presented graphically or mathematically.

Institutional Priorities (0)

Strategic Initiatives (3)

Mission/Core Commitments: 1 Dalton State College provides a diverse student population with opportunities to acquire the knowledge and skills necessary to attain affordable baccalaureate degrees, associate degrees, and certificates and to reach their personal and professional goals.

Strategic Plan, 2016-2019 Goals: 2 Academic Excellence: Dalton State College will develop and maintain a culture of academic and teaching excellence among faculty and staff while creating optimal opportunities for student academic excellence.

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Action Plans for Improvement

Action Plans for Improvement Description

This action plan addresses the problems students had on Questions 2 and 3 of the post test. These questions are about plate tectonics and the evidence that supports it. Students did not understand the relationship between magnetic anomalies and seafloor spreading. Also, they could not correctly identify the process that occurs at each plate boundary. The plan to improve student comprehension of these topics involves the online quizzes students take each week. Up to now, each quiz has focused solely on the topic we covered that week in class. I have increased the number of questions on these quizzes. The extra questions will be review questions related to topics students had trouble with on the post test. More exposure across the semester to the correct concept will hopefully cement student understanding and their retention of material covered earlier in the semester. The target will remain the same.

Due Date

May 01 2017

Status

Planned

Measures

M1

Questions 2 and 3 on pre/post test

Question 2 states: This picture is of the magnetic anomalies on the sea floor. Choose the most accurate statement about what this picture tells us about the anomalies and the process of sea floor spreading. Question 3 states: Give the three types of plate boundaries and the process that occurs at each.

Methodology

Multiple choice question

Source of Evidence: Pre/post test

Target

Students will answer questions correctly on post test.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
70% of students will answer both questions correctly on the post test.	49% answered both questions correctly.	The previous action plan called for rewriting the post test question answer selections and to encourage students to read all five choices carefully before choosing an answer. The questions were rewritten to eliminate some ambiguity. This was not a successful plan. Students did not do any better on these questions, particularly Question 2. The action plan for the future will be much more proactive.	Course Revision: Revised existing course or courses, added assignment, modified assignment, modified content of course, changed textbook, etc.	Not Met

Analysis of Finding and Evaluation Results

A. The percent of students who achieved the target was 49%. There were 53 students in two sections of this class, 27 in one and 26 in the other. Three students in one section failed the course, mostly because they stopped coming to class. Two students in the other section failed by not coming to class. B. The percent of students who

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
	<p>did not achieve the target was 51%. C. The class average on the questions was 56%. D. The weaknesses in this measure came mostly from Question 2 in Section 3. Only 10 out of 25 students who took the post test in Section 3 answered the question correctly, compared with 15 out of 24 students in Section 2. Interestingly, in both sections, when students chose the wrong answer, it was frequently the same wrong answer. Students have quite a strong misconception that because magnetic anomalies are imprinted in the seafloor as a result of seafloor spreading, they imagine that seafloor spreading causes the reversals or that the reversals cause seafloor spreading. E. The strengths on the measure were limited. Again, where students selected the wrong answer, they usually chose the same wrong answer. Neither section did well on both questions. F. The previous action plan called for rewriting the answer choices for the questions and giving explicit directions to read all the answers carefully. I guess you can say it all you want, but it doesn't mean students are going to do it. For the future, I have decided one way to address this is to give them more practice on these concepts with more questions on the online quizzes.</p>			

SLO2

Structure of the Earth

Students will demonstrate an understanding of the structure and composition of the Earth.

Supported Initiatives

Standards (2)

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General Education (1)

10: Science, Math, and Technology - Students will demonstrate the ability to evaluate observations, inferences, or relationships in works under investigation.

Institutional Priorities (0)

Strategic Initiatives (3)

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Action Plans for Improvement

Action Plans for Improvement Description

The same action plan as described above for SLO 1 will apply for SLO 2. Online quizzes will be modified to reiterate the structure of the Earth over the entire semester so students get more practice on the concept after we have finished with it in lecture. The target will remain the same.

Due Date

May 01 2017

Status

Planned

Measures

M1

Question 1 on post test

Question 1 states: When we slice open the Earth we see different layers. What are the layers shown here?

Methodology

Multiple choice question

Source of Evidence: Source Of Evidence for Academic Direct

Target

Correctly answer post test question

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
80% will answer correctly	71% of students answered the question correctly.	The previous action plan was to encourage students to read all the answer choices carefully before choosing an answer. That was not sufficient to help students achieve the target. Therefore, as explained in the action plan for SLO 1, I will modify the online quizzes.	Course Revision: Revised existing course or courses, added assignment, modified assignment, modified content of course, changed textbook, etc.	Not Met

Analysis of Finding and Evaluation Results

A. The percent of students who achieved the target was 71%. There were 49 students who took the post test in two sections. B. The percent of students who did not achieve the target was 29%. C. The average was 71%. D. The weakness on the question was that many students choose the same wrong answer. It is easy to see why they chose that answer. The question asks students to identify the layers of the Earth. Many incorrectly chose the answer that made the crust part of the dynamic Earth. I stressed over and over that the lithosphere includes both crust and upper most mantle, so it is easy to see why they put crust with the dynamic layers. It is an unfortunate sort of confusion because they are right on one level! E. The strength was that the majority did choose the right answer. F. The new action plan will be to include more questions about the layers of the Earth on the weekly online quizzes students take.

SLO3

Connection of rock cycle to plate tectonics

Students will connect plate tectonics to the rock cycle and geomorphic features of the earth

Supported Initiatives

Standards (2)

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General Education (1)

10: Science, Math, and Technology - Students will demonstrate the ability to evaluate observations, inferences, or relationships in works under investigation.

Institutional Priorities (0)

Strategic Initiatives (3)

Mission/Core Commitments: 1 Dalton State College provides a diverse student population with opportunities to acquire the knowledge and skills necessary to attain affordable baccalaureate degrees, associate degrees, and certificates and to reach their personal and professional goals.

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Action Plans for Improvement

Action Plans for Improvement Description

The action plan previously called for spending more time in class going over this concept. I have done so, but students still are not getting it. Instead of just using the picture in the class notes and explaining it, I will diagram the process so students have something to put in their notes for when they study.

Due Date

May 01 2017

Status

Planned

Measures

M1

Essay question on final exam about plate tectonics and rock cycle

Question states: Describe the relationship between plate tectonics and the rock cycle. Be sure to be specific about how all three types of rocks are created by plate tectonics.

Methodology

Essay question

Source of Evidence: Source Of Evidence for Academic Direct

Target

Score on essay question on final exam.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
The target will be 70% or more will score 60% or better on the essay question	46% of students scored 60% or more on the essay question.	The last action plan called for spending more time in class going over the connection between plate tectonics and the rock cycle. Honestly, I spent a lot of time on this!	Course Revision: Revised existing course or courses, added assignment, modified assignment, modified content of course, changed textbook, etc.	Not
		But I think that it requires more than just words. Actual diagrams would probably help cement the idea in students' minds and help them study for this.		Met

Analysis of Finding and Evaluation Results

A. The percent of students who achieved the target was 46%. There were 50 students who took the final exam. B. The percent of students who did not achieve the target was 54%. C. The average score was 45.8%. D. The weakness on the measure was that students did not write complete answers. Most students wrote partial answers that addressed part of the rock cycle and its relation to plate tectonics. Most obviously, the students did not connect sedimentary rocks rocks very well. E. The strength on the measure was that most students were well aware of the connection, even if they could not give details.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
		had spent a great deal of time in class over the semester trying to impress upon students how important this concept was, but apparently it was not yet enough. F. The weakness of this measure suggests that even more time be given during our study of Chapter 11 where this is covered in making sure that the complete rock cycle is connected to plate tectonics. Producing a diagram on the board that students will copy in their notes might make them study this in more detail.		

PO2

Utilize models and concepts to solve problems

Students will utilize appropriate models, systematic methods, and concepts such as the scientific method to solve problems.

Student Learning Outcomes

SLO1

Classify and identify rocks and minerals

Students will classify and identify common rocks and minerals and explain how they form.

Supported Initiatives

Standards (2)

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General Education (1)

9: Science, Math, and Technology - Students will utilize appropriate models, systematic methods, and concepts such as the scientific method to solve problems.

Institutional Priorities (0)

Strategic Initiatives (3)

Mission/Core Commitments: 1 Dalton State College provides a diverse student population with opportunities to acquire the knowledge and skills necessary to attain affordable baccalaureate degrees, associate degrees, and certificates and to reach their personal and professional goals.

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Action Plans for Improvement

Action Plans for Improvement Description

The difficulties students are having on the assessments having to do with rocks will require two different action plans. The first relates to the rock quiz. The previous action plan called for a mandatory review period during the lab on metamorphic rocks. In the future, I will give students a time at which they are allowed to leave after they finish the metamorphic rocks. If they leave earlier, they will get a point reduction on the metamorphic rock lab. The target will remain the same. The second relates to the questions on the post test covering the rocks. I will increase the number of questions on the weekly online quizzes students take. Some of these questions will address the misconceptions students have, particularly about foliation in metamorphic rocks.

Due Date

May 01 2017

Status

Planned

Measures

M1

Rock Quiz

Students will identify rocks in a lab practical.

Methodology

Lab practical

Source of Evidence: Laboratory Work

Target

Score on rock quiz

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
90% will score 60% or better on the rock quiz	62.7% achieved the target.	<p>The previous action plan called for students to spend time after the metamorphic rock lab in reviewing the igneous and sedimentary rocks. There is always plenty of time to do this as the metamorphic rocks don't take much time. I explicitly told students they had to spend at least 10 minutes reviewing the rocks before they left. Many spent a few minutes (not 10) but some just ignored me and left the lab room. Some did come to my office to review the rocks, but oddly, those who did so did not do as well on the rock quiz as I expected. This extra review usually results in a higher grade. In the future, I will have find a way to make the mandatory review actually mandatory.</p>	Course Revision: Revised existing course or courses, added assignment, modified assignment, modified content of course, changed textbook, etc.	<p>Not Met</p>

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
<p>Analysis of Finding and Evaluation Results</p> <p>A. The percent of students who achieved the target was 62.7%. There were 51 students in two sections who took the rock quiz. B. The percent of students who did not achieve the target was 37.3%. C. The average on the rock quiz for the two sections was 64.6% D. The students did not do particularly well on the rock quiz, but section 2 scored higher (average 69.9%) versus Section 3 (average 59.4%). Section 3 has a higher than usual number of students who had difficulty the entire semester and habitually scored lower than the other two sections on almost every assignment. They had many difficulties in labs, often because they did not pay attention in lecture. This was certainly not true of every student, but as a whole they were a lower performing group of students. E. The strength of the measure was that Section 2 scored rather well, 72% of the students achieving the target. F. The previous action plan called for a mandatory study/review period in the lab before the rock quiz lab. Students did not always follow my instructions on what to do. It was also hard to have enough rock sets for everyone to study the rocks from previous labs. I will have to make "mandatory" more strict.</p>				

M2

Questions 5, 7, and 8 on post test

Question 5 states: Describe the difference between granite and basalt in terms of their texture and composition. Question 7 states: Describe the difference between how sandstone forms and how limestone forms. Question 8 states: Describe how foliated rocks form.

Methodology

Multiple choice exam

Source of Evidence: Source Of Evidence for Academic Direct

Target

Scores on questions on post test

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
70% of students will answer these three questions correctly.	36.7% achieved the target.	The action plan for last year was to add one quiz question about how foliation forms to the online quiz for Chapter 8. This was done, but it does not seem to have helped enough to dispel the misconception that heat is needed to produce foliation in metamorphic rocks. I will add more questions to the online quizzes as described above.	Course Revision: Revised existing course or courses, added assignment, modified assignment, modified content of course, changed textbook, etc.	Not Met

Analysis of Finding and Evaluation Results

A. The percent of students who achieved the target was 36.7%. There were 49 student who took the post test in two sections. B. The percent of students who did not achieve the target was 63.3%. C. The average on the two questions was 47.6%. D. The real weakness on this measure was Question 8 about metamorphic rocks. Many students chose the wrong answer that both heat and pressure were required to produce foliation in metamorphic rocks. In Section 3, only 7 out of 25 students chose the correct answer. In Section 2, only 11 out of 24 students chose the correct answer. This points to a major misconception about foliation in metamorphic rocks. E. The strength of this measure was in Section 2. They performed better than Section 3. Again, as stated earlier, Section 3 had difficulties all semester long. Section 2 scored substantially higher on most assignments. F. The misconception on foliation appeared last year in the post test. I added a quiz question to the online quiz for Chapter 8, but this was clearly not enough. I will use the online quizzes to make sure students get more exposure to this concept.

SLO2

Natural hazards

Students will Interpret natural hazards in the context of plate tectonic activity.

Supported Initiatives

Standards (2)

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General Education (1)

9: Science, Math, and Technology - Students will utilize appropriate models, systematic methods, and concepts such as the scientific method to solve problems.

Institutional Priorities (0)

Strategic Initiatives (3)

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Action Plans for Improvement

Action Plans for Improvement Description

There are a number of actions needed to address the problems associated with this SLO. First, there is the problem with question 9 on the post test. Too many students were confused about shape versus position. I will address this in two ways. First, I will demonstrate the elastic rebound theory with a rubber band the way I used to. I gave it up because I

Due Date

May 01 2017

Status

Planned

thought the animations we saw in class were sufficient. The demonstration with the rubber band is very graphic and I think will help dispel the misconception. Also, I will include more review questions about the elastic rebound theory on the new online quizzes. Second, when it comes to the volcano lab, all I feel I can do is be more explicit about what is in the grading rubric that can help students. Instead of just introducing it, I will talk them through some of the common errors and suggest they seek help from me or the Writing Lab for help.

Measures

M1 Questions 6 and 9 on post test

Question 6 states: Why do some volcanoes tend to be dangerously explosive and others are not? Question 9 states: Describe the elastic rebound theory.

Methodology

Multiple choice questions

Source of Evidence: Source Of Evidence for Academic Direct

Target

Scores on post test questions 6 and 9

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
80% of students will answer both questions correctly on the two post test questions about natural hazards.	61.2% answered both questions correctly.	The previous action plan was to rewrite the questions to remove some ambiguous language. It seems to have helped on the volcano question, but not entirely on the earthquake question. I will have two plans to address these separate problems.	Course Revision: Revised existing course or courses, added assignment, modified assignment, modified content of course, changed textbook, etc.	Not Met

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
<p style="text-align: center;">Analysis of Finding and Evaluation Results</p> <p>A. The percent of students who achieved the target was 61.2% There were 49 students who took the post test in two sections. B. The percent of students who did not achieve the target was 38.8%. C. The class average was 64.3%. D. The weakness on the measure was on question 9 about the elastic rebound theory. Many students were confused whether the shape or the position was the same after the earthquake. I was surprised by this confusion. I thought the animations we watched made it very clear that shape rebounds, but the fault moves. E. The strength was the number of students who correctly identified the type of volcano/lava that produces explosive eruptions. There was still some confusion, but lower than previously because the question had been rewritten. F. The confusion on the earthquake question suggests that I need to start using rubber bands again to demonstrate elastic rebound theory. I thought the animations were sufficient, but clearly they are not.</p>				

M2

Volcano Lab

Students will watch a video on a volcanic eruption and write an essay on the ways in which volcanologists predict eruptions.

Methodology

Essay

Source of Evidence: Source Of Evidence for Academic Direct

Target

Score on volcano essay.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
70% of students will score 80% or higher on the volcano essay.	71.7% scored 80% or higher.	The previous action plan called for a new rubric. I modified the rubric grading scale. But I also included some hints on mistakes I commonly see. I introduced the rubric in class the day the volcano lab was assigned. However, the large number of recurring errors means students did not use it or they did not understand how to write correctly to avoid these errors. Some of the worst problems were with ESOL students.	Course Revision: Revised existing course or courses, added assignment, modified assignment, modified content of course, changed textbook, etc.	Met

Analysis of Finding and Evaluation Results

A. The percent of students who achieved the target was 71.7%. There were 46 students who completed the assignment in two sections. B. The percent of students who did not achieve the target was 28.3%. C. The average was 85.4%. D. The weakness was in the number of students who did not turn in the assignment. In one section, four students did not turn in the assignment. In the other section, three students did not turn in the assignment. One student got a zero for the assignment because she copied the text of a web page. The statistics for the average include this grade. Another weakness was in the grammar of the submitted work. I have tried repeatedly to get students to take this assignment seriously as a writing exercise. I gave them a new rubric with an explanation of some of the most common errors I see, but I still read paper after paper with the same mistakes over and over. Although I introduced the rubric and encouraged them strongly to look at it while writing their papers, clearly many of them did not. E. The strength of the measure was the high scores of many of the students. Some were excellent examples of what I was looking for. F.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
Given the fact that the students did not use the rubric as I had hoped, will have to make more of a point in the future about what is actually on the rubric.				
